College Entrance Examination Board
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7/14/2016

Arizona School Accountability Components & System

prepared for

Arizona Department of Education

Respondent Organization

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July 14, 2016

State of Arizona Department of Education
1535 W. Jefferson Street
Phoenix, AZ 85007

Regarding: RFI No.: ADED16-0002 Description: Arizona School Accountability Components & System

Via Online Submission

To Whom It May Concern:

The College Board is pleased to submit information for *School Accountability Components & System* in response to the Arizona Department of Education's (ADE) request.

The College Board has significant experience collaborating with school districts in Arizona and is uniquely positioned to provide all students and educators with the tools and resources they need to connect students to college success and opportunity.

To meet ADE's needs, the College Board is providing information on the following products and services: SAT®, PSAT/NMSQT®[1], PSAT™ 10, PSAT™ 8/9.

We are confident that ADE will recognize the College Board's expertise in the areas referenced in this Request for Information.

We look forward to working with you on this important endeavor.

*NOTE: Pricing for professional development does not include facility rental, catering, or permit fees. Cancellation or rescheduling of scheduled workshops must occur no later than 30 days prior to the first day of the scheduled workshop(s) to avoid payment to the College Board for costs incurred to reschedule the workshop, including consultant fees, materials costs, and other expenses incurred prior to the cancellation/rescheduling request. Cancellations or rescheduling caused by a Force Majeure will not incur expenses.

The College Board will engage subcontractors to furnish certain services and deliverables.

The included prices for College Board tests, services and deliverables are based on the proposed prices for the 2016-17 school year. Any references to prices for subsequent years are solely for projection purposes and may be subject to change based on the College Board's then-current costs, policies and procedures. ACCUPLACER pricing is subject to change and should it change during the term of this agreement, the participating institutions will pay the ACCUPLACER state approved cost available at the time of the participating institutions purchase ACCUPLACER.

[1] PSAT/NMSQT is a registered trademark jointly owned by the College Board and the National Merit Scholarship Corporation, and should be so noted in all communications.

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If the College Board is selected to furnish goods and services for this RFP then the aforementioned College Board's programs, services, exams and data shall be provided in accordance with the College Board's current standard terms, conditions, policies and procedures, including without limitation, provisions on the licensing of College Board intellectual property and data.

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Request for Information

State of Arizona
Department of Education
1535 W. Jefferson Street
Phoenix, AZ 85007

RFI No.: ADED16-0002
Description: **Arizona School Accountability Components & System**

PLEASE COMPLETE THIS FORM AND SUBMIT THE COMPLETED FORM WITH YOUR RESPONSE TO THE RFI.

I/We The College Board the undersigned, do hereby submit this response for information with regard to Arizona's Statewide School Accountability System in accordance with ARS §41-2555 Request for Information specification contained herein.

Jeremy Singer
Name

July 13, 2016
Date

College Entrance Examination Board,
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CollegeBoard

Arizona School Accountability Components & System

Executive Summary

At the center of the national and local conversations regarding education is the ability of K-12 schools to prepare students to succeed in their post-secondary pursuits either as members of academic institutions (e.g. colleges, universities, community colleges) or the workforce. Based on our long history of providing guidance and services to colleges and high schools, the College Board is in a unique position to advise the State of Arizona Department of Education (ADE) on how to assess students and incorporate the results of college and career readiness assessments and supports (such as Advanced Placement® (AP) courses) into Arizona's (AZ) accountability system.

A Review of Existing Initiatives and Legislation

Every Student Succeeds Act (ESSA)

The federal Every Student Succeeds Act (ESSA), signed into law in December 2015, shifts considerable power back to states and local districts. This transition presents an opportunity for states to redesign their accountability systems to focus on the indicators that matter most for students.

Currently, in many states, test scores and graduation rates continue to be the most prominent factors in high school accountability, but these indicators cannot fully capture what it means to be "college and career ready." Under ESSA, states will be required to include test scores, graduation rates, and English-language proficiency—but also one additional indicator that can meaningfully differentiate school performance. The additional indicator can include access to and completion of advanced coursework or postsecondary readiness.

What does College and Career Readiness accountability look like across the country?

- ***28 states include college- and career-ready (CCR) indicators in their state accountability systems***[1]
  CCR indicators include various measures such as participation and performance on college-entrance exams, advanced coursework, and percentage of students earning industry certifications. In addition, a small number of states measure enrollment rates into postsecondary institutions and college remediation rates.

[1] Idaho previously included College and Career Readiness indicators in accountability, but has suspended its accountability model.

- ***5 states use the SAT® as the high school federal accountability test***
  In these five states, the SAT is given as a statewide assessment for federal accountability purposes. Research shows that when Maine replaced its high school statewide assessment with the SAT it increased 4-year college-going rates among Maine public high school graduates by at least 2-3 percentage points overall, and by 10 percentage points among those students who took the SAT only because it was made universal.

  An additional 19 states do not use the SAT or ACT as their high school assessment but do include participation and/or performance on a college-entrance exam as a separate CCR indicator in accountability. (Colorado will begin administering the SAT in 2017 and will most likely switch their indicator from ACT to SAT.)

- ***18 states include participation and/or performance in Advanced Placement (AP) in their state accountability systems***
  Evidence from Florida indicates that including AP in accountability can have an impact on participation, especially among minority and low-income students and in low-performing schools.[2] Including AP participation and/or performance in accountability encourages schools to focus on expanding access to these rigorous courses.

  AP provides high school students with the opportunity to save time and reduce college costs through placement and credit-granting policies offered by thousands of colleges and universities nationwide. Research consistently demonstrates other important ways that AP propels students into postsecondary opportunities and success:

  - AP examinees are more likely to enroll in a four-year institution compared with similar students who do not take any AP Exams;[3]
  - AP examinees are more likely to persist and graduate on-time from college than students of similar academic ability who did not take an AP Exam;[4]
  - AP examinees earning a 3 or higher consistently earn higher GPAs in college than their matched peers;[5]
  - AP examinees are more likely to major in the subject area of their AP Exam or in a related discipline, and that relationship is especially strong for Science, Technology, Engineering, Mathematics (STEM) related fields.[6]

- ***States weigh indicators of college and career readiness***
  States choose to include a variety of indicators and measures in their accountability systems, including proficiency, school growth, student growth, graduation rates, and college and career

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[2] http://www.aefpweb.org/sites/default/files/webform/39th/Gaolatarola2014_HSAccountability_(v01b).pdf

[3] Chajewski, M., Mattern, K. D., & Shaw, E. J. (2011). Examining the role of Advanced Placement® exam participation in four-year college enrollment. *Educational Measurement: Issues and Practice, 30*, 16–27.

[4] Mattern, K. D., Shaw, E. J., & Xiong, X. (2009). *The relationship between AP® Exam performance and college outcomes* (College Board Research Report 2009-4). New York: The College Board. Mattern, K. D., Marini, J. M., & Shaw, E. J. (2013). *Are AP students more likely to graduate from college on time?* (College Board Research Report 2013-5). New York: The College Board.

[5] Mattern, K. D., Shaw, E. J., & Xiong, X. (2009). *The relationship between AP® Exam performance and college outcomes* (College Board Research Report 2009-4). New York: The College Board. Patterson, B. F., Packman, S., & Kobrin, J. L. (2011). *Advanced Placement® exam-taking and performance: Relationships with first-year subject area college grades* (College Board Research Report 2011-4). New York: The College Board.

[6] Mattern, K. D., Shaw, E. J., Ewing, M. (2011). *Is AP Exam participation and performance related to choice of college major?* (College Board Research Report 2011-6). New York: The College Board. Tai, R. H., Liu, C. Q., Almarode, J. T., & Fan, X. (2010). Advanced Placement course enrollment and long-range educational outcomes. In P. M Sadler, G. Sonnert, R. H. Tai, & K. Klopfenstein (Eds.), *AP: A critical examination of the Advanced Placement Program* (pp. 109–118). Cambridge, MA: Harvard Education Press.

readiness. States vary considerably in the weight that they assign to these indicators (for example, some states award bonus points for CCR indicators while in other states these indicators may count for as much as 30% of a school's overall grade). Below are examples of CCR indicators in accountability:

New Mexico

New Mexico's college- and career-readiness measure captures a student's ability to enter postsecondary education or whether a student obtained an industry-recognized certification. High school students are expected to participate in at least one college- or career-readiness program. These activities include:

- Taking college-entrance assessments, such as SAT, SAT Subject Test™, PSAT/NMSQT®[7], or ACCUPLACER®;
- Participating in college-level courses, such as Advanced Placement;
- Obtaining eligibility for an industry-recognized certification.

Texas

In June 2015, the Texas legislature passed HB 2804, a law which updates the state's school accountability system and establishes a Commission to develop and make recommendations for a new assessment and accountability system. The CCR domain outlined under the new law includes 10 different measures of college- and career-readiness, including:

- Dropout rates;
- Graduation rates;
- Percentage of students who successfully completed curriculum requirements for the distinguished level under the foundation high school program;
- Percentage of students who completed the curriculum requirements for an endorsement;
- Percentage of students who completed a coherent sequence of career and technical courses;
- Percentage of students who earn at least 12 hours of postsecondary credit for the foundation high school program or earn an endorsement;
- Percentage of students who have completed an Advanced Placement course.

Nevada

The CCR measure included in the Nevada School Performance Framework (NSPF) reflects the following indicators:

- Percent of students in Nevada colleges requiring remediation;
- Percent of students earning an advanced diploma;
- Percent passing Advanced Placement;
- ACT/SAT participation.

Colorado

The postsecondary and workforce readiness domain in Colorado's School Performance Framework includes measures of graduation rate, disaggregated graduation rate, dropout rate, and score on either the ACT or SAT assessment.

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[7] PSAT/NMSQT is a registered trademark jointly owned by the College Board and the National Merit Scholarship Corporation, and should be so noted in all communications.

How can the College Board support initiatives in Arizona?

As with many of the states profiled previously, AZ is currently assessing the resources needed to provide a quality education to its students and how to measure the state's ability to equitably educate all of students. Through legislation that includes Senate Bills 1289 and 1430, as well as the Department's *AZ Kids Can't Afford to Wait!* Report, the state has put forth the following recommendations:

- Reduce the amount of standardized testing in schools;
- Create an A-F letter grading system that, at a minimum, reflects each school's progress toward college and career readiness for all high schools;
- Create an accountability system that focuses on a wide variety of indicators, including a school's ability to provide Advanced Placement (AP) or other Career and Technical Education options;
- Create guidance for advanced mathematics courses including, but not limited to, Pre-Calculus, Advanced Statistics, Trigonometry, Calculus, and Qualitative Reasoning, for use by schools and districts statewide;
- Support all students in obtaining their desired career goals.

These recommendations are closely aligned to The College Board's core competency of preparing students for successful transition to college through programs and services in college readiness and college success. The College Board believes that our suite of assessments and instruction products can support AZ in the following ways:

- In 2015, 21,545 students voluntarily took the SAT as a college entrance examination in addition to their AZ Merit summative assessment. This number includes over 5,000 students who self-identify as Hispanic or Latin American[8] and over 2,000 students whose first language is not English. By adopting the SAT suite (i.e., PSAT 8/9, PSAT/NMSQT, SAT) as the state's summative assessment in grades 8-11, ADE will not only reduce the number of assessments administered in high school, but will provide a vertical articulation of college readiness. The SAT suite:
    - Measures the English language arts and math **skills students learn in classrooms that evidence shows matter most in college and career success**, including problem solving in the contexts of science and social science passages;
    - Provides a **vertical articulation of college readiness when used in conjunction with the PSAT/NMSQT®, PSAT 10, and PSAT 8/9**; all tests measure the same constructs, use the same question formats, and report test results on a common scale;
    - Meets and exceeds **the security, reliability, and validity** requirements of students, schools, states, and higher education institutions, and exceeds the standards set forth in the Standards for Educational and Psychological Testing;
    - Supports **accessibility** with a broad set of accommodations for students with disabilities;
    - Supports English Language Learners by providing **translated test taking instructions** on the exam.
    - Offers **complete transparency** with access to test specifications and sample items, available at https://collegereadiness.collegeboard.org/educators/k-12
    - Offers a **trusted college entrance credential** with the SAT.

[8] This classification includes students who self-identified as Mexican or Mexican American, Puerto Rican, or Other Hispanic, Latino, or Latin American

- ADE educators, administrators and students will have access to our **online, interactive reporting portal and actionable reports**. The College Board has designed these reports to reflect student performance mapped to standards and tied to instruction. Additionally, these reports provide:

    - Research-based CCR benchmarks to help students get and stay on target to be prepared to enter college and career training;
    - Insights into next steps for students for extra support or possible acceleration that informs instructional improvements;
    - Content subscores that can be used to develop focused, personalized practice plans. Reports provide scores in Analysis in History/Social Studies and Analysis in Science, as well as scores that reflect performance in Algebra, problem solving, and data analysis, and advanced math.
    - Data that supports adjustments to curricula and instructional learning through identification of gaps;
    - Guidance for students and families on high school course selection and post-secondary participation;
    - Translated reports and guidance for students and families who are not proficient in English.

- The College Board provides a series of supports and services that ensure students from all backgrounds have access to personalized practice and college and career planning resources.

    - Through our **partnership[9] with Khan Academy**, students can use their SAT and PSAT 10 results to receive **free, interactive, personalized SAT and PSAT/NMSQT study plans.** The Khan Academy practice program is deliberately linked to classroom learning that focuses on reviewing and filling knowledge gaps students may have developed.
    - **Big Future,** a web-based college- and career- exploratory tool, provides individualized online college- and career-planning, including intelligent search-and-match tools and informative videos. The free site has more than 35 million unique users each year.
    - Taking the SAT automatically qualifies low-income students for the **Realize Your College Potential program**, a national movement to help every student prepare for and succeed in college and career opportunities. One feature of this program is **four college application fee waivers (CAFW) given to low-income students who take the SAT.**
    - To raise rigor and expand participation in advanced academic courses, the free, research-based **AP Potential™ Online Tool** identifies students with the potential to succeed in AP courses.
    - The College Board's **Access to Opportunity™** works to identify and break down barriers that prevent students – particularly low-income, first-generation, rural, African American, Latino, and Native American students — from taking challenging course work and applying to, enrolling in, and succeeding in colleges that are the best personal fit.

- In addition to the SAT suite of assessments, the following services are available to Joint Technical Education Districts (JTEDs) and Career and Technical Education (CTE) programs across the state:

    - **ACCUPLACER**, used in all 21 community colleges in AZ as well as at Northern Illinois University and Arizona State University, is an online placement assessment that helps students identify their strengths and needs in subject areas which include arithmetic,

[9] References to "partner" or "partnership" in the College Board's response are not meant to refer to a partnership in the legal sense. Neither of the parties mentioned can obligate or speak for the other. Instead, as used in this response, the term should be read to mean services provided by one of the referenced parties to the other.

college-level math, elementary algebra, reading comprehension, sentence skills, written essay, and English as a second language.
  - **Advanced Placement (AP) courses that benefit students in schools throughout the state, including those pursuing degrees in JTEDs and CTEs**, include AP Computer Science, AP Computer Science Principles, AP Environmental Science, AP Physics C: Electricity and Magnetism, and AP Physics C: Mechanics.

The College Board looks forward to providing continuing guidance to ADE as it develops its accountability system.

Information Being Requested:

1. Demonstration of values

Question 3 includes a set of research-based indicators that the College Board believes ADE should consider when creating an accountability system. It is important to note that these indicators are not solely based on the assessment results of particular students or school populations, since the excellence or failure of a school or a student cannot be determined based solely on assessment performance. Assessment must do more than simply provide a score or a ranking; it must become a force that helps deliver opportunity when education professionals select and utilize the appropriate academic supports, such as those listed below. It is the responsibility of the school to provide equitable access to these opportunities and the responsibility of each district to ensure that their schools have the resources needed to succeed.

- **Differentiated instructional support:** A student's assessment score should represent the likely knowledge, skills, and understandings the student possesses. Each school should have access to well composed score reports that provide numerical and content-based interpretations of student performance that not only define what students know and can do, but also help students and teachers identify strengths and needs to inform instruction and increase student achievement.

- **Equitably delivered resources**: The internet allows for distribution of resources and support to schools in urban, suburban and rural areas. It is the responsibility of the schools and districts to ensure that resources delivered remotely or in person are available to everyone. The College Board is dedicated to ensuring all students have equitable access to resources that will support their postsecondary success. This mission has resulted in the following:

  - The creation of free online resources such as interactive, personalized SAT and PSAT/NMSQT study plans;
  - Partnership with Khan Academy to provide a free differentiated practice solution to all students;
  - Partnership with state education agencies to develop innovative ways for students to access a variety of AP programs.

  The College Board will work with the ADE to develop a program that ensures all students have access to the academic support they need to succeed after graduation.

- **Individualized college and career planning**: In addition to providing equitable access to academic support it is important to provide all students who are interested in pursuing higher education the

information they need to enroll in a college that is a good fit academically, socially, and financially. To do this, students must have the information necessary to explore the full range of college options. Research shows that:

- Low-income students tend to apply to fewer colleges than higher-income students with similar academic records;
- Low-income students apply to far fewer colleges that fit their academic performance than their higher-income peers;
- Sending customized college information directly to these students encourages them to apply to a wider array of colleges and universities.

As noted in the executive summary, the College Board provides a variety of programs to help all students enroll in and succeed in colleges that are the best personal fit. ADE is encouraged to take advantage of the College Board's resources and create additional resources that will meet the needs of AZ students as they create and refine their Education and Career Action Plans.

a) How does a transparent and fair accountability system define an "excellent" school in regards to:

i. Preparing all students for College/Career readiness

An analysis of data culled from SAT test takers and determined that **when students are prepared, they enter college, persist, and complete at much higher rates than those who are not prepared.** Studies show that students who meet the SAT College and Career Readiness Benchmark are more likely to enroll in a four-year college, more likely to earn a higher first-year GPA (FYGPA), more likely to persist beyond the first year of college, and more likely to complete their degree than their peers who did not meet the benchmark.

Those students who met the SAT College and Career Readiness Benchmark had a number of critically important academic characteristics that must be shared by all students if AZ is to make meaningful gains in educational attainment. Below are highlights of the characteristics of these students to help demonstrate successful patterns that can be replicated in schools and districts throughout AZ, and which are currently in place at schools that are considered to be "excellent" at preparing students for College/ Career readiness:

- Students who met the SAT College and Career Readiness Benchmark were more likely to have completed a core curriculum, which is defined as four or more years of English, three or more years of mathematics, three or more years of natural science, and three or more years of social science and history. However, of the students who completed a core curriculum (75 percent), only 49 percent met the SAT Benchmark, indicating a need for more rigorous core courses;
- Students who met the SAT College and Career Readiness Benchmark were more likely to have taken honors or AP courses, more likely to have taken higher-level mathematics courses (e.g., pre-calculus, calculus, and trigonometry), and more likely to be in the top 10 percent of their high school graduating class than their peers who did not meet the SAT Benchmark.

ii. Improving achievement and outcomes among student subgroups

The number of AZ students who opt to take the SAT represents a diverse population – 10% of students self-identify their first language as one that is not English, while 25% of students self-identify

as being Latin American or Hispanic[10] In addition to providing data-driven differentiated intervention and remediation to all students, "excellent" schools must provide access to rigorous coursework, especially to underrepresented minority students. The College Board's research has found that in recent years an increased number of minority students have opted to take college entrance exams and have met benchmark scores[11]. While gains in SAT participation by underrepresented minority students are encouraging, there continue to be striking differences in academic preparation among these groups that directly impact college readiness. These students, who often lack access to rigorous course work such as AP in high school, are also less likely to complete a core curriculum and less likely to report a GPA equivalent to an A. To have any hope of achieving breakthrough increases in the number of AZ students who are prepared for college and careers, all schools must address the challenges these students face.

To support schools in identifying students who are prepared to partake in higher level coursework, the College Board created AP Potential™, an educational guidance tool that uses PSAT/NMSQT scores to identify students who have the potential to do well on one or more Advanced Placement® (AP) Exams. An "excellent" school will use this information to encourage identified students to pursue higher level coursework. Based on available data on AP Potential there were over 4,800 Arizona students in the graduating class of 2015 who demonstrated the potential to be successful in an AP subject but did not have the opportunity to take the exam. The College Board will work with ADE to help all schools in supporting students identified through AP Potential.

iii. Graduating students prepared for postsecondary workforce and/or education

To accelerate the trend toward postsecondary achievement, a larger proportion of high school students will need to graduate from high school prepared for the challenge of college-level work or career training programs. This will require students to engage in an effective college-preparation process early. This process should include a system that allows students to exhibit their knowledge, skills, and abilities as they relate to college and career readiness and monitor whether they get on target and stay on target for postsecondary success. "Excellent" schools have systems in place that help students engage in the college-preparation process early and monitor their progress toward college and career readiness. In this way, parents and practitioners can identify students who are not on target for college and career success and intervene in a timely manner to get them on target to succeed.

"Excellent" schools recognize what is truly required for postsecondary readiness and success. College Board research, which includes insight from over 2,000 different representatives from higher education institutions and K-12 educators from across the country, indicates that postsecondary readiness and success includes the following attributes:

- Students who focus on learning fewer, more important things in depth have a stronger foundation on which to build when they proceed to college and career. This kind of clarity in instruction, centered on the essentials of college and career readiness, is a hallmark of classrooms and teachers that dramatically impact achievement and prepare students for college and career success.
- Students who take rigorous courses as part of their k–12 education are much more likely to be ready for and succeed in college and workforce training programs than are students who don't take rigorous courses.

[10] This percentage includes students that identify as Mexican, Mexican American, Puerto Rican or Other Hispanic, Latino, or Latin American

[11] http://media.collegeboard.com/homeOrg/content/pdf/sat-report-college-career-readiness-2013.pdf

- Students who fall behind academically need early, productive interventions that help them develop academic and noncognitive skills needed to succeed.
- Students who are prepared for postsecondary education must be made aware of and empowered to take advantage of the opportunities they've earned.

We know from our work with higher education as well as from other sources that there is a critical set of knowledge, skills, and understandings that disproportionately predicts student success in college and workforce training programs. Based on a wealth of evidence about essential prerequisites for student success in postsecondary education, we conclude that students must be able to:

- Read, analyze, and use reasoning to comprehend challenging literary and informational texts, including texts on science and history/social studies topics, to demonstrate and expand their knowledge and understanding;
- Revise and edit extended texts across a range of academic and career-related subjects for expression of ideas and to show facility with a core set of grammar, usage, and punctuation conventions;
- Show command of a focused but powerful set of knowledge, skills, and understandings in math and apply that ability to solve problems situated in science, social studies, and career-related contexts;
- Make careful and considered use of evidence as they read and write;
- Demonstrate skill in analyzing data, including data represented graphically in tables, graphs, charts, and the like, in reading, writing, and math contexts; and
- Reveal an understanding of relevant words in context and how word choice helps shape meaning and tone.

The ELA/literacy and mathematics knowledge, skills, and understandings identified by this evidence are the building blocks for all of the complex and integrated work that students will do in college and career, whether that is developing and presenting an argument about the causes of the Civil War for their U.S. history course, designing and implementing a lab experiment to test a hypothesis about gene mutations for their biology class, analyzing a master painter's work for their studio art course, drafting a business plan for a start-up company, or creating computer code that will automatically answer simple questions for a local business.

iv. Demonstrating growth on standardized assessments aligned to Arizona's standards

The College Board believes that growth metrics on standardized assessment scores must be evaluated in conjunction with other indicators when evaluating the performance of a school. Our assessments, as well as the assessments of other providers, can provide limited insight into all of the different factors that contribute to excellence in a school or classroom. In response to question 4, we provide information on how our assessments can be used to determine student growth. The College Board can work with Arizona to provide technical assistance and support to balance our assessment and other programs into factoring growth as an indicator of school excellence or failure.

v. Providing a high-quality, well-rounded education to families regardless of income

In response to question 4, we provide information on the different resources the College Board provides to low income students to help them accomplish their post-secondary education goals. College Board programs are available to all schools and we will work with ADE to increase awareness among families in AZ. In our experience, "excellent" schools have systems in place to identify students who will benefit from our resources and provide them with guidance on how to successfully participate in the programs.

Our reporting platform provides educators and counselors with the information they need to support students from different socioeconomic backgrounds. For example, AP Potential identifies students with the potential to succeed in AP classes, and the partnership with Kahn Academy provides free personalized practice resources so that students do not need to pay for expensive test prep services. Furthermore, the College Board can work with the state to devise innovative ways to expand access to AP courses to students throughout the state. In addition to the resources we can provide, we recommend that districts throughout the state help distribute information to students in all of their schools to support school efforts to attain "excellence".

vi. Meeting the needs of parents and students in the community

The College Board recognizes the importance of parent involvement in a student's education and fostering a community that will support the efforts of the local school and school district. To that end, the College Board partners with a variety of community based organizations that are dedicated to supporting families in attaining the resources that will allow them to make educated decisions regarding their student's postsecondary plans. For example, we partner with the Boys and Girls Clubs of America, so that students can utilize SAT practice tools both within the school day and outside of it. The College Board recognizes that many at-risk students do not have access to technology solutions at home and therefore actively invests in leveling the playing field to support these students. An "excellent" school will also foster similar partnerships within their communities to augment the services they currently provide to families. We will gladly partner with ADE to communicate similar opportunities to all schools across the state.

b) How does a transparent and fair accountability system define a "failing" school in regards to:

- **i. Preparing all students for College/Career readiness**
- **ii. Improving achievement and outcomes among student subgroups**
- **iii. Graduating students prepared for postsecondary workforce and/or education**
- **iv. Demonstrating growth on standardized assessments aligned to Arizona's standards**
- **v. Providing a high-quality, well-rounded education to families regardless of income**
- **vi. Meeting the needs of parents and students in the community**

In question 1a, we provide insights on the system components we believe contribute to fostering "excellent" schools. We defer to ADE in determining how an absence of these components will contribute to the definition of a "failing" school.

c) How does a transparent and fair accountability system differentiate among schools that are neither "excellent" nor "failing"?

In question 1a, we provide insights on the system components we believe contribute to fostering "excellent" schools. We defer to ADE in determining how an absence of these components will contribute to the definition of a school that is neither "excellent" nor "failing."

2. Background

a) Provide a brief history of the organization and its governance structure, if applicable, or provide a brief overview of the individual's experience with accountability of K-12 public schools and districts

The College Board is a mission-driven, not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT, the PSAT/NMSQT, PSAT™ 10, PSAT™ 8/9, and the Advanced Placement Program. The organization also serves the education community through research and advocacy on behalf of students, educators and schools.

The College Board is governed by an elected Board of Trustees with guidance from three national assemblies and six regional assemblies. Each member institution appoints delegates to serve on our three national assemblies:

- Academic
- College Scholarship Service
- Guidance and Admission

Representatives share in the governance of the College Board and define its core strengths and values. They provide a direct link between institutions and the College Board. Representatives attend regional and national assembly meetings to give voice to concerns and cast votes on behalf of institutions.

Matters are typically presented to the membership at the annual meeting and include business such as approval of new members and election of College Board Trustees, who oversee a number of Committees and Advisory Panels.

The Board of Trustees maintains the following standing committees:

- Executive Committee
- Committee on Audit
- Committee on Finance
- Committee on Human Resources and Compensation
- Committee on Membership
- Committee on Nominations
- Investment Subcommittee

Trustees are typically appointed to one of these committees after their first year of service.

The Board of Trustees has also established the advisory panels listed below to provide guidance and additional expertise in specific areas:

- Advisory Council to the Puerto Rico and Latin America Office
- Community College Advisory Panel (CCAP)
- Advisory Panel on Student Opportunity

The Advisory Council to the Puerto Rico and Latin America Office advises the president of the College Board and the vice president of the Puerto Rico and Latin America Office on the work of the College Board in Puerto Rico and Latin America. The council is composed of College Board members from the Commonwealth of Puerto Rico and the United States.

Community College Advisory Panel (CCAP) was established with the goal of better serving community colleges and the majority of students whose access to higher education is through this sector.

The Advisory Panel on Student Opportunity provides the key perspective of students**.** Composed of secondary school and college students from member institutions, these students advise the College Board on the social, economic, public policy and educational effect of our programs and services.

High School Accountability – A Shift to Opportunity and College/Career Readiness
The SAT Suite of Assessments has been designed to measure the content and skills that research shows to be essential for college and career readiness and success – those same skills taught in classrooms across the nation and published on College Board's website (URL:), accessible and transparent to teachers, counselors, principals, superintendents, parents and students. Simply, there are no mysteries, no secrets in what the assessments are measuring. Each assessment in the suite is designed to measure the progress students have made since the last assessment, and the tests are scaled in such a way to detect student progress and report it as a simple difference in the scores attained on two subsequent measures. With these assessments as a centerpiece, a number of states are redesigning their accountability systems to focus on delivering opportunities to students. College Board stands ready to work with state leaders to develop such a system right for them.

b) Identify the individuals from the organization that will be working with Arizona officials on all aspects of the accountability system's implementation.

The following table identifies the individuals who will work with Arizona officials on the accountability system's implementation, a summary of their experience, and their general responsibilities.

Table 1: Staff Qualifications and Specifications

Role	Staff Member	Qualifications /Experience	Responsibilities
Chief Assessment Officer	Cyndie Schmeiser	Cyndie has been a leader in assessment design for nearly four decades, serving most recently as the president and COO of ACT's Education Division. She has served as president of the National Council on Measurement in Education (NCME), as an NCME board member and as chair of several NCME committees, including the committee that developed the NCME Code of Professional Responsibilities in Educational Measurement. Cyndie has published and made numerous presentations on such topics as innovative education reform,	Responsible for all aspects of assessment development, including oversight of the SAT®, PSAT/NMSQT®, ACCUPLACER® and CLEP® programs and the design of next-generation assessments. She also leads our research and assessment development work.

Role	Staff Member	Qualifications /Experience	Responsibilities
		adolescent literacy, the role of assessment in raising student achievement and equity in K–12 education.	
Senior Vice President, Research	Jack Buckley	Extensive background in education research. Jack served as commissioner of the U.S. Department of Education's National Center for Education Statistics where he was responsible for the measurement of all aspects of U.S. education, including conducting the National Assessment of Educational Progress and coordinating U.S. participation in international assessments, including PISA, TIMSS, and PIAAC. He was also a senior technical adviser to Department of Education leadership and co-chair of its Data Strategy team.	Heads the College Board's Research department and is responsible for research across our entire suite of assessments, as well as regarding broader issues in education.
WRO, Regional Vice-President	Scott Hill	More than 25 years of experience in education in the United State and internationally. Scott is the former Undersecretary of Education in California. Extensive expertise in assessments and standards. Executive leadership and oversight of complex implementations and projects.	Responsible for success of overall implementation of project. Primary liaison with College Board Executive Leadership to resolve any issues requiring escalation.
Vice-President Assessment Design and Development	Sherral Miller	Over 25 years of experience overseeing the development of multiple large-scale, national, and state assessment programs, including working closely with multiple states on statewide adoptions of both the SAT and the ACT; From 2008–2010, Sherral worked with ACT, College Board, Achieve, and Student Achievement Partners in developing the Common Core State Standards, an initiative of CCSSO and NGA.	Responsible for overall design, content, and development of assessments.
Executive Director, Business Solutions	Tania Husband	Extensive experience leading the implementation of major project initiatives which span the many projects and services offered by the College Board. Serve as the technology management point for all front end customer engagement activities across state-wide initiatives. Manage the delivery of large scale,	Responsible for the customer requirements elicitation activities and for the successful planning and execution of IT related activities for the project.

Role	Staff Member	Qualifications /Experience	Responsibilities
		cross-functional state and district implementations.	
WRO, Executive Director, K-12	Sandra Williams-Hamp	Over seventeen years of experience managing state and district program implementations, state contracts and unified initiatives and delivering state-wide assessment and district training programs and outreach. Extensive experience managing large district partnerships including LAUSD and Clark County as well as statewide assessment contracts in Oregon, Idaho, Hawaii, and other western states.	Provides management, strategy, and guidance to the implementation team
WRO, Higher Education Executive Director	Kenneth Woods	Over twenty years of experience implementing best practices in Admissions offices regarding the use of standardized test scores for admission and scholarships. A former Director of Regional Offices for the University of Denver.	Responsible for ensuring college enrollment professionals understand the components of the SAT scoring and other data/resources that are used to support college admissions, placement and financial aid decisions.
Executive Director Services for Students with Disabilities (special populations)	Steven Pereira	An attorney with 30 years of experience which includes 25 years in the areas of education (including education of ELL students) and disability. Has headed the College Board's Services for Students with Disabilities unit for ten years and has been responsible for managing accommodation policies and processes for state-wide administrations of College Board assessments.	Manage Services for Students with Disabilities process and policies. Primary point of contact to resolve issues pertaining to accommodations.
Lead Psychometrician, Research	Deanna Morgan	Extensive experience and psychometric knowledge; decision-making authority; Senior Psychometrician supports all College Board assessments as needed, provides psychometric leadership. Over 15 years' experience in educational assessment; manages Standard Setting team within the Psychometric group and advises on psychometric issues. Works with cross functional teams to implement a research agenda to monitor psychometric quality. Presents to AP Technical Advisory Committee on	Guide psychometric decisions; provide psychometric options and recommendations. Participate in TAC meetings; present to a variety of professional and lay audiences including the Arizona TAC, the Arizona State Board of Education, media, and community members.

Role	Staff Member	Qualifications /Experience	Responsibilities
		psychometric work and issues. Represent College Board on Technical Issues in Large Scale Assessment (TILSA) committee for the Council of Chief State School Officers. Fifteen years' experience as proposal reviewer, session chair, and/or session discussant for the National Council on Measurement in Education, American Educational Research Association, Northeast Educational Research Association, Association of Test Publishers, and American Psychological Association	
WRO Director, Arizona Program Manager	David Moniz	Fifteen years of K12 education experience supporting large school districts and state-wide implementation of College Board programs. Experience providing professional development, supporting strategic planning, and using data to inform instructional practice.	Works closely with Project Coordinator and ADE leadership to ensure Project is implemented according to the project plan. Serves as primary liaison to College Board Senior Leadership and manages training, outreach and technical support to districts/schools.

c) Disclose and discuss the organization's work within and around Arizona's state education agency, local education agencies, and/or public education agencies including assurance any work or deliverables produced by the organization will exclude bias or undue influence, if applicable.

The College Board currently partners with multiple Arizona districts and schools in joint efforts to create opportunities for Arizona high school and middle school students. The following districts contract with the College Board to provide the College Readiness Assessments including PSAT/NMSQT and SAT School Day.

- Paradise Valley USD: PSAT/NMSQT (10th)
- Scottsdale USD: PSAT/NMSQT (10th)
- Tucson USD: PSAT/NMSQT (10th and 11th) and SAT School Day (12th)
- Tolleson UHSD: PSAT/NMSQT (10th)

AP Capstone

Seven Arizona High Schools have adopted the College Board's AP Capstone™, an innovative and engaging college-level program for high school students that complements and enhances discipline-specific AP courses. AP Capstone is built on two new courses—AP® Seminar and AP Research—that immerse students in the practice of critical skills needed to distinguish themselves in college and life. AP Capstone is the pinnacle of the high school experience, encouraging a passion for learning and

transforming students into curious, collaborative, and independent thinkers with skills that are valued and sought after by colleges and universities. The high schools shown below may award an AP Capstone Diploma™ to students who earn scores of 3 or higher in both of the AP Capstone courses and on four additional AP Exams of their choosing.

- BASIS Chandler - Chandler, AZ
- BASIS Flagstaff - Flagstaff, AZ
- BASIS Scottsdale - Scottsdale, AZ
- BASIS Tucson North - Tucson, AZ
- Cesar Chavez High School - Laveen, AZ
- Red Mountain High School - Mesa, AZ
- Rio Rico High School - Rio Rico, AZ

AP STEM Access initiative 2012-2014–

Assessment data from the PSAT/NMSQT exam were used to identify several schools with large numbers of female and underrepresented minority students who had high potential for success in AP STEM courses. The College Board secured foundation funding from Google and DonorsChoose so that these schools could launch STEM courses. The College Board provided training and ongoing support for administrators and counselors, while foundation funding covered the costs of textbooks, lab equipment and professional development for teachers.

- Campo Verde High School
- Hamilton High School
- Highland High School
- Horizon High School
- Mesquite High School
- North High School
- Perry High School
- Red Mountain High School
- Sandra Day O'Connor High School
- Westwood High School

Counselor Workshops

Each year the College Board partners with University of Arizona and Mesa Community College to provide free professional development to approximately 100 high school counselors in Arizona. In half-day workshops, the counselors receive training on financial aid, scholarships and fee waivers, and the effective use of student data for placement and guidance.

The College Board assures that any work or deliverables within and around Arizona's state education agency, local education agencies, and/or public education agencies produced by the organization will exclude bias or undue influence.

3. Overview of System

a) List and define the metrics included in a potential accountability system which meets the needs of Arizona's various school types and uses multiple measures. Please highlight the extent to which academic achievement on

Arizona's statewide assessments (i.e. AzMERIT, NCSC, AIMS, etc.) and/or results from a menu of assessment can be meaningfully integrated in the proposed system.

Students need to accomplish a series of concrete steps during high school to graduate well-positioned for postsecondary opportunities and success.[12] Research shows that low-income students who successfully accomplish these steps are much more likely to enroll and succeed in college and, in turn, to propel themselves into social mobility as adults.[13] Yet high school remains a choke point for many low-income teenagers, who fail to complete steps that most affluent families take for granted.

Arizona can align its accountability systems by selecting a set of indicators that will focus high schools on the four domains that research shows matter most to students:

1) Complete challenging coursework. This domain would include indicators such as the percentage of students who complete a college-prep curriculum, including Advanced Placement courses.

Research shows that students who complete challenging coursework in high school are more likely to:

- Earn higher grades in college;
- Persist in college;
- Obtain a bachelor's degree; and
- Experience better labor market outcomes as adults.[14]

Completing challenging coursework is critical for low-income students. A recent study found "substantial significant differences in outcomes for those who take rigorous courses, and these estimated effects are often larger for disadvantaged youth and students attending disadvantaged schools."[15]

2) Demonstrate college readiness. This domain would include indicators such as the percentage of students scoring on-track for college and career readiness early in high school (e.g. meeting the on-track benchmark on the PSAT™ 8/9 PSAT™ 10) and the percentage scoring college ready later in high school (e.g. meeting the CCR benchmark on the SAT®). For states that choose the SAT as an indicator, all students would have access to Official SAT Practice on khanacademy.org which was created to help level the playing field for all students who are interested in taking the SAT and preparing for college. The tools help reinforce what students are learning in classrooms and focus on the content tested on the SAT, not just test-taking strategies.

In order to apply to most four-year colleges and universities, students need to take and score well on a college entrance exam such as the SAT. College Board research shows that students who meet the college-and-career ready benchmark on the SAT are more likely to:

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[12] These same steps – and the skills/knowledge students need to complete them – are strongly represented in the framework for college and career readiness developed by David T. Conley and available from the Educational Policy Improvement Center (EPIC): https://www.epiconline.org/Issues/college-career-readiness/the-solution/

[13] Roderick, M., Nagaoka, J., Coca, V., Moeller, E. (2008, March). *From High School to the Future: Potholes on the Road to College.* Chicago, IL: Consortium on Chicago School Research. And Roderick, M., Coca, V., Moeller, E., and Kelley-Kemple, T. (2009, April). *From High School to the Future: Making Hard Work Pay Off.* Chicago, IL: Consortium on Chicago School Research.

[14] *Postsecondary outcomes*: Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* Washington, D.C.: U.S. Department of Education.
Labor market outcomes: Rose, H., & Betts, J. R. (2004). The effect of high school courses on earnings. The *Review of Economics and Statistics, 86*(2), 497–513.

[15] Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal, 49*(2), 285-322

- Earn higher grades in college;
- Persist in college; and
- Graduate from college.

3) Get a head start on college and careers. This domain would include indicators such as participation and performance in college-level coursework (e.g. Advanced Placement) and career-technical pathways.

Students can get a head start on postsecondary success by earning college credit during high school through programs such as Advanced Placement (AP). Students also can earn industry-certified credentials during high school.

Students who succeed in AP courses can save time and reduce college costs through placement and credit-granting policies offered by thousands of colleges and universities nationwide. Research consistently demonstrates other important ways AP can propel students into postsecondary opportunity and success:

- AP examinees are more likely to enroll in a four-year institution compared with similar students who do not take any AP Exams;[16]
- AP examinees are more likely to persist and graduate on-time from college than students of similar academic ability who did not take an AP Exam;[17]
- AP examinees earning a 3 or higher consistently earn higher GPAs in college than their matched peers;[18]
- AP examinees are more likely to major in the subject area of their AP Exam or in a related discipline, and that relationship is especially strong for STEM-related fields.[19]

Specifically for low-income students who received an exam-fee reduction, research demonstrates those students had higher four-year college-going rates, retention rates, and first-year grade point average than did their non-AP peers.[20]

Yet, every year, hundreds of thousands of students nationwide – including tens of thousands of black, Hispanic, and Native American students – miss out on an opportunity to realize their potential because they do not enroll in AP courses in which they are likely to succeed. Based on available data on AP Potential[21], there were over 4,800 Arizona students in the graduating class of 2015 who demonstrated the potential to be successful in an AP subject but did not have the opportunity to take the exam.

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[16] Chajewski, M., Mattern, K. D., & Shaw, E. J. (2011). Examining the role of Advanced Placement® exam participation in four-year college enrollment. *Educational Measurement: Issues and Practice, 30*, 16–27.

[17] Mattern, K. D., Shaw, E. J., & Xiong, X. (2009). *The relationship between AP® Exam performance and college outcomes* (College Board Research Report 2009-4). New York: The College Board. Mattern, K. D., Marini, J. M., & Shaw, E. J. (2013). *Are AP students more likely to graduate from college on time?* (College Board Research Report 2013-5). New York: The College Board.

[18] Mattern, K. D., Shaw, E. J., & Xiong, X. (2009). *The relationship between AP® Exam performance and college outcomes* (College Board Research Report 2009-4). New York: The College Board. Patterson, B. F., Packman, S., & Kobrin, J. L. (2011). *Advanced Placement® exam-taking and performance: Relationships with first-year subject area college grades* (College Board Research Report 2011-4). New York: The College Board.

[19] Mattern, K. D., Shaw, E. J., Ewing, M. (2011). *Is AP Exam participation and performance related to choice of college major?* (College Board Research Report 2011-6). New York: The College Board. Tai, R. H., Liu, C. Q., Almarode, J. T., & Fan, X. (2010). Advanced Placement course enrollment and long-range educational outcomes. In P. M Sadler, G. Sonnert, R. H. Tai, & K. Klopfenstein (Eds.), *AP: A critical examination of the Advanced Placement Program* (pp. 109–118). Cambridge, MA: Harvard Education Press.

[20] Wyatt, J.N. & Mattern, K.D. (2011). Low-SES Students and College Outcomes: The Role of AP Fee Reductions.(College Board Research Report 2011-9).

[21] AP Potential is a free, Web-based tool that allows states, districts, and schools to generate rosters of students who are likely to score a 3 or higher on a given AP Exam. Based on research that shows strong correlations between PSAT/NMSQT scores and AP

AZ has committed $5 million, beginning in the 2017-2018 school year, for the "College Credit by Examination Incentive Program." This pilot program will provide incentive bonuses to teachers, school districts, and charter schools for students who obtain a passing score on a qualifying examination, such as an AP Exam, for college credit while in high school.

4) Plan for the future. This domain would include indicators such as the percentage of students applying to four or more postsecondary programs and the percentage that complete federal student financial aid forms.

Students who complete all of the steps above can still flounder if they don't take steps to capitalize on the postsecondary opportunities they have earned: apply strategically for college and file student financial aid forms.

Applying to College:

- Most lower-income students *who score in the very top range of the SAT* do not apply to a single selective college;[22]
- Applying to four or more colleges increases a student's chances of enrolling in a college that is a good academic, social, and financial fit;[23]
  - In a nationally representative sample from the high school class of 2004, low-SES students submitted an average of 2.67 applications to four-year colleges, compared with an average of 3.7 applications submitted by high-SES students;
  - Increasing the number of college applications from one to two increases a student's probability of enrolling at a four-year college by 40%, and increasing the number of applications from two to three can increases a student's probability of enrollment by 10%.

Affording College:

- Many low-income students who are prepared academically for college and apply to college fail to file a Free Application for Federal Student Aid (FAFSA). According to one estimate by the American Council on Education (ACE), nearly one in five low-income, Pell-eligible students who enroll in college never complete a FAFSA.[24] Students who do complete the FAFSA are more likely to enroll and persist in college;
- In the Chicago Public Schools, students who were accepted to college and completed a FAFSA were over 50 percent more likely to enroll than those who did not complete a FAFSA;[25]
- One recent study found filing a FAFSA can raise the odds of college persistence by 122% for low-income students eligible for federal Pell Grants.[26]

b) Describe how the proposed metrics are aligned to college / career expectations and include any alignment studies, if available.

Exam results, AP Potential is designed to help educators increase access to AP and to ensure that no student who has the chance of succeeding in AP is overlooked.

[22] Lower-income defined as bottom quartile of income. College Board's 20*13 SAT Report on College & Career Readiness*, p8.

[23] Smith, J. (2013, December). The effect of college applications on enrollment. *B.E. Journal of Economic Analysis & Policy, 14*(1): 151-188.

[24] Nagaoka, J., Roderick, M., and Coca, V. (2009, January.) Barriers to College Attainment: Lessons from Chicago. Washington, DC: Center for American Progress. January 2009.

[25] Roderick, M., Nagaoka, J., Coca, V., and Moeller, E. (2008, March.) *From High School to the Future: Potholes on the Road to College.* Chicago: Consortium on Chicago School Research.

[26] Novak, H. and McKinney, L. (2011.) The consequences of leaving money on the table: Examining persistence among students who do not file a FAFSA. *Journal of Student Financial Aid 41*(3), 2001.

The College Board maintains the SAT Suite of Assessments to a standard of quality that meets and in many cases exceeds the Standards for Educational and Psychological Testing. Because of the reach and high quality of the assessment program developed by the College Board, the SAT is the most researched and cited educational assessment.

The College Board and its members hold the SAT to the highest standards as the SAT is part of high-stakes decision-making processes for higher education institutions and students. Each year, the College Board examines and publishes a report on the validity of the SAT for predicting college outcomes such as grade point average (GPA), course grades, persistence, and completion with a national sample of students and institutions. In addition, the College Board offers colleges and universities the use of its free, online validity study service, the Admitted Class Evaluation Service™ (ACES), to receive unique, institution-specific validity reports based on College Board tests.

To further aid in the interpretation of SAT scores, the College Board develops and monitors College and Career Readiness Benchmarks and documents college outcomes, such as persistence and college graduation, for students who meet the benchmarks compared to those who do not. AP Potential is reported based on all scores from the SAT Suite of Assessments, further extending the utility of SAT scores. This extension of AP Potential to SAT scores is based on validity evidence from prior research showing that PSAT/NMSQT scores (and, by extension, SAT scores given the tight alignment of both tests) are strong predictors of success on AP Exams.

College Board typically provides two performance levels with respect to its College and Career Readiness Benchmarks: met and not met. Meeting the benchmark implies that a student is on-track to be academically prepared to succeed at a two or four year college or university or in career training programs. Not meeting the benchmark implies that a student will need additional academic preparation to succeed in a postsecondary program. College Board has extensive research program supporting the College and Career Readiness Benchmarks and documents college outcomes, such as persistence and college graduation, for students who meet the benchmarks as compared to those who do not.

The College Board completed an Alignment Study of the SAT Suite of Assessments and the Arizona Standards in February, 2015. The study includes Arizona alignment summaries for English Language Arts/Literacy and Math. State Standards Alignment Tables are included for the SAT, PSAT/NMSQT and PSAT 10, and PSAT 8/9. A full copy of the study has been previously submitted to the State Board of Education and to the Deputy Associate Superintendent for Assessment at the ADE upon their request.. **See Attachment 1, Alignment Study.**

The College and Career Readiness Benchmarks

To further support accountability and to evaluate student performance, the College Board's College and Career Readiness Benchmarks provide an optimal solution with clear results. These Benchmarks provide a content relevant early indication of whether or not students are on target for college preparedness and success. Moreover, the benchmarks are applicable to a greater number of students as they will be based on the performance of students attending both two- and four-year institutions. These benchmarks will accurately represent the variety of post-secondary educational options available to students.

The benchmarks are derived from each section (Reading Test, Writing and Language Test, and Math Test) and the three benchmarks will correspond to content-relevant, introductory, first-semester college courses (typically a 100 level college course listing). The benchmarks are based on student academic performance (as indicated by course grade). These courses require knowledge and skills similar to those measured by the relevant Reading, Writing and Language, and Math sections. The College and Career Readiness Benchmarks are also based on minimum scores necessary for students to have a high probability of success. To support the validity evidence for these benchmarks, the College Board maintains a Higher Education Validity database that includes SAT scores matched to student course

grades, persistence, and graduation data from over 150 four-year institutions. This database has been expanded to include two-year institutional data.

The benchmarks are set using a logistic regression analysis. Using this approach, benchmarks are determined based on a probability of achieving a defined outcome (course grade), which indicates the successful completion of the course. Moreover, benchmarks for the PSAT/NMSQT assessments are set by an empirical analysis of feasible student growth from grade 8 to the SAT. All work will be discussed with a panel of external experts, the College Board's standing Research Advisory Committee.

c) Describe how differentiated weights and metrics resulting in an overall letter grades can be compared between schools and across years to inform the following:

i. **Achievement of all students and progress of student subgroups**
ii. **Information needed by parents/communities to inform school choice**
iii. **Improvement of various types of schools within Arizona**
iv. **Construct relevant components of school quality**

Any decisions related to the weighting or use of the previously described metrics for determining letter grades are the express purview of the state. If the College Board assessments are considered for use in the AZ Accountability system the Board work with the state to provide information and support to meet state and federal accountability requirements.

d) Describe how the proposal may reduce administrative burden for LEAs and the SEA given the variation in accountability requirements related to applicable federal laws, state laws, State Board of Education rules, charter school authorizers, and other regulatory bodies.

Over 20,000 students across the state chose to take the SAT as their college entrance examination. Several districts, including Tucson USD, Tolleson Union High School District, Scottsdale USD, and Paradise Valley USD, use the PSAT/NMSQT in grade 10 to assess their students in addition to the AZMerit exams. Under ESSA, ADE can choose to administer the SAT Suite as part of their accountability system. ESSA also includes a provision that allows districts to seek state approval to use "a nationally recognized high school assessment" in lieu of the traditional state test. The SAT meets the criteria established under ESSA to be the high school accountability assessment – either statewide or as part of a local option.

When administered as part of the state accountability system, the SAT Suite of assessments serves a dual purpose, as a college entrance examination and an accountability measure, thus reducing administrative burden at LEAs. Furthermore, the SAT can be administered as part of the established school day, eliminating the need for the logistics associated with staffing a weekend assessment administration within the district.

4. Measuring Student Growth

a) What are the advantages of utilizing this measure of growth on Arizona's statewide assessments and in Arizona's new A-F Letter Grade Accountability System?

Please see sections 4b-4d for technical responses from the College Board.

b) Please discuss evidence of technical appropriateness and statistical robustness to support the validity and reliability of student-level growth scores based on each of the following assessment scenarios:

- **i. Vertically scaled assessments of grades 3 through 8 ELA standards**
- **ii. Vertically scaled assessments of grades 3 through 8 Mathematics standards**
- **iii. Vertically scaled, non-sequential with extreme variability in the instructional format for end of course assessments of high school ELA and Mathematics standards**
- **iv. Across test administration modality (Paper and computer-based) equated on a common vertical scale in each of the subjects above**
- **v. Varying assessments selected off of a menu of assessments potentially available in high school grades and administered in various modalities**
- **vi. Varying assessments selected off of a menu of assessments potentially available to students in elementary grades and administered in various modalities**
- **vii. Annual tests of English language proficiency as measured by AZELLA administered in Grades K through 12**
- **viii. Summative assessments of Science standards administered to students enrolled in grades 4, 8, and high school**

Item Pretesting & Field Testing

Every item used in an operational form of the SAT has previously been pretested; that is, the item is tried out with an appropriate group of students to make sure that it is not ambiguous or confusing and to determine the difficulty level and the degree to which it differentiates among higher- and lower-achieving students. The pretest responses are also analyzed to determine whether students of different racial/ethnic groups, or gender groups, respond to the question differently.

SAT item writing and review are ongoing activities throughout the year. The multiple choice items in Reading, Writing and Language, and Math, as well as the student-produced response items in Math, are pretested using a sample of actual SAT test takers or on a motivated sample of students that closely resembles the SAT population. Pretests are assembled from questions that have received a number of content, fairness, and editorial reviews prior to pretesting. Data from 1,000 to 3,000 students responding to each question are used to evaluate question performance. This item information provides an extremely accurate estimate of how the item will function when administered as part of a future SAT.

Analysis of Pretest Information

Data collected from multiple-choice and student produced response pretests are analyzed to provide important information about the appropriateness of items for use in operational forms of the SAT. Three statistical indices are computed: **equated p-value** as an index of item difficulty within the SAT

population, ***r*-biserial** as an index of whether the item discriminates between higher- and lower-achieving students, and Mantel-Haenszel **DIF** (differential item functioning) as an index of the relationship between group membership and the likelihood of answering the question correctly. These item statistics are used to judge whether a given question is suitable for inclusion in the pool of items from which operational forms will be assembled. The item statistics may also reveal problems with the conceptualization or wording of a question. Some of these items will be revised and re-pretested; others will be discarded.

Differential Item Functioning

In addition to item difficulty, analyses of differential item functioning (DIF) are conducted to identify items that may function differently for members of different groups. DIF analyses compare the performance of two groups of test-takers (e.g., males vs. females, Asian American test takers vs. white test takers) who have been matched on their Reading, Writing and Language, or Math achievement (SAT Reading, Writing and Language, or Math test score) on each item. The underlying assumption in conducting such analyses is that all test-takers demonstrating the same level of achievement in the content area should have similar chances of answering each item correctly, regardless of gender, race, or ethnicity. Differential item functioning occurs when individuals with similar scores on the SAT Reading, SAT Writing and Language or SAT Math tests differ notably in their performance on a specific test item. The presence of DIF indicates that an item functions differently for one subgroup from the way it functions for another subgroup of same achievement level. While the theoretical framework for explaining DIF is not yet well established, the assumption is that items exhibiting high levels of DIF may be measuring factors irrelevant to a test (such as culture) or more than one dimension for which the two groups have different strengths. For example, DIF may result from a math word problem because the question measures language proficiency in addition to mathematical reasoning. One group of test takers may well be stronger in the language proficiency. An item like this will be reviewed by one or more experts who have not been involved with the item and who are trained with respect to the construct being tested and item sensitivity to determine whether the amount of language proficiency required by the item is irrelevant to the dimension of interest; that is, mathematical reasoning.

DIF analyses begin by examining any differences in the performance on each individual item of two comparable groups, referred to as the reference group and the focal group. Typically, DIF analyses for the SAT compare groups based on gender (where males are the reference group and females are the focal group) or ethnicity/race (where white test takers are the reference group and African American, Hispanic American, Asian American, or Native American test takers are the focal group). Occasionally DIF analyses are conducted with other groups (e.g., students with disabilities and those without disabilities; ESL and non-ESL). Items having extreme values of DIF, those items favoring one group over another for examinees of the same level of achievement, undergo further review to determine whether some aspect of what the item is measuring is particularly related to subgroup membership and irrelevant to the dimension being measured. When an item is identified as exhibiting such characteristics, it is either revised and re-pretested or eliminated. The final form of a test rarely includes an item that exhibits sizable DIF. All items with DIF, however, have been reviewed by experts and have been determined to be appropriate for administration.

The Mantel-Haenszel procedure (MH), adapted by Holland and Thayer (1988), is used for DIF analyses with the SAT. This procedure computes a ratio for the conditional probability of successful reference group performance on an item over the conditional probability of successful focal group performance on the item for each score level on the test. Thus, comparisons are made of test takers with equivalent scores (e.g., equivalent achievement in mathematical reasoning) at each point on the test. Statistically optimal weights are then assigned to each ratio, and they are averaged across all score points. The MH statistic is transformed to a delta scale, and the resulting statistic is referred to as the Mantel-Haenszel delta DIF (MH D-DIF). The MH D-DIF statistic ranges from negative infinity to infinity, with a value of 0 indicating no DIF. Both the magnitude of the MH D-DIF and a significance test are used to evaluate the presence or absence of DIF. For the SAT, MH D-DIF values are considered:

- Negligible if they are between 1.0 and –1.0 or are not statistically different from zero at the .05 significance level;
- Moderate if they fall between 1.0 and 1.5 or –1.0 and –1.5, or if they are greater than 1.5 or –1.5 and not significantly different from the absolute value of 1.0 at the .05 significance level;
- Sizable if they exceed 1.5 or –1.5 and are statistically different from the absolute value of 1.0 at the .05 significance level.

Items exhibiting sizable DIF are not included when a test is assembled. Items exhibiting moderate DIF may be selected for a final form if items with negligible DIF are insufficient to meet particular specifications.

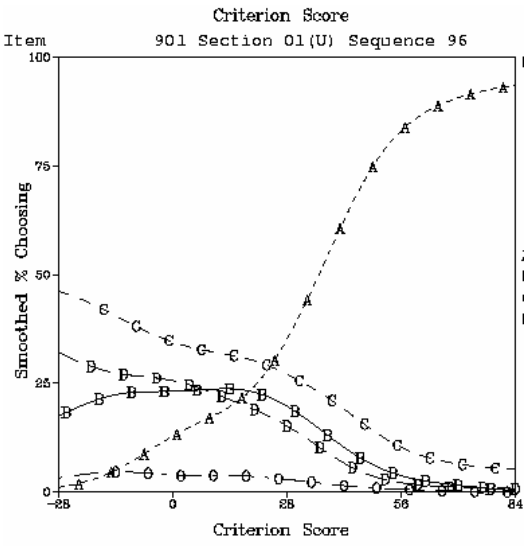
Item Discrimination & Item/Test Relationship

Although differential item functioning is one important criterion in selecting items, item discrimination is essential to be able to distinguish among test-takers at different levels of achievement. The r-biserial correlation coefficient between the item and total test score is most often used to assess the item's utility in discriminating among test-takers of differing achievement levels and the homogeneity of test items (or extent that students' performance on an item relates to their total test score). The biserial correlation ranges from +1 to –1. The more positive the correlation, the more the item distinguishes test-takers with high total scores from those with low scores. A negative biserial correlation indicates that the item is measuring something different from the rest of the test: test takers with high scores are more likely to answer that item incorrectly than those with low scores. Correlations that are near zero indicate that high-scorers and low-scorers have the same chance of correctly answering the item. Therefore, the SAT does not include items with low or negative biserial correlations.

Biserial correlations also provide an indication of the homogeneity of test items. If the correlation is very close to +1, all of the information provided by the item is redundant with that provided by the other test items. Items with moderate biserial correlations distinguish among ability levels, yet also supply unique information. Therefore, most items included on SAT operational forms fall within a biserial range of +.30 to +.80.

In determining whether to select, omit, or edit and refine a multiple-choice item based on results from pretests, test developers also consider the number and percent of test-takers who respond to the correct option and to each incorrect option. At each score level, the percentage of test-takers selecting each option is plotted. For a correct option, it is expected that the percentage of students selecting the option will increase as the test score increases. The figure below displays an item with this increasing pattern (note: option A is the correct option for this item). If the correct option does not display this pattern, the item is carefully reviewed. Similarly, if an incorrect option has this typical increasing pattern, then that option is closely evaluated. As a result of the evaluation, the item may be revised and then re-pretested, or it may be discarded entirely.

Figure 1: Item with Increasing Pattern



Evaluating Essay Pretests

Each SAT Essay passage and prompt is reviewed by College Board staff as well as by external content experts and fairness reviewers. After all content and fairness concerns raised during the review process are resolved, the passage and prompt are pretested in a special administration in high school English classrooms. For each group of pretests, a diverse sample of schools is invited to participate by having students respond to a particular passage during their English class. A sample of at least 300 responses to each pretest passage is obtained to provide a wide range of essays for determining whether the passage is accessible to students and to provide exemplars of various levels of reading, analysis, and writing skill for use in training readers.

The responses to each pretested Essay passage are scored by a group of experienced readers who are trained to apply the SAT reading, analysis, and writing rubrics using exemplar essays gleaned from the pretest samples. For each pretested passage, the distribution of reader-assigned scores is analyzed to determine whether the passage is readily understood by high school students and elicits the full range of student achievement in reading, analysis, and writing. In other words, does the passage lead to responses that can be scored reliably and that provide differentiation among higher- and lower-achieving students in all three domains? A passage that is determined not to elicit the full range of responses, or that elicits responses that are markedly skewed toward either end of that range, are deemed not usable for operational testing. In addition to the full distribution of essay scores, the distributions of scores by student gender or ethnicity are compared to uncover passages that appear to favor one demographic group over another. Passages which appear to demonstrate this limitation are deemed unusable for operational testing.

The SAT Suite of Assessments uses a classical test theory (CTT) model for scoring and scaling the tests. This model was selected due to the expected multidimensional nature of the tests.

To establish the scales for the SAT suite of assessments, the College Board has undertaken several significant scaling and norming studies, thus collecting student performance data on each assessment. These data were then analyzed, and proper screenings then applied. Specifically, unmotivated students were identified and removed, and the demographic composition of the study data were evaluated for representativeness with respect to intended target populations. Initial scales and the norms associated with these scales were developed from the analyzed and screened data. The resulting scales and norms, while representing the highest degree of rigor in terms of study design and data collection, will be verified based on the performance of students from their operational administration. The College Board expects the validity of the rSAT to be equal to or better than what is referenced in these studies and will

conduct similar studies as access to data is available to sustain robust validity efforts.

Normative evidence for the PSAT/NMSQT and SAT was established through national administrations of the tests. College Board used sample data collected during these national administrations to develop two norm groups for each test: or each test: a group representative of high school students nationwide and a group representative of the typical population of testers for each test.

College Board maintains an ongoing research program to evaluate changes to the national and testing populations and collects data on the characteristics of the testers with each administration. As the national population and the testing population changes, College Board will update the norms for the tests. As the examinee population is defined by students who have participated in any one given year, the College Board user group normative information reflects the ability distribution of its test takers. Such updating allows for examinees to compare themselves against previous typical cohorts. College Board will also evaluate whether underlying changes in the national population characteristics occur, which in return will require changes to the nationally representative norms. Updates to the nationally representative norms will be conducted at specific intervals, or whenever evidence is collected that existing normative demographic sample compositions no longer reflect those of the national examinee target population.

Examinees from a series of targeted field trials were used to establish both the College Board user and nationally representative norm sets. The examinee sample was recruited so as to closely mimic the demographic, college readiness and skill characteristics of a nationally representative student population (typical college bound 12th grade seniors, 10th and 11th graders for PSAT 10 and 8th and 9th grade students for PSAT 8/9). Using the NCES Common Core of Data, NCES Private School Survey data, and a College Board internal sampling plan, field trial examinees were weighted to accurately reflect the compositions observed at the national student and the College Board user cohort level.

During the scaling and norming field trial administrations, Services for Students with Disabilities (SSD) forms included, for example, administrations with extended time and institution-provided accommodations such as large print. While SSD examinee performances were not directly included in the creation of College Board's test scales and normative information, the data are available as a resource for future screening purposes and analysis.

Predictive Validity of the SAT

The SAT Suite of Assessments includes multiple-choice items, student-produced response items (grid-ins), and an optional direct writing task (the SAT Essay). Multiple-choice items offer well-known benefits including the ability to effectively and efficiently measure student achievement across the domain of interest. In student-produced response items, utilized in portions of the Math tests, students do not select a response but rather enter their answer to a math problem directly onto the answer sheet. In the Essay task, students read and produce a written analysis of a provided source text. All items and Essay tasks are developed with the help of K–12 and postsecondary educators and other subject-matter experts; pretested on a motivated, representative sample of students; and evaluated statistically in terms of difficulty, to discern whether the questions can differentiate between lower- and higher-achieving students, and to ensure that students from different racial/ethnic groups do not differentially respond to the questions.

Research over many decades and from many sources has documented the predictive value of high-quality multiple-choice and student produced response assessments of students' writing, reading, and math skills. The College Board sustains a continuous program of validity research on the SAT, examining the validity, fairness, and effectiveness of the SAT nationally. Extensive research on the predictive validity of the SAT has established its use as a College Entrance Exam through studies on the relationship between SAT Score and First-Year GPA in college. The College Board has also studied the relationship

between SAT Scores and other critical postsecondary outcomes, such as college enrollment persistence, GPA in second and third year, as well as graduation rate. With the redesign of the SAT the predictive validity of the test is as strong as it is today both in the aggregate and across demographic groups. The following discusses the validity of the current SAT, and can serve as an example of the methodology that will be utilized for the redesigned SAT.

A synthesis of recent Research can be found here: http://research.collegeboard.org/sites/default/files/publications/2014/6/Synthesis-of-Recent-SAT-Validity-Findings.pdf**.** This report provides coverage of the predictive validity of the SAT as well as differential predictions for subgroups such as ethnicity, best-language, parental education, income, and characteristics of institution attended. The report also includes evidence of the SAT's predictive validity for outcomes other than first year grade point average, such as cumulative GPA in second and third year, retention, and four-year graduation. An additional report summarizing recent SAT validity evidence can be found here: http://research.collegeboard.org/sites/default/files/publications/2015/6/research-report-sat-validity-primer.pdf.

As part of the redesign of the SAT, the College Board conducted a pilot study to measure the predictive validity of the new test. The results from that study are included below.

The Redesigned SAT Predictive Validity - Pilot Study Results

The redesigned SAT covers the content and skills that research shows matter most for college readiness – and it remains as predictive of college success as the current SAT.

Key Findings

- Redesigned SAT scores, like current SAT scores, are strong predictors of college performance.
- Redesigned SAT scores improve the ability to predict college performance above high school GPA alone.
- There is a strong, positive relationship between redesigned SAT scores and grades in matching college course domains, suggesting that the redesigned SAT is sensitive to instruction in English/Language arts, math, science, and history/social studies.

Background and Purpose

As part of the redesign of the SAT, the College Board conducted a pilot study to measure the predictive validity of the new test. Complete study results will be available online as a research report in early 2016.

Fifteen four-year institutions administered a pilot form of the redesigned SAT to a sample of first-year, first-time students early in the fall semester of 2014. In total, 2,050 students were included in this sample. Measures were taken to ensure that the redesigned SAT was administered to students under standardized conditions and that students were motivated to perform well on the test.

Participating institutions provided the College Board with these students' first-year performance data in June 2015, allowing the College Board to analyze the relationships between SAT scores and college performance.

Relationship between the Redesigned SAT Scores and First-Year GPA

Correlations[27,28] were computed between the different SAT scores (Evidence-Based Reading & Writing [EBRW] section score, Math section score), HSGPA, and FYGPA (see following table).

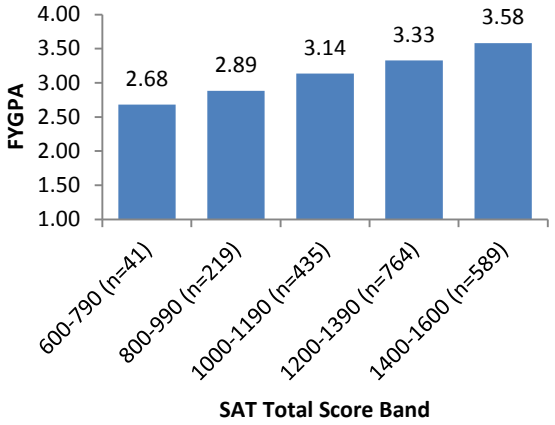
Table 2: Correlations of Predictors with FYGPA

Predictor(s)	Correlation(s)
1. HSGPA	0.48 (0.27)
2. SAT EBRW Section score	0.51 (0.33)
3. SAT Math Section score	0.49 (0.30)
4. SAT EBRW, SAT Math	0.53 (0.35)
5. HSGPA, SAT EBRW, SAT Math	0.58 (0.40)

Note: Number of students (*n*) = 2,050. Pooled within-institution, restriction of range corrected correlations are presented. The raw correlations are shown in parentheses.

The following figure shows that as the SAT score bands increase, so does the mean FYGPA.

Figure 2: Mean FYGPA by SAT Total Score Band



Note: Results based on fewer than 15 cases are not reported (e.g. score band 400-590, n=2).

[27] An often-cited rule of thumb for interpreting correlation coefficients is that a small correlation has an absolute value of approximately.10; a medium correlation has an absolute value of approximately .30; and a large correlation has an absolute value of approximately .50 or higher. From **Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.**

[28] Both raw and corrected correlations are presented. Note that it is a widely accepted practice to statistically correct correlation coefficients for restriction of range since only a sample (admitted/enrolled students) is available for analysis as opposed to the population (all applicants) for which the measure (SAT) was used to make decisions

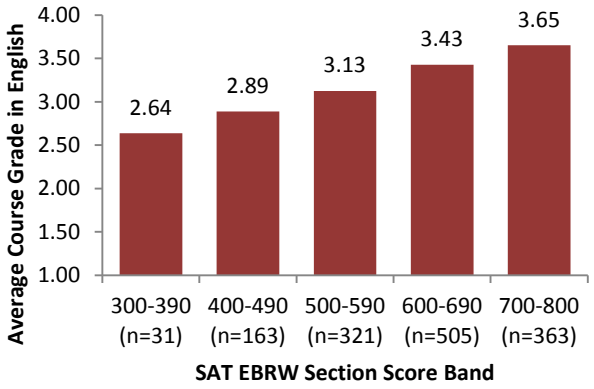
The results clearly show that:

- Redesigned SAT scores, like current SAT scores, are strong predictors of college performance;
- Redesigned SAT scores improve the ability to predict college performance above high school GPA alone;
- There is a strong, positive relationship between redesigned SAT scores and grades in matching college course domains, suggesting that the redesigned SAT is sensitive to instruction in English/Language arts, math, science, and history/social studies.

Relationship between Redesigned SAT Section Scores and College Course Grades

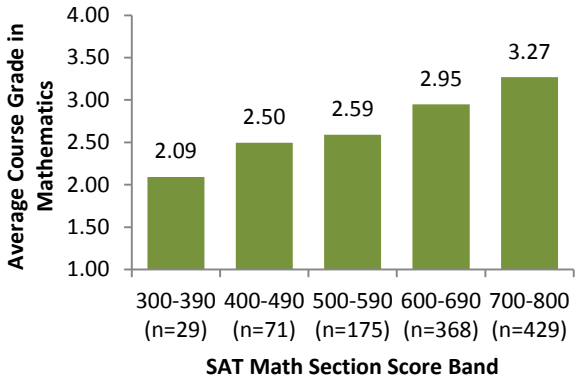
The study also examined the relationship between the redesigned SAT section scores and the average college first-semester course grades in the matching academic domain. The following graphs show a strong, positive relationship between SAT section scores and grades in matching college courses.

Figure 3: Relationship between SAT Evidence-Based Reading & Writing Section Scores and Course Grades in the Same Domain



Note: Results based on fewer than 15 cases are not reported (e.g. score band 200-290, n=1). Average English course grade includes first-semester college courses that are reading- and writing-intensive (excluding foreign and classical languages).

Figure 4: Relationship between SAT Math Section Scores and Course Grades in the Same Domain



Note: Results based on fewer than 15 cases are not reported (e.g. score band 200-290, n=1). Average math course grade includes first-semester coursework in algebra, pre-calculus, calculus, and statistics.

Next Steps

After the first administration of the redesigned SAT in March 2016, the College Board launched a more comprehensive, longitudinal national SAT Validity Study in partnership with colleges and universities to examine the relationship between SAT scores and important college outcomes such as GPA, course grades, persistence, and completion. Initial findings from this large-scale study will be available in 2019.

Scaling Model

The SAT Suite of Assessments uses a classical test theory (CTT) model for scoring and scaling the tests. This model was selected due to the expected multidimensional nature of the tests. To establish the scales for the SAT suite of assessments, the College Board has undertaken several significant scaling and norming studies, thus collecting student performance data on each assessment. These data were then analyzed, and proper screenings then applied. Specifically, unmotivated students were identified and removed, and the demographic composition of the study data were evaluated for representativeness with respect to intended target populations. Initial scales and the norms associated with these scales were developed from the analyzed and screened data. The resulting scales and norms, while representing the highest degree of rigor in terms of study design and data collection, will be verified based on the performance of students from their operational administration. The College Board expects the validity of the rSAT to be equal to or better than what is referenced in these studies and will conduct similar studies as access to data is available to sustain robust validity efforts.

The redesigned SAT was scaled using data collected from a national administration of the redesigned SAT. Multiple forms of the SAT were distributed to preselected test centers to form the core sample for scaling the new tests. Sample criteria were designed to select a sample representative of college bound high school juniors and seniors. From the data returned from this administration, one form of the test was selected as a 'scaling test.' The Section Scores of the Math, Reading and Writing and Language tests were established as 200-to-800 point scales with means of 500. All other scales were set to achieve approximately equal conditional standard errors of measurement. Preliminary studies using simulations as well as actual data collections were conducted to help ensure success of the final scaling. Data for vertical scaling were collected from ninth, tenth, and eleventh, graders. Two potential target populations were considered for establishing the redesigned SAT, PSAT/NMSQT and PSAT 10, and: 1) nationally representative high school students; and, 2) college bound examinees similar to historical cohorts of SAT, P/N and ReadiStep test-takers.

Preliminary scales for the redesigned SAT were established and compared using the definition of the college bound examinees, similar to historical cohorts. Preliminary vertical scales for the redesigned SAT, PSAT/NMSQT and PSAT 10, and scales were established using the nationally representative high school sample.

Preliminary redesigned SAT scales were established based on data from the scaling and concordance studies conducted in spring 2015. Preliminary vertical scales between the redesigned SAT, PSAT/NMSQT and PSAT 10, a scales were established at this time, also. Final scales will be set using operational data collected in the March 2016 SAT administration.

Current and Proposed SAT Equating Procedures:

Equating

Test scores, cross-test scores, and sub-scores in each form of the test are equated using a randomly equivalent groups data collection design (See Kolen, M. J. & Brennan, R. L. (2014). *Test Equating, Scaling, and Linking Methods and Practices.* New York, NY: Springer, for a full description of data

collection designs and methodologies for equating). As part of every equating administration, each score is equated using several methods. The equating solution that produces the best result is then selected to create the final conversion for the respective content.

Raw scores on the current SAT are first equated to produce unrounded conversions, which are rounded to reported scaled scores of 200 to 800. Converting raw scores into scaled scores is a mathematical process that results in an equation or a table of values that relates each raw score to a corresponding score on the fixed reporting scale. The purpose of such a scale is to provide a common basis for reporting and interpreting scores obtained on different forms of the test. The process of score equating adjusts for inevitable variations in difficulty among different test forms and makes it possible to compare test performance directly in terms of scaled scores, even when different test forms of varying difficulty are involved. As part of the equating process, several observed score and true score models are evaluated. At times, the converted scores may round to less than 200 or more than 800. When this happens, reported scores are truncated such that 200 is the lowest possible score and 800 is the highest possible score.

Each content area on the current SAT is equated through four specific form embedded anchors to one form administered the previous year, and three forms administered more than one year earlier. Several equating methods are conducted for each common anchor item set under the common item non-equivalent groups design. The best-suited equating solutions are chosen for each of the four anchors, and are then weighted to form the final conversion for the respective content. Unlike Critical Reading and Math, the Writing section score is derived by first equating (using the above delineated procedure) the writing multiple choice items. Next, the essay scores are linked to the scale of the multiple choice items and are then scaled to form a composite scaled score utilizing both the essay and multiple choice scores.

SCORE RELIABILITY

The estimates of reliability for the SAT are internal-consistency measures, which are derived from analysis of the consistency of the performance of individuals on items within a test (internal-consistency reliability). Therefore, they apply only to the test form being analyzed. They do not take into account form-to-form variation due to equating limitations or lack of parallelism, nor are they responsive to day-to-day variation due, for example, to state of health or testing environment. For each administration of the SAT, estimates of internal consistency reliability are computed for both raw and scaled scores.

The standard error of measurement is an estimate of the amount of variation that can be expected in obtained scores for the same individual or for individuals with the same true score. The interpretation of the standard error of measurement is usually made in terms of a statement of probability that the score obtained by an individual is within a certain distance of his or her true score (that is, the score he or she would obtain on a perfectly reliable test). The probability is .68 that an individual's score will be within one SEM of his or her true score and .95 that it will be within two SEMs. The reliability and SEM on the national equating sample for all sections of the SAT are within normally acceptable ranges.

Specifics regarding the reliabilities and standard errors of measurement are not yet available. However, in the redesigning of the SAT, the estimates of reliability were set such that the minimum lower-bound test score reliability estimate would be 0.85 (with current reliabilities usually exceeding 0.90) and subscore reliability estimates would not be below 0.70.

c) Please describe the organization's professional experience and technical capacity for conducting this type of work on behalf of education agencies locally, nationally, and/or internationally.

The College Board annually conducts single-day high stakes, secure test administrations of over 4 million students in U.S. schools each fall and the SAT program alone has more than 7 administrations annually that exceed 100,000 students on a single day. Each of the students gets individualized score reports and schools get student level and aggregate data within the scoring window. Millions of students also

participate in the College Board's ACCUPLACER and CLEP computer-based assessments for college placement and course credit each year.

The addition of an Arizona test administration is within the current capacity of the organization.

The College Board has been delivering high quality assessments for **90 years** since the creation of the SAT in 1926, followed by the PSAT/NMSQT in 1959 and the PSAT 8/9 in 2014.

The College Board retains ~1,500 employees nationwide. In addition to its main offices in New York, NY and Reston, VA, the College Board maintains six regional offices to better serve schools and districts nationwide. The College Board Western Regional Office (WRO) serves the state of Arizona, connecting the educators of the state with the staff and resources of the College Board to advance college readiness and success for students in Arizona. The College Board will establish a **dedicated Arizona outreach team** experienced in implementing successful large-scale assessment administration and collaborating with personnel at the state, district, and school levels to carry out a comprehensive, coordinated delivery plan.

The following table represents projects similar to the one described in this RFI. The list below represents, in part, the College Board's long history of providing service similar to those included in this response.

Table 3: Professional Experience

	Project	# of students served per year	Performance Period
Michigan Department of Education	Michigan administers SATSD (11th grade), PSAT 10 (10th grade) and PSAT 8/9 (9th grade)	369k	04/12/11-01/21/13; 3/1/15-6/30/18
Connecticut Department of Education	Connecticut administers PN (10th 11th) and PSAT 8/9 in Alliance Districts and will administer SAT state wide beginning this year	83.3k	2007- present 2016 - 2017
New Hampshire Department of Education	New Hampshire administers SATSD without essay (11th grade)	14.5k	7/1/15-6/30/16
Delaware Department of Education	Delaware administers SATSD at 11th grade, PSAT/NMSQT (10th grade)	18.6k	1/10/11-6/30/16
Idaho Department of Education	Idaho administers the SAT or ACCUPLACER to 11th graders, and the PSAT/NMSQT to 10th graders	41.5k	04/01/12-present
Orange County Public Schools	Orange County administers SATSD (11th grade), PSAT/NMSQT (9th and 10th grade), and other College Board programs and services.	42k	08/14/11-6/30/16
Houston Independent School District	Houston ISD administers SATSD (11th grade), PSAT/NMSQT (9th and 10th grade), and PSAT 8/9 (8th grade) and other College Board programs and services	50.2k	1/5/09-6/30/16
Hillsborough County Public Schools	Hillsborough County administers SATSD (11th grade), PSAT/NSMQT (grades 9, 10, 11), and several other College Board programs and	57.8k	5/14/09 – 7/5/17

	Project	# of students served per year	Performance Period
	services.		

Prior Experience
The College Board currently partners with 13 states in the administration of large-scale assessments, including five state-wide administrations* of the SAT School Day:

1. Michigan*
2. Florida
3. Georgia
4. Idaho*
5. Indiana
6. Arizona
7. Maine
8. Delaware*
9. Connecticut*
10. New Hampshire*
11. Alaska
12. Arkansas
13. Oregon

The College Board also partners with hundreds of school districts nationwide to deliver assessments district-wide including New York City Department of Education, Los Angeles Unified School District, Region IX Education Cooperative - New Mexico, Clark County School District, Orange County Public Schools (FL), Hillsborough County Public Schools, Fairfax County Public Schools, Orange County Public Schools, Houston Independent School District, Palm Beach School District, Montgomery County Public Schools, Wake County Public Schools, Charlotte-Mecklenburg Schools, Dallas Independent School District, Prince George's County Public Schools, Cobb County School District, San Diego Unified School District, and Baltimore County Public Schools.

d) Describe any services or assistance the vendor might provide to expedite the calculation of student growth scores so they are available to ADE, schools, students, and parents via student score reports produced by Arizona's test vendor(s).

The SAT Suite is designed to measure a precisely defined domain of knowledge and skills that allows for criterion-referenced interpretations of student performance to be made, in addition to offering normative interpretations.

For example:

- Student scores are accompanied by content-referenced interpretations that describe the knowledge and skills that are represented by a student's performance relative to the specific content/skill domains covered by the assessment. In addition, performance can be measured against state standards. This latter information is provided to students and schools so that they can identify what both individual and groups of students should work on next to strengthen their knowledge and skills;
- Student scores are accompanied by norms that convey how well the students performed compared to one or more defined norm groups. These norms are conveyed as percentile ranks that help students and educators understand how student scores ranked relative to the scores of other students;
- Free of charge, unparalleled diagnostic information and instructional support for administrations that

have released test forms;

- Teachers and counselors can take a closer, detailed look at students' academic skills by providing a snapshot of student performance on each test question;
- Item-by-item analysis of every question on the assessments for students, schools, districts, and the states via the online portal, which can be used to inform educational decisions at all levels;
- Reporting portals, with individual educator and administrator logins, grant appropriate access to score data from every exam in the SAT Suite taken;
- Educators have interactive reporting features such as sorting, filtering, data drill down, etc.

The SAT Suite reported scores are intended to provide additional information about student achievement and readiness that will convey a cohesive profile of student readiness. Providing both numerical and content-based interpretations of student performance not only better defines what students know and can do, but also helps students and teachers identify the knowledge, skills, and understandings students can focus on learning next to increase their achievement. The following table shows score relationships across the SAT. Because of the integrated design, the SAT, PSAT/NMSQT, PSAT 10, follow the structure with the only difference the score ranges are shifted to reflect a different span of knowledge and skills being measured.

The redesigned SAT Suite reports several subscores for Reading, Writing and Language, and Math, each on a 1-15 score scale. The Math Test will report three subscores: 1) Heart of Algebra, 2) Problem Solving and Data Analysis, and 3) Passport to Advanced Math. The Reading and Writing and Language Tests contribute questions to two subscores: (1) Command of Evidence and (2) Words in Context. The Writing and Language Test will also report two additional subscores: (3) Expression of Ideas and (4) Standard English Conventions.

Table 4: SAT Scores

SAT Score Reported	Details	Score Range
Total score	Sum of the two section scores.	400–1600
Section scores (2)	Evidence-Based Reading and Writing, and Math.	200–800
Test scores (3)	Reading, Writing and Language, and Math.	10–40
SAT Essay scores (3) ***The SAT Essay is optional.***	Reading, Analysis, and Writing.	2–8
Cross-test scores (2)	Analysis in History/Social Studies and Analysis in Science. Based on selected questions in the Reading, Writing and Language, and Math Tests. These scores show how well the student used skills to analyze texts and solve problems in these subject areas.	10–40
Subscores (7)	Reading and Writing and Language: Command of Evidence and Words in Context. Writing and Language: Expression of Ideas and Standard English Conventions. Math: Heart of Algebra, Problem Solving and Data Analysis, and Passport to Advanced Math.	1–15

The College Board provides a series of predetermined reports and other publications including the student score reports for the SAT Suite of Assessments. The Individual student reports, School, District, and State reports include easy-to-read reports with a complete set of scores as well as comparisons, benchmarks, feedback, and explanations of scores. Extensive, personalized feedback driven from

student item level performance is available through the Khan Academy Partnership. Further details are provided in the following sections.

Reporting User Access and Interface

Score reports are available for each individual student/family via a secure Web site. SAT School Day paper score reports will be available to students on request or printed from the online report. One PSAT 10 and PSAT 8/9 paper score report per student is provided to schools. With proper authorization, schools, districts, and ADE have secure access to aggregate- and/or student- level data and have the ability to sort and filter the data on the Web portal or export the data for use in student information systems. District and ADE data files include student's state identification (if it had been provided at time of registration).

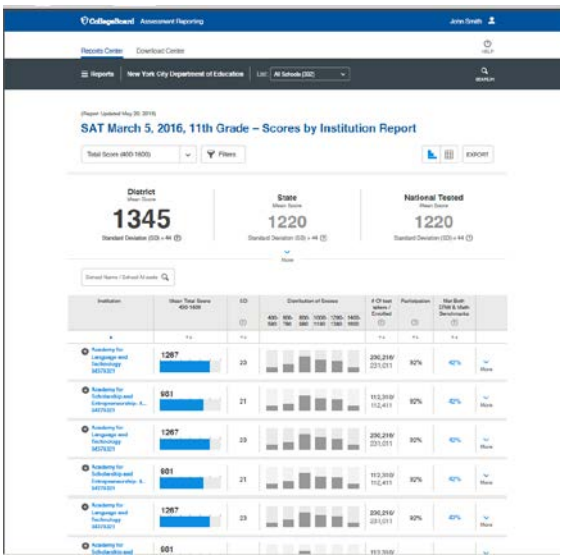
Summative Assessment Reports

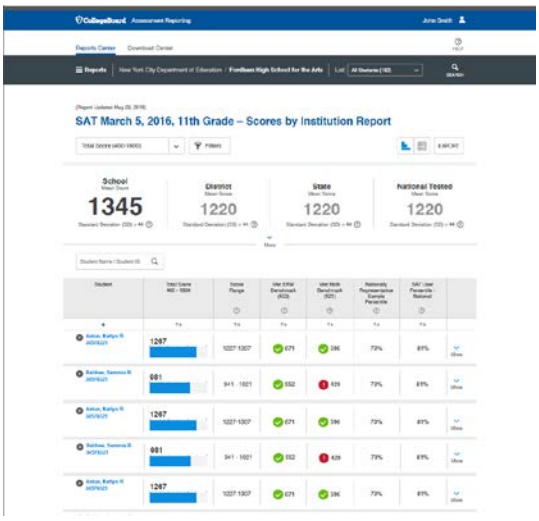
All snapshot, longitudinal, and participation reports are available through the College Board's reporting portal and data reports will be provided to the ADE in a standard format via secure electronic file transfer. Sample summative reports for a district (showing all schools included) and schools (showing all students) are shown in the following figures. As shown, the online user will be able to drill down for more details. These reports allow users to:

- View mean score comparisons: School, District, State, Nation;
- View scores for
  - Districts/schools in a state;
  - Schools in a District;
  - Students in a School;
- View Benchmark performance and percentiles;
- Drill through to reports in lower levels of hierarchy;
- Filter by demographics such as Race/Ethnicity and Sex.

Figure 5: Sample Summative Reports

Note: All data in these samples are fictitious and for example only. SAT, PSAT/NMSQT, PSAT 10, and score reports will have the same design and information included on the student score reports





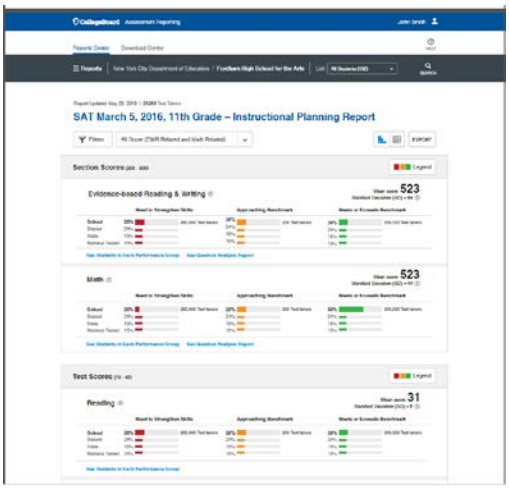
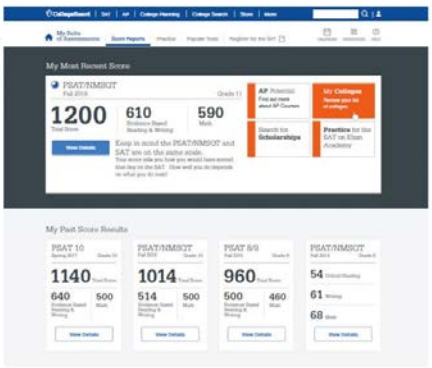


Figure 6: Sample Student Dashboard and Score Reports

Note: All data in these samples are fictitious and for example only. SAT, PSAT/NMSQT, PSAT 10, and PSAT 8/9 score reports will have the same design and information included on the student score reports student score reports

Student Reports - Dashboard

- Consolidated view of all assessment scores
- Brief overview of each assessment including grade and year taken plus top level section scores
- Includes pre-2015 PSAT/NMSQT scores
  - 'Report Details' less detailed for pre-2015 PSAT/NMSQT



Student Reports – Desktop, Tablet, Mobile

- All student score report pages will adapt for:
  - Desktop
  - Tablet
  - Smart-phone

As part of the SAT School day program, comprehensive reporting by school, district and state is available to approved ADE users. With proper authorization, schools, districts, and ADE have secure access to aggregate- and/or student- level data and have the ability to sort and filter the data on the Web portal or export the data for use in student information systems. District and ADE data files include item level responses, raw score data and the student's state identification (if it had been provided at time of registration).

The College Board has engaged educators, parents, students, and experts in info-graphic design to create a user-friendly and action oriented set of reporting tools. The reports for students and families have been optimized for access through mobile devices, web browsers, or paper. School, district, and state reports will be accessible through a reporting portal allowing educators to view aggregate through student level data in one place.

The 10th grade individual student score reports fulfill the Federal reporting requirements by allowing individual and aggregate reports that describe student performance against the ADE standards.

Most importantly these reports point to very specific next steps for the student (accessible through a single click on the web or mobile versions) to connect to additional instruction, career guidance, or important college process information. The materials on Khan Academy and collegeboard.org provide the most complete and free resources to help students improve their college and career readiness.

All reports include an indication of measurement error and comparative information displaying student scale score relative to the benchmarks in that area. Performance level descriptors provide explanatory narrative on all reports where appropriate.

These reports will include translated report shells into Spanish with explanations for parents and students whose native language is not English.

Report Dissemination

Score reports will be available for each individual student/family via a secure Web site. SAT School Day paper score reports will be available to students on request or printed from the online report. One paper score report per student will be provided to schools. With proper authorization, schools, districts, and ADE will have secure access to aggregate- and/or student- level data and have the ability to sort and filter the data on the Web portal or export the data for use in student information systems. District and ADE data files will include student's state identification (if it had been provided at time of registration).

e) How can parents, teachers, students, and schools use growth score(s) to interpret individual student trajectory relative to Arizona's academic standards?

The College Board will provide a guide and many resources for students, parents, and educators to interpret and use assessment results. Examples of these resources already on the Web site (https://sat.collegeboard.org/scores) include:

- Online Score Report – See how a student did on different kinds of questions in each section of the test;
- Score Choice – Choose the scores to send to colleges for the SAT and SAT Subject Tests;
- Find a College;
- Retaking the SAT – You are familiar with the test and more prepared for the types of questions on it;
- SAT Skills Insight – Pinpoint the skills needed to do better on the test.

Students, parents, and educators will have access to thousands of practice items, personalized tutorial on test content, and official full-length SAT and PSAT/NMSQT tests through College Board resources and a partnership with Khan Academy.

f) How can growth scores be aggregated and integrated into accountability determinations which may include varied weighting of proficiency results and other indicators of school performance?

<Intentionally left blank>

5. Other Technical Considerations

a) Describe any detailed analyses currently available or could be conducted to support the validity, reliability, and fairness of a proposed system as well as the methodology and validation process for standard setting the overall A-F letter grade determinations. The ADE will model all components for possible inclusion in a final accountability system.

<Intentionally left blank>

b) Describe the timeline necessary to produce school accountability ratings which will differentiate and support the variety of public schools and districts within Arizona.

The College Board can provide to ADE administrators a variety of score reports that can be used as a factor in producing school accountability ratings (see question 4d). ADE can expect to receive these reports approximately two months after the test administration date.

Using the College Board's portal, schools, districts, and ADE will have secure access to aggregated reports as shown in the following table. The reports will be sortable based on organization type (School, District, and State) and Demographics (based on supplementary data captured during registration and student-provided detail such as gender, high school courses, Race and Ethnicity, etc.).

Available Reports

- Scores (score bands) by Institutions (State to District, District to Schools, Schools to Students);
- Scores (score bands) by Demographics (Gender, Race/Ethnicity, etc.);
- Benchmarks by Institutions;
- Benchmarks by Demographics;
- Instructional Planning;
- Question Analysis (detail level in report will vary if a disclosed admin vs a non-disclosed admin. Currently, the April administration will release the test form);
- Registration and Score Roster;
- Student Score Report.

Table 5: Summary of SAT Reports by Key Stakeholder

Report type	Key Stakeholders								Recipient
	School	District	State	Teacher	Counselor	Principal	Curriculum	Superintendent District Admin.	
Student Score Report	X	X	X						School, District, State
Registration and Score Roster	X				X				School, District
Instructional Planning Report	X	X	X	X	X		X	X	School, District, and/or State
Question Analysis *	X	X	X	X	X		X	X	School, District, and/or State
Scores by Institution Scores by Demographics Benchmarks by Institution Benchmarks by Demographics	X	X	X					X	School, District, and/or State
Complete student-level data file	X	X	X					X	School, District, and/or State

** Detailed version only available for the April SAT SD administration that includes a released test form.*

Score reports will be available for each student and their family via a secure Web site. SAT paper score reports will be available to students on request, or printed from the online report at no additional cost.

Communication about the SAT to parents and students will be a key part of the College Board's work with ADE. The materials and plan are part of the College Board's work with many state partners and will be greatly increased in Arizona to support SAT SD.

A combination of email, print materials, web resources, mobile alerts, and in-person support through schools and community-based organizations (CBO) will ensure that every stakeholder in Arizona will understand how the SAT, and specifically SAT SD in Arizona, helps students navigate their path through high school toward college and career, and offers a range of unique benefits to students that:

- Inspire Productive Practice;
- Help Students Build Skills Over Time;
- Open Doors to College;
- Equip Students with Free Practice on Khan Academy;
- Connect Students to Scholarship Opportunities;
- Increase Access to AP and College Credit.

c) Describe the level of complexity and ability to replicate the statistical techniques which may be utilized throughout the system to differentiate school performance.

<Intentionally left blank>

d) Describe any resources related to personnel, data, and/or technology the proposal may require, including any additional resources, data collection, management, and storage needed by the Department.

ADE will not need to invest in additional staff or technology in order to implement our proposed solution.

e) Please highlight any significant deviations from previous practice or changes to operational definitions currently utilized within Arizona's system of holding schools accountable.

The College Board does not foresee any significant deviations from previous practice within Arizona's system of holding school accountable based on the elements of our proposal.

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Attachment 1:

SAT Arizona Alignment Study

COLLEGE BOARD + ARIZONA

SAT® Suite of Assessments: Alignment to Arizona Standards

CollegeBoard

SAT®

About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators, and schools. For further information, visit www.collegeboard.org.

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Executive Summary

While the College Board's redesigned SAT Suite of Assessments was not designed to assess the attainment of any single set of standards, its tests measure knowledge and skills that the best available evidence shows are essential for college and career readiness and success. The SAT Suite, which includes the redesigned SAT®, PSAT/NMSQT® and PSAT™ 10, and PSAT™ 8/9, provides states and schools with a longitudinal, evidence-based assessment system that measures growth in relation to essential college and career readiness and success outcomes from grade 8 through grade 12. The College Board is committed to ensuring that students are ready to make successful transitions to college and career by the time they leave high school. This report demonstrates that the SAT Suite strongly aligns with your state's standards and thereby supports your students' progress toward educational and workplace success.

The alignment of the Arizona state standards with the SAT Suite of Assessments is strong to very strong. There is a very strong alignment between the Arizona state standards in reading, writing, and language and the Reading Test, the Writing and Language Test, and the SAT Essay in the SAT Suite. In Math, the alignment of the Arizona state standards and the SAT Suite is strong. The SAT Suite of Assessments do not assess speaking and listening and therefore, we do not align to the Arizona state standards in speaking and listening.

The key features of the redesigned SAT Suite's English language arts/literacy–related assessments are

- the use of a specified range of text complexity consistent with college and workforce training requirements;
- an emphasis on source analysis and use of evidence;
- the inclusion of data and informational graphics, which students must analyze in conjunction with text;
- a focus on words in context and on word choice for rhetorical effect;
- attention to a core set of important English language conventions and to effective written expression; and
- the requirement that students work with texts across a wide range of disciplines.

The key features of the redesigned SAT Suite's math assessments are

- a strong focus on content that matters most for college and career readiness;
- an emphasis on rich applied problems in real-life settings where the use of mathematical practices is integrated with the content;
- a balance of fluency, conceptual understanding, and application items within and across all content topics;
- an emphasis on problem solving and data analysis; and
- the inclusion of both calculator and no-calculator portions as well as strategic attention to the use of a calculator as a tool.

The heart of the report is a series of tables indicating both the alignment of the Arizona standards to the elements measured by the SAT Suite of Assessments and the alignment of the elements measured by

the SAT Suite of Assessments to the Arizona standards. As these tables and the associated documentation demonstrate, the alignment between Arizona's standards and the SAT Suite is robust.

Summary of the English Language Arts/Literacy alignment:

Alignment of Arizona standards to SAT Suite assessments

- **Anchors (aligned to SAT, including Essay):** All of the Arizona Reading and Language Anchor Standards are addressed in whole or in part on the redesigned SAT. Seven of the ten Arizona Writing Anchor Standards are addressed in whole or in part. (Standards regarding technology use [W.CCR.6] and conducting research [W.CCR.7, W.CCR.8] are not aligned to.) Speaking and listening are not addressed on the SAT and are thus not aligned to.
- **Grades 11–12 ELA/Literacy (aligned to SAT, including Essay):** Seven of the nine Reading Standards for Literature 11–12 and all of the Reading Standards for Informational Text 11–12 are addressed in whole or in part on the redesigned SAT. (RL.11–12.7, requiring synthesis of multiple literary texts, was not aligned to, as the SAT Reading Test's paired-passage format is restricted to history/social studies and science texts; RL.11–12.9, which requires demonstration of eighteenth-, nineteenth-, and twentieth-century US literature, is largely outside of the Reading Test domain.) Seven of the ten Writing Standards 11–12 are addressed in whole or in part. (As with the anchor standards, W.11–12.6, W.11–12.7, and W.11–12.8 were not aligned to.) All of the Language "progressive" standards applicable to grades 11–12 are aligned to, as are all of the Language Standards 11–12, in whole or in part.
- **Grades 11–12 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to SAT, not including Essay):** While the SAT Suite assessments are not tests of history/social studies and science content knowledge, they do address aspects of literacy in these subject areas. Nine of the ten Reading Standards for Literacy in History/Social Studies 11–12 are addressed in whole or in part, the lone exception being RH.11–12.8, which requires external validation or critique of an author's argument. Nine out of ten of the Reading Standards for Literacy in Science and Technical Subjects 11–12 are addressed in whole or in part, the lone exception being RST.11–12.3, which is concerned with following a multistep procedure. Four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12 are addressed in whole or in part. As with the ELA/Literacy counterparts, standards pertaining to technology use (WHST.11–12.6) and research (WHST.11–12.7, WHST.11–12.8) are not addressed; because the Essay task does not involve analyzing a history/social studies, science, or technical source, WHST.11–12.9 and WHST.11–12.10 are not aligned to.
- **Grades 9–10 ELA/Literacy (aligned to PSAT/NMSQT and PSAT 10):** Seven of the nine Reading Standards for Literature 9–10 are addressed in whole or in part. Not aligned to are RL.9–10.7, which focuses on artistic media, and RL.9–10.9, which focuses on a very specific form of intertextuality. Nine of the ten Reading Standards for Informational Text 9–10 are addressed in whole or in part. Not aligned to is AZ.9–10.7, which focuses on different mediums for accounts. Five of the ten Writing Standards 9–10 are addressed in whole or in part, the difference from 11–12 accounted for by the fact that the latter was also aligned to the SAT Essay. Five of the six Language Standards 9–10 are aligned to, with L.9–10.3a, concerning use of style manuals, being out of the testing domain.
- **Grades 9–10 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to PSAT/NMSQT and PSAT 10):** All ten of the Reading Standards for Literacy in History/Social Studies 9–10 are addressed in whole or in part. Eight of the ten Reading Standards for Literacy in Science and Technical Subjects 9–10 are aligned to; RST.9–10.3 (following multistep procedures)

and RST.9–10.9 (comparing and contrasting findings presented in a text to those from other sources) are not addressed. As with grades 11–12, four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 9–10 are aligned to, the exceptions again pertaining to technology (WHST.9–10.6), research (WHST.9–10.7, WHST.9–10.8), source use (WHST.9–10.9), and direct writing (WHST.9–10.10).

- **Grade 8 ELA/Literacy (aligned to PSAT 8/9):** Seven of the nine Reading Standards for Literature 8 are addressed in whole or in part. Not aligned to are RL.8.7, which involves filmed and live productions of stories or dramas, and RL.8.9, which (like RL.9–10.9) focuses on a very specific form of intertextuality. Nine of the ten Reading Standards for Informational Text 8 are aligned to, the exception being AZ.8.7, which concerns the use of media. As was true for grades 9–10, five of the ten Writing Standards 8 are addressed in whole or in part, with elements of research, source use, and direct writing not aligned to. All six of the Language Standards 8 are aligned to in whole or in part.
- **Grade 8 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to PSAT 8/9):** All ten of the Reading Standards for Literacy in History/Social Studies 8 are addressed in whole or in part. As was true for grades 9–10, eight of the ten Reading Standards for Literacy in Science and Technical Subjects 8 are aligned to, with the same sorts of exceptions: RST.8.3 (following multistep procedures) and RST.8.9 (comparing and contrasting information from a text to that gained from other sources). In a similar vein, four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 8, with the omissions again being related to technology (WHST.8.6), research (WHST.8.7, WHST.8.8), source use (WHST.8.9), and direct writing (WHST.8.10).
- Inclusion of the redesigned SAT's Essay improves the alignment in numerous ways, including by addressing Writing standards not directly measured by the selected-response SAT Writing and Language Test.

Alignment of SAT Suite assessments to Arizona standards

- All but two of the elements in the SAT Suite of Assessments are addressed directly by Arizona standards.
- The two exceptions are text complexity in Writing and Language, which is not addressed by Arizona standards, and the SAT Essay's requirement for accuracy in representation of source texts, which is implicit in Arizona's research-related standards (for example, in the provision in W.8.8 to avoid plagiarism).

Summary of the Math alignment:

- The alignment between the redesigned SAT content specifications and the Arizona Standards for High School Mathematics is strong in the Number and Quantity, Algebra, Functions, Modeling, Geometry, and Statistics and Probability conceptual categories. The SAT's domain sampling approach covers standards from 20 of the 22 domains within these conceptual categories. The two domains not covered, Vector and Matrix Quantities (from Number and Quantity) and Using Probability to Make Decisions (from Statistics and Probability), are intentionally excluded as they are composed entirely of (+) standards. The (+) standards throughout the Arizona Standards for High School Mathematics are intended as preparation for advanced courses and are not essential for all students to learn to be college and career ready.

- Ideas from the conceptual category of Modeling are interspersed in problems aligned to the other conceptual categories, as suggested by the standards themselves in the statement, "Modeling is best interpreted not as a collection of isolated topics, but rather in relation to the other standards." Modeling is emphasized throughout the redesigned SAT Math Test.
- All skills measured in the redesigned SAT appear in the Arizona Standards for High School Mathematics.
- Additionally, an emphasis on the Arizona Standards for Mathematical Practice is apparent throughout the redesigned SAT. In order to do well on the varied item types they will see, students must make sense of problems and persevere in solving them (Math Practice 1). Students have many opportunities to make use of structure (Math Practice 7) in the Heart of Algebra and Passport to Advanced Math domains, while they must evaluate claims (Math Practice 3) in the Problem Solving and Data Analysis domain. They represent quantities in context with mathematical relationships and interpret their results (Math Practice 2) in all three of those domains. Mathematical modeling (Math Practice 4) is especially important in Heart of Algebra and Passport to Advanced Math. Finally, students must solve a carefully selected set of items that rewards strategic, rather than indiscriminant, use of the calculator in the Calculator portion of the Math Test (Math Practice 5).
- The alignment between the PSAT/NMSQT and PSAT 10 content specifications and the Arizona Standards for High School Mathematics is strong in Algebra and Functions. PSAT/NMSQT and PSAT 10 content specifications also draw from the conceptual categories of Number and Quantity, Geometry, and Statistics and Probability.
- All skills measured in the PSAT/NMSQT and PSAT 10 appear in the Arizona Standards for High School Mathematics.
- Like the redesigned SAT, the PSAT/NMSQT and PSAT 10 include ideas from the conceptual category of Modeling and aligned to the Arizona Standards for Mathematical Practice interspersed in problems aligned to other conceptual categories.
- Like the redesigned SAT, the PSAT/NMSQT and PSAT 10 have a cross-disciplinary focus, drawing topics from Science and Social Studies.
- The alignment between the PSAT 8/9 content specifications and the Arizona Standards for Grades 6, 7, and 8 is strong in Expressions and Equations and in Statistics and Probability. There is also a strong alignment between the PSAT 8/9 content specifications and the Grade 8 Functions content category, the Grade 6 Ratios and Proportional Relationships content category, and the High School Mathematics Algebra and Functions content categories. PSAT 8/9 content specifications also draw from the conceptual categories of Grade 7 and High School Geometry as well as High School Number and Quantity, Geometry, and Statistics and Probability.
- All skills measured in the PSAT 8/9 appear in the Arizona Standards for grades 6, 7, 8, or High School Mathematics.
- Like the redesigned SAT, the PSAT 8/9 includes ideas from the conceptual category of Modeling and aligned to the Arizona Standards for Mathematical Practice interspersed in problems aligned to other conceptual categories.
- Like the redesigned SAT, the PSAT 8/9 has a cross-disciplinary focus, drawing topics from Science and Social Studies.

The redesigned SAT Suite of Assessments aligns well with the Arizona standards. Both have been designed to promote in a clear and transparent way the goal of college and career readiness and success

for all students, and both are grounded in high-quality evidence about essential postsecondary requirements.

Section 1: Introduction

This report conveys the results of a College Board–conducted alignment study between the SAT Suite of Assessments and state standards.

The SAT Suite of Assessments measures the knowledge and skills that the best available evidence shows are essential for college and career readiness and success. The College Board works in partnership with states, districts, and schools to prepare all students to attain their post–high school educational goals, and our evidence-based assessments align closely with high-quality state standards that focus on essential college and career readiness and success outcomes.

While the revised SAT Suite of Assessments are not specifically aligned to any single set of standards; they measure the skills and knowledge that most current research and evidence shows are essential for college and career success, and are focused on what is familiar to students in their classrooms today regardless of their location. The College Board is committed to ensuring that students are ready to make successful transitions to college and career by the time they leave high school. This report shows that the SAT Suite of Assessments strongly aligns with your state's standards and thereby supports your students' progress toward educational and workplace readiness and success.

The SAT Suite of Assessments

The SAT Suite of Assessments (consisting of the SAT, PSAT/NMSQT and PSAT 10, and PSAT 8/9) focuses on the knowledge and skills that high-quality research shows are essential for college and career readiness and success. The assessments reflect the work students are doing in classrooms across the country.

The SAT Suite makes it easier for students to navigate a path through high school, college, and career by providing unmatched benefits to students, educators, and states/districts, including

- focused, clear, and useful assessments that reflect the knowledge and skills that research shows are essential for college and career readiness and success;
- free, personalized, focused practice resources for all students;
- college opportunities through scholarships, fee waivers, and AP credit; and
- career opportunities through powerful career-planning partnerships and a focus on coding and STEM.

The assessments in the SAT Suite are scored on the same underlying scale, which provides a powerful tool for measuring growth. Taken together, these assessments provide benchmarks and consistent feedback, showing student progress over time and allowing teachers to accelerate students who are either ahead or behind.

PSAT 8/9. Taken in the fall or spring of eighth or ninth grade, the PSAT 8/9 serves as a foundation for student progress in high school and helps ensure students are on target for being college and career ready by the time they leave high school.

PSAT/NMSQT and PSAT 10. Students take the PSAT/NMSQT in the fall of tenth or eleventh grade (though only eleventh graders are eligible for the National Merit Scholarship Program); some schools may instead deliver the PSAT™ 10 in the spring of students' tenth-grade year. Both assessments cover the same content domain and serve as a "check-in" on student progress and to pinpoint areas for development.

SAT. The SAT is offered throughout the school year and provides a powerful connection to college. Most students take the SAT for the first time during the spring of their junior year and a second time during the fall of their senior year.

The Alignment Approach

Point-by-point technical alignments between a test's or program's domain and a state's standards have been the centerpiece of traditional alignment study reports. Such alignments are valuable in that they illustrate in detail how and to what extent specific elements of a state's standards are assessed by an assessment program. They also identify any content in the assessments that is not included in the state's standards. Point-by-point alignments, however, tell only part of the story. While it is critical to know how well the elements of assessments and standards align, these types of studies often miss how well the broader aims and emphases of the assessment and standards mesh. Even extensive overlap between the elements of assessment and standards is not a guarantee that the two programs are well aligned at a broad, conceptual level.

As section 2 of this report outlines, several dominant themes emerge from in-depth study of educational standards and research literature on what knowledge and skills are most valuable in both postsecondary education and workforce training. For instance, a principal theme is that students are generally better served by learning core knowledge and skills in depth rather than undertaking a surface-level exploration of a wider range of topics. Therefore, it makes sense to identify the evidence-based core knowledge and skills on which college and career readiness and success rely and then to develop tests of that core. This has been the College Board's approach in redesigning its SAT Suite of Assessments.

Another important theme is that, even for assessments (such as the College Board's) concentrated on measuring attainment of core knowledge and skills, it is a practical impossibility to assess every possible element in depth in a reasonable time frame. However, when each element belongs to a cohesive knowledge and skill domain, as is the case with the SAT Suite's assessments, careful, strategic sampling of that domain permits valid and reliable inferences about an examinee's level of learning. Careful domain sampling enables tests of reasonable length and time to render technically sound educational measurements.

This report includes both conceptual and point-by-point alignments in a way that we believe is open, clear, transparent, and reader friendly. Section 2 outlines the evidentiary foundation for key elements of the redesigned SAT Suite's Reading Tests, Writing and Language Tests, Essay (SAT only), and Math Tests. For a detailed account of the test specifications for the redesigned SAT (which also applies to the PSAT/NMSQT, PSAT 10, and PSAT 8/9), please refer to *Test Specifications for the Redesigned SAT* at https://www.collegeboard.org/pdf/sat/delivering-opportunity/test_specifications_for_the_redesigned_sat_102414.pdf.

Sections 3 through 6 detail the technical alignment between the redesigned assessments and the state standards. Section 3 provides a summary of the match between the key features of the redesigned SAT Suite assessments and the state standards. Sections 4, 5, and 6 offer point-by-point comparisons of assessment domains to standards, presented first with the state's standards as the organizing principle and second with the elements of the redesigned assessments as the principle.

Section 2: Evidentiary Foundation

This section outlines the evidence base supporting the redesigned SAT Suite of Assessments. The discussion focuses first on Evidence-Based Reading and Writing (Reading; Writing and Language) and the optional Essay (SAT only) and then on Math. The section offers a global description of the key evidence undergirding the major choices guiding the redesign of the SAT Suite. As new evidence about the essential requirements for college and career readiness and success emerges from our ongoing research, we will incorporate it in our evidence base and document the results.

For a detailed account of the evidence base, see "The Redesigned SAT: Evidentiary Foundation," section II of the *Test Specifications for the Redesigned SAT* at https://www.collegeboard.org/pdf/sat/delivering-opportunity/test_specifications_for_the_redesigned_sat_102414.pdf.

Evidence-Based Reading and Writing; Essay

The Evidence-Based Reading and Writing (ERW) section of each assessment in the SAT Suite is composed of two required multiple-choice tests:

- a **Reading Test** focused on the assessment of students' comprehension and reasoning skills in relation to appropriately challenging prose passages (sometimes paired, or associated with one or more informational graphics) across a range of content areas; and
- a **Writing and Language Test** focused on the assessment of students' revising and editing skills in the context of extended prose passages (sometimes associated with one or more informational graphics) across a range of content areas.

The optional **Essay (SAT only)** is focused on the assessment of students' skill in developing a cogent and clear written analysis of a provided source text.

The scores on the Reading Test and the Writing and Language Test are multiplied by ten and combined to yield an Evidence-Based Reading and Writing section score. The three scores yielded by the SAT Essay (Reading, Analysis, Writing) complement those from the multiple-choice English language arts/literacy assessments but are not combined with them or with each other.

A number of key design elements strongly supported by evidence are interwoven throughout the Evidence-Based Reading and Writing and the Essay sections of the assessments. These include

- the use of a specified range of text complexity aligned to college and career readiness levels of reading, based on extensive research on requirements for reading and comprehension in college, career, and life;
- an emphasis on source analysis and use of evidence, based on current curricular and career emphases;
- the inclusion of data and informational graphics, which students must analyze in conjunction with text, based on studies showing the ever-increasing importance of visual displays of information;

- a focus on relevant words in context and on word choice for rhetorical effect, based on studies going back nearly a century;
- attention to a core set of important English language conventions and to effective written expression, based on recent research in metalinguistic understanding; and
- the requirement that students work with texts across a wide range of disciplines, based on extensive research showing the importance of developing discipline-specific literacy skills.

Math

The overall aim of the Math section in each of the SAT Suite's assessments is to assess students' fluency with, understanding of, and ability to apply the mathematical concepts, skills, and practices that are most strongly prerequisite and useful for a range of college majors and careers. The Math Test rewards a much stronger command of fewer, more important topics than has traditionally been assessed. To succeed on the Math Test, students need to exhibit command of mathematical practices, fluency with mathematical procedures, and conceptual understanding of mathematical ideas. In keeping with the best available evidence on essential college and career readiness and success outcomes, the assessment also provides opportunities for students to engage with rich applied problems.

Among the key evidence-based design elements that shape the Math Test are

- a focus on content that matters most for college and career readiness and success, based on extensive research and on national surveys of teachers of mathematics;
- an emphasis on problem solving and data analysis in real-world settings where the use of mathematical practices is integrated with content, based on recent studies and on recent results of the Programme for International Student Assessment (PISA);
- a balance of fluency, conceptual understanding, and application items within and across all content topics; and
- the inclusion of both calculator and no-calculator portions as well as attention to the use of a calculator as a tool, based on clear data reflecting the expectations of postsecondary instructors of mathematics.

Summary

All of the tests that are part of the redesigned SAT Suite of Assessments are informed by evidence about essential requirements for college and career readiness and success and are designed to measure robustly students' attainment of those key requirements. The Reading, Writing and Language, and (optional; SAT only) Essay sections of the assessments share a focus on text—its complexity, its use of evidence, its relationship to data, its disciplinary roots—and on language, particularly its use in communicating information and ideas clearly and purposefully. The redesigned SAT Suite also supports sustained attention on a core of math concepts, skills, and understandings rather than encouraging a race through a vast array of math soon forgotten. An important element of math is that knowing a few things very well gives students a wide-ranging readiness. The math in the SAT Suite reflects what

students can expect to see and use throughout a range of college courses, workforce training programs, and career opportunities.

The College Board's commitment to focus across all the sections in the SAT Suite can be summed up as follows: The redesigned assessments are not mysterious or tricky. They are completely transparent. They focus on the knowledge and skills that are worthy of practice. They are designed to offer clear signals to instruction and to resemble the best of classroom work and work outside of the classroom. The redesigned assessments are reliable, measuring durable knowledge and skills needed in all levels of postsecondary education, work, and life. Rather than covering a great number of topics and concepts that most examinees will never see again, the assessments focus on study of a deep core that students can draw upon again and again in college and career.

Section 3: Arizona Standards Alignment Summary

Section 3 outlines the alignment of the SAT Suite of Assessments to Arizona's standards conducted by the College Board and provides a high-level summary of the results.

English Language Arts/Literacy Alignment Summary

The College Board's Assessment Design and Development English Language Arts/Literacy team conducted the following alignments between the SAT Suite of Assessments and the Arizona Standard for English Language Arts:

(1) Arizona's English Language Arts/Literacy standards (including college and career readiness anchor standards; grades 11–12, grades 9–10, and grade 8 English Language Arts standards [including SAT-applicable Language "progressive" standards]; and grades 11–12, grades 9–10, and grades 6–8 Literacy in History/Social Studies, Science, and Technical Subjects standards) to the redesigned SAT Suite Reading, Writing and Language, and Essay testing domains; and the redesigned SAT Suite Reading, Writing and Language, and (optional; SAT only) Essay testing domains to Arizona's English Language Arts/Literacy standards (anchors and grades 11–12, 9–10, and 8).

The overall alignment is clear and robust, as summarized below.

- **Anchors (aligned to SAT, including Essay):** All of the Arizona Reading and Language Anchor Standards are addressed in whole or in part on the redesigned SAT. Seven of the ten Arizona Writing Anchor Standards are addressed in whole or in part. (Standards regarding technology use [W.CCR.6] and conducting research [W.CCR.7, W.CCR.8] are not aligned to.) Speaking and listening are not addressed on the SAT and are thus not aligned to.
- **Grades 11–12 ELA/Literacy (aligned to SAT, including Essay):** Seven of the nine Reading Standards for Literature 11–12 and all of the Reading Standards for Informational Text 11–12 are addressed in whole or in part on the redesigned SAT. (RL.11–12.7, requiring synthesis of multiple literary texts, was not aligned to, as the SAT Reading Test's paired-passage format is restricted to history/social studies and science texts; RL.11–12.9, which requires demonstration of eighteenth-, nineteenth-, and twentieth-century US literature, is largely outside of the Reading Test domain.) Seven of the ten Writing Standards 11–12 are addressed in whole or in part. (As with the anchor standards, W.11–12.6, W.11–12.7, and W.11–12.8 were not aligned to.) All of the Language "progressive" standards applicable to grades 11–12 are aligned to, as are all of the Language Standards 11–12, in whole or in part.
- **Grades 11–12 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to SAT, not including Essay):** While the SAT Suite assessments are not tests of history/social studies and science content knowledge, they do address aspects of literacy in these subject areas. Nine of the ten Reading Standards for Literacy in History/Social Studies 11–12 are addressed in whole or in part, the lone exception being RH.11–12.8, which requires external validation or critique of an author's argument. Nine out of ten of the Reading Standards for Literacy in Science and Technical Subjects 11–12 are addressed in whole or in part, the lone exception being RST.11–12.3, which is concerned with following a multistep procedure. Four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12 are addressed in whole or in part. As with the ELA/Literacy counterparts, standards

pertaining to technology use (WHST.11–12.6) and research (WHST.11–12.7, WHST.11–12.8) are not addressed; because the Essay task does not involve analyzing a history/social studies, science, or technical source, WHST.11–12.9 and WHST.11–12.10 are not aligned to.

- **Grades 9–10 ELA/Literacy (aligned to PSAT/NMSQT and PSAT 10):** Seven of the nine Reading Standards for Literature 9–10 are addressed in whole or in part. Not aligned to are RL.9–10.7, which focuses on artistic media, and RL.9–10.9, which focuses on a very specific form of intertextuality. Nine of the ten Reading Standards for Informational Text 9–10 are addressed in whole or in part. Not aligned to is AZ.9–10.7, which focuses on different mediums for accounts. Five of the ten Writing Standards 9–10 are addressed in whole or in part, the difference from 11–12 accounted for by the fact that the latter was also aligned to the SAT Essay. Five of the six Language Standards 9–10 are aligned to, with L.9–10.3a, concerning use of style manuals, being out of the testing domain.
- **Grades 9–10 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to PSAT/NMSQT and PSAT 10):** All ten of the Reading Standards for Literacy in History/Social Studies 9–10 are addressed in whole or in part. Eight of the ten Reading Standards for Literacy in Science and Technical Subjects 9–10 are aligned to; RST.9–10.3 (following multistep procedures) and RST.9–10.9 (comparing and contrasting findings presented in a text to those from other sources) are not addressed. As with grades 11–12, four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 9–10 are aligned to, the exceptions again pertaining to technology (WHST.9–10.6), research (WHST.9–10.7, WHST.9–10.8), source use (WHST.9–10.9), and direct writing (WHST.9–10.10).
- **Grade 8 ELA/Literacy (aligned to PSAT 8/9):** Seven of the nine Reading Standards for Literature 8 are addressed in whole or in part. Not aligned to are RL.8.7, which involves filmed and live productions of stories or dramas, and RL.8.9, which (like RL.9–10.9) focuses on a very specific form of intertextuality. Nine of the ten Reading Standards for Informational Text 8 are aligned to, the exception being AZ.8.7, which concerns the use of media. As was true for grades 9–10, five of the ten Writing Standards 8 are addressed in whole or in part, with elements of research, source use, and direct writing not aligned to. All six of the Language Standards 8 are aligned to in whole or in part.
- **Grade 8 Literacy in History/Social Studies, Science, and Technical Subjects (aligned to PSAT 8/9):** All ten of the Reading Standards for Literacy in History/Social Studies 8 are addressed in whole or in part. As was true for grades 9–10, eight of the ten Reading Standards for Literacy in Science and Technical Subjects 8 are aligned to, with the same sorts of exceptions: RST.8.3 (following multistep procedures) and RST.8.9 (comparing and contrasting information from a text to that gained from other sources). In a similar vein, four of the nine Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 8, with the omissions again being related to technology (WHST.8.6), research (WHST.8.7, WHST.8.8), source use (WHST.8.9), and direct writing (WHST.8.10).
- Inclusion of the redesigned SAT's Essay improves the alignment in numerous ways, including by addressing Writing standards not directly measured by the selected-response SAT Writing and Language Test.

Alignment of SAT Suite assessments to Arizona standards

- All but two of the elements in the SAT Suite of Assessments are addressed directly by Arizona standards.

- The two exceptions are text complexity in Writing and Language, which is not addressed by Arizona standards, and the SAT Essay's requirement for accuracy in representation of source texts, which is implicit in Arizona's research-related standards (for example, in the provision in W.8.8 to avoid plagiarism).

Math Alignment Summary

The College Board's Assessment Design and Development Math team conducted the following alignments between the SAT Suite of Assessments and Arizona's standards:

(1) the Arizona Standards for Mathematics, Grades 6, 7, 8, and High School (including Number and Quantity, Algebra, Functions, Modeling, Geometry, and Statistics and Probability) to the redesigned SAT Suite Math testing domains; and

(2) the redesigned SAT Suite Math testing domains to the Arizona Standards for Mathematics, Grades 6, 7, 8, and High School.

The overall alignment is again clear and robust, as summarized below.

- The alignment between the redesigned SAT content specifications and the Arizona Standards for High School Mathematics is strong in the Number and Quantity, Algebra, Functions, Modeling, Geometry, and Statistics and Probability conceptual categories. The SAT's domain sampling approach covers standards from 20 of the 22 domains within these conceptual categories. The two domains not covered, Vector and Matrix Quantities (from Number and Quantity) and Using Probability to Make Decisions (from Statistics and Probability), are intentionally excluded as they are composed entirely of (+) standards. The (+) standards throughout the Arizona Standards for High School Mathematics are intended as preparation for advanced courses and are not essential for all students to learn to be college and career ready.
- Ideas from the conceptual category of Modeling are interspersed in problems aligned to the other conceptual categories, as suggested by the standards themselves in the statement, "Modeling is best interpreted not as a collection of isolated topics, but rather in relation to the other standards." Modeling is emphasized throughout the redesigned SAT Math Test.
- All skills measured in the redesigned SAT appear in the Arizona Standards for High School Mathematics.
- Additionally, an emphasis on the Arizona Standards for Mathematical Practice is apparent throughout the redesigned SAT. In order to do well on the varied item types they will see, students must make sense of problems and persevere in solving them (Math Practice 1). Students have many opportunities to make use of structure (Math Practice 7) in the Heart of Algebra and Passport to Advanced Math domains, while they must evaluate claims (Math Practice 3) in the Problem Solving and Data Analysis domain. They represent quantities in context with mathematical relationships and interpret their results (Math Practice 2) in all three of those domains. Mathematical modeling (Math Practice 4) is especially important in Heart of Algebra and Passport to Advanced Math. Finally, students must solve a carefully selected set of items that rewards strategic, rather than indiscriminant, use of the calculator in the Calculator portion of the Math Test (Math Practice 5).
- The alignment between the PSAT/NMSQT and PSAT 10 content specifications and the Arizona Standards for High School Mathematics is strong in Algebra and Functions. PSAT/NMSQT and

PSAT 10 content specifications also draw from the conceptual categories of Number and Quantity, Geometry, and Statistics and Probability.

- All skills measured in the PSAT/NMSQT and PSAT 10 appear in the Arizona Standards for High School Mathematics.
- Like the redesigned SAT, the PSAT/NMSQT and PSAT 10 include ideas from the conceptual category of Modeling and aligned to the Arizona Standards for Mathematical Practice interspersed in problems aligned to other conceptual categories.
- Like the redesigned SAT, the PSAT/NMSQT and PSAT 10 have a cross-disciplinary focus, drawing topics from Science and Social Studies.
- The alignment between the PSAT 8/9 content specifications and the Arizona Standards for Grades 6, 7, and 8 is strong in Expressions and Equations and in Statistics and Probability. There is also a strong alignment between the PSAT 8/9 content specifications and the Grade 8 Functions content category, the Grade 6 Ratios and Proportional Relationships content category, and the High School Mathematics Algebra and Functions content categories. PSAT 8/9 content specifications also draw from the conceptual categories of Grade 7 and High School Geometry as well as High School Number and Quantity, Geometry, and Statistics and Probability.
- All skills measured in the PSAT 8/9 appear in the Arizona Standards for grades 6, 7, 8, or High School Mathematics.
- Like the redesigned SAT, the PSAT 8/9 includes ideas from the conceptual category of Modeling and aligned to the Arizona Standards for Mathematical Practice interspersed in problems aligned to other conceptual categories.
- Like the redesigned SAT, the PSAT 8/9 has a cross-disciplinary focus, drawing topics from Science and Social Studies.

Section 4: State Standards Alignment Tables—SAT

The detailed results of the alignments between Arizona's standards and the knowledge and skills assessed by the redesigned SAT are presented in this section. The English Language Arts/Literacy alignment results are presented in tables 1 through 14 and are followed by the Math alignment results in tables 15 and 16. Tables 1 through 11 (English Language Arts/Literacy) and table 15 (Math) show Arizona's standards in the left-hand column and aligned SAT content specifications in the right-hand column. Tables 12 through 14 (English Language Arts/Literacy) and table 16 (Math) present the SAT content specifications in the left-hand column and aligned Arizona standards in the right-hand column.

English Language Arts/Literacy Alignment: Arizona's Standards to SAT

Tables 1 through 11 detail the SAT-Arizona alignment using Arizona's standards as the organizing principle. In selected cases, a partial or otherwise qualified alignment was noted through the use of red text. A partial or qualified alignment was indicated only when College Board staff felt that doing so identified an essential agreement that respected the spirit of the element being incompletely aligned to. Additional explanatory notes (also in red, in the right-hand column) are included to help illuminate College Board's methodology.

Table 1: College and Career Readiness Anchor Standards for Reading: AZ to SAT

Arizona Anchor Standards for Reading	SAT Reading Test and SAT Essay
1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. Essay—Reading *Speaking is not assessed.*

Arizona Anchor Standards for Reading	SAT Reading Test and SAT Essay
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Essay—Reading
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Essay—Reading
4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Essay—Reading Essay—Analysis

Arizona Anchor Standards for Reading	SAT Reading Test and SAT Essay
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Essay—Analysis *Reading Test and Essay passages are generally too short to allow for "larger portions" to be meaningfully present.*
6. Assess how point of view or purpose shapes the content and style of a text.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). Essay—Analysis
7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Media and purely visual information are not included, although informational graphics, such as tables, graphs, and charts, are included on the Reading Test.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. Essay—Analysis

Arizona Anchor Standards for Reading	SAT Reading Test and SAT Essay
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts.
10. Read and comprehend complex literary and informational texts independently and proficiently.	Text complexity: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry. Essay—Reading *Passages on the Essay are "informational texts" and "literary nonfiction" per Arizona's standards and fall within the range of high school–level reading difficulty.*

Table 2: Reading Standards for Literature 11–12: AZ to SAT

Arizona Reading Standards for Literature 11–12	SAT Reading Test
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. *Students are asked on the Reading Test to cite the best evidence for the answer to a particular question or in support of a given point or conclusion.*
2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. *Reading Test passages may or may not have multiple themes or central ideas.*

Arizona Reading Standards for Literature 11–12	SAT Reading Test
3. Analyze the impact of the author's choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). *Drama is not included on the Reading Test.*
4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.
5. Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.

Arizona Reading Standards for Literature 11–12	SAT Reading Test
6. Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. *Such texts are within the Reading Test domain but are not guaranteed to appear on any given test form.*
7. Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text.	
8. (Not applicable to literature)	
9. Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.	*A given Reading Test form may include a work of classic US literature. Multiple literature texts are not included.*
10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11-CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11–CCR text complexity band independently and proficiently.	Text complexity: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry. *Scaffolding is not available during the summative Reading Test. Drama and poetry are not included on the Reading Test.*

Table 3: Reading Standards for Informational Text 11–12: AZ to SAT

Arizona Reading Standards for Informational Text 11–12	SAT Reading Test and SAT Essay
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. Essay—Reading
2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Essay—Reading *Reading Test and Essay passages may or may not have multiple central ideas.*

Arizona Reading Standards for Informational Text 11–12	SAT Reading Test and SAT Essay
3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Essay—Reading
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Essay—Reading Essay—Analysis *The passages in any given Reading or Essay administration may or may not include extended study of a particular term.*

Arizona Reading Standards for Informational Text 11–12	SAT Reading Test and SAT Essay
5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Essay—Analysis
6. Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). Essay—Analysis
7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Media and purely visual information are not included, although informational graphics, such as tables, graphs, and charts, are included on the Reading Test. Students are not asked to solve problems.*

Arizona Reading Standards for Informational Text 11–12	SAT Reading Test and SAT Essay
8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses).	Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. *The Reading Test includes either a selection from a US founding document or a selection from a text in the Great Global Conversation; Essay includes an argument written for a broad audience. Reading Test passages may or may not assess the application of constitutional principles and use of legal reasoning.*

Arizona Reading Standards for Informational Text 11–12	SAT Reading Test and SAT Essay
9. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purposes, and rhetorical features.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. *The Reading Test includes either a selection from a US founding document or a selection from a text in the Great Global Conversation.*
10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11-CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.	Text complexity: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry. Essay—Reading *Passages on the Essay are "informational texts" and "literary nonfiction" per Arizona's standards and fall within the range of high school–level reading difficulty. Scaffolding is not available during the summative Reading Test.*

Table 4: College and Career Readiness Anchor Standards for Writing: AZ to SAT

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	structures to accomplish needed rhetorical purposes. Essay—Analysis Essay—Writing
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Essay—Analysis Essay—Writing
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy).

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. *Fictional narratives are not included on the Writing and Language Test.*
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	Essay—Analysis Essay—Writing
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence.

Arizona Anchor Standards for Writing	SAT Writing and Language Test and SAT Essay
	Essay—Writing *The Writing and Language Test is a test of revision and editing. Time does not typically permit students taking the Essay to rewrite or try a new approach. Students taking the Essay may plan, but their planning is not scored.*
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.	
7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.	
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.	
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	Essay—Reading Essay—Analysis *Passages on the Essay are "informational texts" and "literary nonfiction" per Arizona's standards. On the Essay, students are required to draw evidence from an argument written for a broad audience.*
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	Essay—Analysis Essay—Writing *The Essay is a timed, single-sitting assessment. The Essay task is consistent from administration to administration.*

Table 5: Writing Standards 11–12: AZ to SAT

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Essay—Analysis

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	Essay—Writing
2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Essay—Analysis Essay—Writing

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	Formatting and multimedia are not used in the Writing and Language Test or Essay.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. *Fictional narratives are not included on the Writing and Language Test.*
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Essay—Analysis Essay—Writing
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
	the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. Essay—Writing *The Writing and Language Test is a test of revision and editing. Time does not typically permit students taking the Essay to rewrite or try a new approach. Students taking the Essay may plan, but their planning is not scored.*
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under	

Arizona Writing Standards 11–12	SAT Writing and Language and SAT Essay
investigation.	
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and over reliance on any one source and following a standard format for citation.	
9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grades 11–12 Reading standards to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics"). b. Apply grades 11–12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]").	Essay—Reading Essay—Analysis *Passages on the Essay are "informational texts" and "literary nonfiction" per Arizona's standards. On the Essay, students are required to draw evidence from an argument written for a broad audience. See the relevant Reading standards for alignment details.*
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	Essay—Analysis Essay—Writing *The Essay is a timed, single-sitting assessment. The Essay task is consistent from administration to administration.*

Note: The College and Career Readiness Anchor Standards for Speaking and Listening and the Speaking and Listening standards 11–12 are not included here as the SAT does not measure speaking and listening and therefore does not align with any of these standards.

Table 6: College and Career Readiness Anchor Standards for Language: AZ to SAT

Arizona Anchor Standards for Language	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and

Arizona Anchor Standards for Language	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept/except*, *allusion/illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. Essay—Writing *Speaking is not assessed.*
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation.

Arizona Anchor Standards for Language	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. Essay—Writing
3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Essay—Reading Essay—Analysis Essay—Writing *Listening is not assessed.*
4. Determine or clarify the meaning of unknown	Determining explicit meanings: The student will

Arizona Anchor Standards for Language	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.	identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Essay—Reading *Vocabulary strategies are not directly assessed. Students do not have access to reference materials.*
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Essay—Reading Essay—Analysis Essay—Writing
6. Acquire and use accurately a range of general academic and domain-specific words and phrases	Determining explicit meanings: The student will identify information and ideas explicitly stated in

Arizona Anchor Standards for Language	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.	text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Essay—Reading Essay—Analysis Essay—Writing *Speaking and listening are not assessed.* *Acquisition of vocabulary knowledge is not directly assessed.*

Table 7: Language "Progressive" Standards 11–12: AZ to SAT

Note: Only those "progressive" standards applicable to grades 11–12 are included in this table. The various PSAT/NMSQT and PSAT 10 as well as PSAT 8/9 alignments to Arizona standards indicate the minor alignment variations for those programs. "Items in a series" and "parallel structure" are treated as distinct testing points in the SAT, PSAT/NMSQT and PSAT 10, and PSAT 8/9 domains, as indicated throughout this document.

Arizona "Progressive" Standards for Language 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
Ensure subject-verb and pronoun-antecedent agreement	Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Essay—Writing
Choose words and phrases for effect	Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Essay—Writing
Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.	Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Essay—Writing
Correctly use frequently confused words (e.g., *to*/*too*/*two*; *there*/*their*).	Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Essay—Writing
Choose punctuation for effect.	End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will

Arizona "Progressive" Standards for Language 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Essay—Writing
Recognize and correct inappropriate shifts in verb tense.	Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Essay—Writing
Recognize and correct inappropriate shifts in pronoun number and person.	Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Essay—Writing
Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).	Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Essay—Writing
Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.	Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun person and number: The student will

Arizona "Progressive" Standards for Language 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within

Arizona "Progressive" Standards for Language 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. Essay—Writing *Speaking is not assessed.*
Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.	Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Essay—Writing
Maintain consistency in style and tone.	Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Essay—Writing
Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.	Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).

Arizona "Progressive" Standards for Language 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	Essay—Writing
Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.	Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Essay—Writing
Recognize and correct inappropriate shifts in verb voice and mood.	Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Essay—Writing
Use parallel structure.	Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Essay—Writing

Table 8: Language Standards 11–12: AZ to SAT

Arizona Language Standards 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested. b. Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's *Dictionary of English Usage*, Garner's *Modern American Usage*) as needed.	Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences.

Arizona Language Standards 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. Essay—Writing *Speaking is not assessed. Students do not have access to reference materials.*
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	Essay—Writing

Arizona Language Standards 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
a. Observe hyphenation conventions. b. Spell correctly.	
3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. a. Vary syntax for effect, consulting references (e.g., Tufte's *Artful Sentences*) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Essay—Reading Essay—Writing *Listening is not assessed. Students do not have access to reference materials.*
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Essay—Reading *Students are assessed on passages, not directly on "content." Students' flexible use of strategies is not directly assessed. Reference materials are not available to students.*
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions

Arizona Language Standards 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
b. Analyze nuances in the meaning of words with similar denotations.	from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Essay—Reading Essay—Analysis Essay—Writing
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice.

Arizona Language Standards 11–12	SAT Reading Test, SAT Writing and Language Test, and SAT Essay
	Essay—Reading Essay—Analysis Essay—Writing *Speaking and listening are not assessed.* *Acquisition of vocabulary knowledge is not directly assessed.*

Table 9: Reading Standards for Literacy in History/Social Studies 11–12: AZ to SAT

Arizona Reading Standards for Literacy in History/Social Studies 11–12	SAT Reading Test
1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text.
3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.	Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).

Arizona Reading Standards for Literacy in History/Social Studies 11–12	SAT Reading Test
4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines faction in *Federalist* No. 10).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. *The passages in any given Reading administration may or may not include extended study of a particular term.*
5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. *Primary sources (in the form of US founding documents and texts in the Great Global Conversation) are included but are not always "complex."*
6. Evaluate authors' differing points of view on the same historical event or issue by assessing the authors' claims, reasoning, and evidence.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support

Arizona Reading Standards for Literacy in History/Social Studies 11–12	SAT Reading Test
	a claim or counterclaim. Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *Passages from US founding documents and texts in the Great Global Conversation may be (but are not necessarily) paired. Social science passages are not paired.*
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Media and purely visual information are not included, although informational graphics, such as tables, graphs, and charts, are included on the Reading Test. Students are not asked to solve problems.*
8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.	
9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *The Reading Test includes one passage pair as well as a number of items requiring cross-text "bridging." Pairing may involve either primary and secondary sources or both, depending on test administration.*
10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11–CCR text complexity band independently and proficiently.	Text complexity: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.

Table 10: Reading Standards for Literacy in Science and Technical Subjects 11–12: AZ to SAT

Arizona Reading Standards for Literacy in Science and Technical Subjects 11–12	SAT Reading
1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. Assessing reasoning: The student will assess an author's reasoning for soundness. *While Reading Test passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text.
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions

Arizona Reading Standards for Literacy in Science and Technical Subjects 11–12	SAT Reading
	from text. *Students are assessed on passages, not directly on topics.*
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Media and purely visual information are not included, although informational graphics, such as tables, graphs, and charts, are included on the Reading Test. Students are not asked to solve problems.*
8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the

Arizona Reading Standards for Literacy in Science and Technical Subjects 11–12	SAT Reading
	information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. *While Reading Test passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre. Students have no direct means of externally validating or critiquing passages.*
9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *The Reading Test includes one passage pair as well as a number of items requiring cross-text "bridging." Pairing may or may not involve science, depending on test administration. Conflicting information may be noted and analyzed but cannot be resolved through external validation.*
10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.	Text complexity: The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry. *While Reading Test passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*

Table 11: Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12: AZ to SAT

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
1. Write arguments focused on *discipline-specific content*. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
	purposes. *The Writing and Language Test does not directly address precise concerns about audience. Writing and Language passages are too short to have distinct sections.*
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
	Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. *Formatting and multimedia are not used in the Writing and Language Test. The Writing and Language Test does not directly address such audience concerns as identified in (b) and (d), above. Writing and Language passages are too short to have distinct sections.*
3. (Not applicable as a separate requirement)	
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
	necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and

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	tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun person and number: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
	Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 11–12	SAT Writing and Language
	recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. *The Writing and Language Test is a test of revision and editing.*
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.	
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.	
9. Draw evidence from informational texts to support analysis, reflection, and research.	
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences	

English Language Arts/Literacy Alignment: SAT to Arizona's Standards
Tables 12 through 14 detail the SAT-Arizona alignment using SAT content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

Table 12: SAT Reading Test: SAT to AZ

SAT Reading Test	Arizona Standards
Text Complexity The passages/pair on the SAT Reading Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.	R.CCR.10 RL.11–12.10 AZ.11–12.10 RH.11–12.10 RST.11–12.10
Information and Ideas	
The student will identify information and ideas explicitly stated in text.	R.CCR.1 R.CCR.4 RL.11–12.1 RL.11–12.4 AZ.11–12.1 R1.11–12.3 AZ.11–12.4 L.CCR.3 L.CCR.4 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.4a L.11–12.5a L.11–12.6 RH.11–12.1 RH.11–12.4 RST.11–12.1 RST.11–12.4 RST.11–12.8

SAT Reading Test	Arizona Standards
The student will draw reasonable inferences and logical conclusions from text.	R.CCR.1 R.CCR.4 RL.11–12.1 RL.11–12.4 AZ.11–12.1 AZ.11–12.3 AZ.11–12.4 L.CCR.3 L.CCR.4 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.4a L.11–12.5a L.11–12.6 RH.11–12.1 RH.11–12.4 RST.11–12.1 RST.11–12.4 RST.11–12.8
The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation.	R.CCR.1 RL.11–12.1 AZ.11–12.1 AZ.11–12.3 RH.11–12.1 RST.11–12.1 RST.11–12.8
The student will cite the textual evidence that best supports a given claim or point.	R.CCR.1 RL.11–12.1 AZ.11–12.1 RH.11–12.1 RH.11–12.3 RST.11–12.1
The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text.	R.CCR.2 RL.11–12.2 AZ.11–12.2 AZ.11–12.9 RH.11–12.2 RST.11–12.2
The student will identify a reasonable summary of a text or of key information and ideas in text.	R.CCR.2 RL.11–12.2 AZ.11–12.2 RH.11–12.2 RST.11–12.2

SAT Reading Test	Arizona Standards
The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).	R.CCR.3 AZ.11–12.3 RH.11–12.3 RST.11–12.5
The student will determine the meaning of words and phrases in context.	R.CCR.4 RL.11–12.4 AZ.11–12.4 L.CCR.3 L.CCR.4 L.CCR.5 L.CCR.6 L.11–12.4a L.11–12.5a L.11–12.5b L.11–12.6 RH.11–12.4
Rhetoric	
The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.	R.CCR.4 RL.11–12.4 AZ.11–12.4 AZ.11–12.9 L.CCR.3 L.CCR.5 L.CCR.6 L.11–12.5a L.11–12.6 RH.11–12.4
The student will describe the overall structure of a text.	R.CCR.5 RL.11–12.3 AZ.11–12.5 RH.11–12.5 RST.11–12.5
The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.	R.CCR.5 RL.11–12.3 RL.11–12.5 AZ.11–12.5 AZ.11–12.9 L.CCR.5 L.CCR.6 L.11–12.5a L.11–12.6 RH.11–12.1 RH.11–12.5 RST.11–12.5 RST.11–12.6 RST.11–12.8

SAT Reading Test	Arizona Standards
The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style.	R.CCR.6 RL.11–12.3 RL.11–12.6 AZ.11–12.6 RH.11–12.6
The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).	R.CCR.6 RL.11–12.3 AZ.11–12.6 AZ.11–12.8 AZ.11–12.9 RST.11–12.6
The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text.	R.CCR.8 AZ.11–12.8 AZ.11–12.9 RH.11–12.6 RST.11–12.8
The student will assess an author's reasoning for soundness.	R.CCR.8 AZ.11–12.8 AZ.11–12.9 RH.11–12.6 RST.11–12.1 RST.11–12.8
The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.	R.CCR.8 AZ.11–12.8 AZ.11–12.9 RH.11–12.6 RST.11–12.8
Synthesis	
The student will synthesize information and ideas from paired texts.	R.CCR.9 RH.11–12.6 RH.11–12.9 RST.11–12.9
The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text.	R.CCR.7 AZ.11–12.7 RH.11–12.7 RST.11–12.7

Table 13: SAT Writing and Language Test: SAT to AZ

SAT Writing and Language Test	Arizona Standards
Text Complexity The passages on the SAT Writing and Language Test represent a specified range of text complexities from grades 9–10 to postsecondary entry.	
Expression of Ideas	
The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1a W.11–12.2a W.11–12.3a W.11–12.4 W.11–12.5 WHST.11–12.1a WHST.11–12.2a WHST.11–12.4 WHST.11–12.5
The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1b W.11–12.2b W.11–12.2d W.11–12.3b W.11–12.3d W.11–12.4 W.11–12.5 WHST.11–12.1b WHST.11–12.2b WHST.11–12.2d WHST.11–12.4 WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1b W.11–12.2b W.11–12.2d W.11–12.3b W.11–12.3d W.11–12.4 W.11–12.5 WHST.11–12.1b WHST.11–12.2b WHST.11–12.2d WHST.11–12.4 WHST.11–12.5
The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1b W.11–12.2b W.11–12.4 W.11–12.5 WHST.11–12.1b WHST.11–12.2b WHST.11–12.4 WHST.11–12.5
The student will revise text as needed to ensure that information and ideas are presented in the most logical order.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1a W.11–12.2a W.11–12.3a W.11–12.3c W.11–12.4 W.11–12.5 WHST.11–12.1a WHST.11–12.2a WHST.11–12.4 WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1a W.11–12.1c W.11–12.1e W.11–12.2a W.11–12.2c W.11–12.2f W.11–12.3a W.11–12.3c W.11–12.3e W.11–12.4 W.11–12.5 WHST.11–12.1a WHST.11–12.1c WHST.11–12.1e WHST.11–12.2a WHST.11–12.2c WHST.11–12.2e WHST.11–12.4 WHST.11–12.5
The student will revise text as needed to improve the exactness or content appropriateness of word choice.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.5 W.11–12.1c W.11–12.2d W.11–12.3d W.11–12.5 L.CCR.3 L.CCR.5 L.CCR.6 L.3.3a—progressive L.7.3a—progressive L.11–12.5b L.11–12.6 WHST.11–12.1c WHST.11–12.2d WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy).	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.5 W.11–12.5 L.CCR.3 L.7.3a—progressive WHST.11–12.5
The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.4 W.CCR.5 W.11–12.1d W.11–12.2d W.11–12.2e W.11–12.3d W.11–12.4 W.11–12.5 L.CCR.3 L.6.3b—progressive WHST.11–12.1d WHST.11–12.2d WHST.11–12.4 WHST.11–12.5
The student will use various sentence structures to accomplish needed rhetorical purposes.	W.CCR.1 W.CCR.2 W.CCR.3 W.CCR.5 W.11–12.1c W.11–12.2c W.11–12.5 L.CCR.3 L.11–12.3a WHST.11–12.1c WHST.11–12.2c WHST.11–12.5
Standard English Conventions	
The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).	W.CCR.5 W.11–12.5 L.CCR.1 L.4.1f—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will recognize and correct problems in coordination and subordination in sentences.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct problems in parallel structure in sentences.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.9–10.1a—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.7.1c—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences.	W.CCR.5 W.11–12.5 L.CCR.1 L.5.1d—progressive L.6.1e—progressive L.8.1d—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1c—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct pronouns with unclear or ambiguous antecedents.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1d—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will recognize and correct cases in which possessive determiners (*its, your, their*), contractions (*it's, you're, they're*), and adverbs (*there*) are confused with each other.	W.CCR.5 W.11–12.5 L.CCR.1 L.4.1g—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct lack of agreement between pronoun and antecedent.	W.CCR.5 W.11–12.5 L.CCR.1 L.3.1f—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct lack of agreement between subject and verb.	W.CCR.5 W.11–12.5 L.CCR.1 L.3.1f—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct lack of agreement between nouns.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept/except*, *allusion/illusion*).	W.CCR.5 W.11–12.5 L.CCR.1 L.4.1g—progressive L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct cases in which unlike terms are compared.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.11–12.1a WHST.11–12.5
The student will recognize and correct cases in which a given expression is inconsistent with standard written English.	W.CCR.5 W.11–12.5 L.CCR.1 L.6.1e—progressive L.11–12.1a WHST.11–12.5

SAT Writing and Language Test	Arizona Standards
The student will recognize and correct inappropriate uses of ending punctuation in cases in which the content makes the intent clear.	W.CCR.5 W.11–12.5 L.CCR.2 L.4.3b—progressive L.6.1e—progressive WHST.11–12.5
The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences.	W.CCR.5 W.11–12.5 L.CCR.2 L.4.3b—progressive L.6.1e—progressive WHST.11–12.5
The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms.	W.CCR.5 W.11–12.5 L.CCR.2 L.6.1e—progressive WHST.11–12.5
The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series.	W.CCR.5 W.11–12.5 L.CCR.2 L.6.1e—progressive L.9–10.1a—progressive WHST.11–12.5
The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation.	W.CCR.5 W.11–12.5 L.CCR.2 L.6.1e—progressive L.6.2a—progressive WHST.11–12.5
The student will recognize and correct cases in which unnecessary punctuation appears in a sentence.	W.CCR.5 W.11–12.5 L.CCR.2 L.6.1e—progressive WHST.11–12.5

Table 14: SAT Essay: SAT to AZ

SAT Essay	Arizona Standards
Reading	
Comprehension of the source text	R.CCR.1 R.CCR.2 R.CCR.3 R.CCR.4 AZ.11–12.1 AZ.11–12.2 AZ.11–12.3 AZ.11–12.4 L.CCR.3 L.CCR.4 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.4a L.11–12.5a L.11–12.5b L.11–12.6
Understanding of central ideas, important details, and their interrelationship	R.CCR.1 R.CCR.2 R.CCR.3 R.CCR.4 AZ.11–12.1 AZ.11–12.2 AZ.11–12.3 AZ.11–12.4 L.CCR.3 L.CCR.4 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.4a L.11–12.5a L.11–12.5b L.11–12.6
Accuracy in representation of the source text (i.e., no errors of fact or interpretation introduced)	Implicit in Arizona's research-related standards
Use of textual evidence (quotations, paraphrases, or both) to demonstrate understanding of the source text	R.CCR.1 AZ.11–12.1 W.CCR.9 W.11–12.9

SAT Essay	Arizona Standards
Analysis	
Analysis of the source text and understanding of the analytical task	R.CCR.4 R.CCR.5 R.CCR.6 R.CCR.8 AZ.11–12.4 AZ.11–12.5 AZ.11–12.6 W.CCR.1 W.CCR.2 W.CCR.4 W.CCR.9 W.11–12.1a W.11–12.1b W.11–12.2a W.11–12.2b W.11–12.4 W.11–12.9 L.CCR.3 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.5a L.11–12.6
Evaluation of the author's use of evidence, reasoning, and/or stylistic and persuasive elements, and/or features chosen by the student	R.CCR.4 R.CCR.5 R.CCR.6 R.CCR.8 AZ.11–12.4 AZ.11–12.5 AZ.11–12.6 W.CCR.1 W.CCR.2 W.CCR.4 W.CCR.9 W.11–12.1a W.11–12.1b W.11–12.2a W.11–12.2b W.11–12.4 W.11–12.9 L.CCR.3 L.CCR.5 L.CCR.6 L.11–12.3a L.11–12.5a L.11–12.6

SAT Essay	Arizona Standards
Support for claims or points made in the response	W.CCR.1 W.CCR.2 W.CCR.4 W.11–12.1b W.11–12.2b W.11–12.2d W.11–12.4
Focus on features of the text most relevant to addressing the task	W.CCR.1 W.CCR.2 W.CCR.4 W.11–12.1b W.11–12.2b W.11–12.2d W.11–12.4
Writing	
Use of a central claim	W.CCR.1 W.CCR.2 W.CCR.4 W.CCR.5 W.11–12.1a W.11–12.2a W.11–12.4 W.11–12.5
Use of effective organization and progression of ideas	W.CCR.1 W.CCR.2 W.CCR.4 W.CCR.5 W.11–12.1a W.11–12.1c W.11–12.1e W.11–12.2a W.11–12.2c W.11–12.2f W.11–12.4 W.11–12.5
Use of varied sentence structures	W.CCR.1 W.CCR.2 W.CCR.5 W.11–12.1c W.11–12.2c W.11–12.5 L.CCR.3 L.11–12.3a

SAT Essay	Arizona Standards
Employment of precise word choice	W.CCR.1 W.CCR.2 W.CCR.5 W.11–12.1c W.11–12.2d W.11–12.5 L.CCR.3 L.CCR.5 L.CCR.6 L.3.3a—progressive L.7.3a—progressive L.11–12.5b L.11–12.6
Maintenance of a consistent, appropriate style and tone	W.CCR.1 W.CCR.2 W.CCR.4 W.CCR.5 W.11–12.1d W.11–12.2d W.11–12.2e W.11–12.4 W.11–12.5 L.CCR.3 L.6.3b—progressive
Command of the conventions of standard written English	W.CCR.5 W.11–12.5 L.CCR.1 L.CCR.2 L.3.1f—progressive L.4.1f—progressive L.4.1g—progressive L.4.3b—progressive L.5.1d—progressive L.6.1c—progressive L.6.1d—progressive L.6.1e—progressive L.6.2a—progressive L.7.1c—progressive L.8.1d—progressive L.9–10.1a—progressive L.11-12.1a L.11–12.2a L.11–12.2b
Overall task	
Timed, on-demand writing task	W.CCR.10 W.11–12.10

Math Alignment: Arizona's Standards and SAT

The alignment between the Arizona Standards for High School Mathematics and the SAT Math Test is shown in tables 15 and 16. Table 15, Arizona High School Math Standards Alignment: AZ to SAT, details the Arizona-SAT alignment using Arizona's standards as the organizing principle. A standard is considered aligned if the content covered by the Arizona standard is measured on the SAT. For those standards that are covered, the SAT content dimensions are presented in the right-hand column. If the SAT column is blank, the knowledge or skill covered by the standard is not assessed on the SAT.

Table 16, SAT Math Test Alignment: SAT to AZ, details the SAT-Arizona alignment using SAT content specifications as the organization principle. In this table, the complete SAT content specifications are shown with the relevant Arizona standards aligned to each SAT content dimension.

Table 15: Arizona High School Math Standards Alignment: AZ to SAT

Arizona High School Math Standards: Number and Quantity	SAT Math Test
N-RN The Real Number System	
Extend the properties of exponents to rational exponents.	
1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**Passport to advanced math** Equivalent expressions
Use properties of rational and irrational numbers.	
3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	
N-Q Quantities	
Reason quantitatively and use units to solve problems.	
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Define appropriate quantities for the purpose of descriptive modeling.	
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	
N-CN The Complex Number System	
Perform arithmetic operations with complex numbers.	
1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	Additional topics in math Complex numbers
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex	Additional topics in math Complex numbers

Arizona High School Math Standards: Number and Quantity	SAT Math Test
numbers.	
Use complex numbers in polynomial identities and equations.	
7. Solve quadratic equations with real coefficients that have complex solutions.	

Arizona High School Math Standards: Algebra	SAT Math Test
A-SSE Seeing Structure in Expressions	
Interpret the structure of expressions	
1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	**Heart of algebra** Linear functions Linear equations in two variables **Passport to advanced math** Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
2. Use the structure of an expression to identify ways to rewrite it.	**Heart of algebra** Linear functions Linear equations in two variables **Passport to advanced math** Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
Write expressions in equivalent forms to solve problems	
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions.	**Passport to advanced math** Nonlinear functions

Arizona High School Math Standards: Algebra		SAT Math Test
	4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.	
A-APR Arithmetic with Polynomials and Rational Expressions		
	Perform arithmetic operations on polynomials	
	1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**Passport to advanced math** Equivalent expressions
	Understand the relationship between zeros and factors of polynomials	
	2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	**Passport to advanced math** Nonlinear functions
	3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Use polynomial identities to solve problems	
	4. Prove polynomial identities and use them to describe numerical relationships.	
	Rewrite rational expressions	
	6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/ b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	**Passport to advanced math** Equivalent expressions.
A-CED Creating Equations		
	Create equations that describe numbers or relationships	
	1. Create equations and inequalities in one variable and use them to solve problems.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables
	2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**Heart of algebra** Linear functions
	3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	**Heart of algebra** Linear equations in two variables Linear inequalities in one or two variables
	4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**Passport to advanced math** Nonlinear equations in one

Arizona High School Math Standards: Algebra		SAT Math Test
		variable and systems of equations in two variables
A-REI Reasoning with Equations and Inequalities		
	Understand solving equations as a process of reasoning and explain the reasoning	
	1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**Heart of algebra** Linear equations in one variable Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables **Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
	2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Solve equations and inequalities in one variable	
	3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables **Problem solving and data analysis** Ratios, rates, proportional relationships, and units Two-variable data: Models and scatterplots

	Arizona High School Math Standards: Algebra	SAT Math Test
	4. Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Solve systems of equations	
	5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
	6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	**Heart of algebra** Systems of two linear equations in two variables
	7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Represent and solve equations and inequalities graphically	
	10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**Heart of algebra** Linear equations in two variables Nonlinear functions
	11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	
	12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	**Heart of algebra** Linear inequalities in one or two variables

	Arizona High School Math Standards: Functions	SAT Math Test
F-IF Interpreting Functions		
	Understand the concept of a function and use function notation	

Arizona High School Math Standards: Functions	SAT Math Test
1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	
Interpret functions that arise in applications in terms of the context	
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
Analyze functions using different representations	
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**Heart of algebra** Linear functions **Problem solving and data analysis** One variable data: Distributions and measures of center and spread **Passport to advanced math** Nonlinear functions
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions

Arizona High School Math Standards: Functions		SAT Math Test
	expressions for exponential functions.	
	9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-BF Building Functions		
	Build a function that models a relationship between two quantities	
	1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
	Build new functions from existing functions	
	3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
	4. Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	

Arizona High School Math Standards: Functions		SAT Math Test
F-LE Linear, Quadratic, and Exponential Models		
	Construct and compare linear, quadratic, and exponential models and solve problems	
	1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	**Heart of algebra** Linear functions **Problem solving and data analysis** Ratios, rates, proportional relationships, and units Two-variable data: Models and scatterplots **Passport to advanced math** Nonlinear functions
	2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	
	4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	
	Interpret expressions for functions in terms of the situation they model	
	5. Interpret the parameters in a linear or exponential function in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-TF Trigonometric Functions		
	Extend the domain of trigonometric functions using the unit circle	
	1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	Additional topics in math Circles
	2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	Additional topics in math Circles
	Model periodic phenomena with trigonometric functions	
	5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	
	Prove and apply trigonometric identities	

Arizona High School Math Standards: Functions		SAT Math Test
	8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	

Arizona High School Math Standards: Modeling	SAT Math Test
Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol.	An emphasis on modeling is apparent throughout the redesigned SAT Math Test

Arizona High School Math Standards: Geometry		SAT Math Test
G-CO Congruence		
	Experiment with transformations in the plane	
	1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Additional topics in math Lines, angles, and triangles Right angles and trigonometry Circles
	2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	
	3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	
	4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	
	5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	
	Understand congruence in terms of rigid motions	
	6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	

	Arizona High School Math Standards: Geometry	SAT Math Test
	7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	
	8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	
	Prove geometric theorems	
	9. Prove theorems about lines and angles.	Additional topics in math Lines, angles, and triangles
	10. Prove theorems about triangles.	Additional topics in math Lines, angles, and triangles
	11. Prove theorems about parallelograms.	
	Make geometric constructions	
	12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	
	13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	
G-SRT Similarity, Right Triangles, and Trigonometry		
	Understand similarity in terms of similarity transformations	
	1. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	
	2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	
	3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	
	Prove theorems involving similarity	
	4. Prove theorems about triangles.	Additional topics in math Lines, angles, and triangles
	5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Additional topics in math Lines, angles, and triangles
	Define trigonometric ratios and solve problems involving right triangles	

Arizona High School Math Standards: Geometry		SAT Math Test
	6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Additional topics in math Right triangles and trigonometry
	7. Explain and use the relationship between the sine and cosine of complementary angles.	Additional topics in math Right triangles and trigonometry
	8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Additional topics in math Right triangles and trigonometry
G-C Circles		
	Understand and apply theorems about circles	
	1. Prove that all circles are similar.	
	2. Identify and describe relationships among inscribed angles, radii, and chords.	Additional topics in math Circles
	3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Additional topics in math Circles
	Find arc lengths and areas of sectors of circle	
	5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	Additional topics in math Circles
G-GPE Expressing Geometric Properties with Equations		
	Translate between the geometric description and the equation for a conic section	
	1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Additional topics in math Circles
	2. Derive the equation of a parabola given a focus and directrix.	
	Use coordinates to prove simple geometric theorems algebraically	
	4. Use coordinates to prove simple geometric theorems algebraically.	
	5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	**Heart of algebra** Linear equations in two variables
	6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	
	7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	
G-GMD Geometric Measurement and Dimension		
	Explain volume formulas and use them to solve problems	
	1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	

Arizona High School Math Standards: Geometry		SAT Math Test
	3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Additional topics in math Area and volume
	Visualize relationships between two-dimensional and three-dimensional objects	
	4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	
G-MG Modeling with Geometry		
	Apply geometric concepts in modeling situations	
	1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	
	2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
	3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	

Arizona High School Math Standards: Statistics and Probability		SAT Math Test
S-ID Interpreting Categorical and Quantitative Data		
	Summarize, represent, and interpret data on a single count or measurement variable	
	1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread

Arizona High School Math Standards: Statistics and Probability	SAT Math Test
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	
Summarize, represent, and interpret data on two categorical and quantitative variables	
5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**Problem solving and data analysis** Probability and conditional probability
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	**Problem solving and data analysis** Two variable data: Models and scatterplots
Interpret linear models	
7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**Problem solving and data analysis** Two variable data: Models and scatterplots **Heart of algebra** Linear equations in two variables
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.	
9. Distinguish between correlation and causation.	
S-IC Making Inferences and Justifying Conclusions	
Understand and evaluate random processes underlying statistical experiments	
1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**Problem solving and data analysis** Inference from sample statistics and margin of error
2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	
Make inferences and justify conclusions from sample surveys, experiments, and observational studies	

	Arizona High School Math Standards: Statistics and Probability	SAT Math Test
	3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
	4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	
	5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	
	6. Evaluate reports based on data.	**Problem solving and data analysis** Evaluating statistical claims: Observational studies and experiments
S-CP Conditional Probability and the Rules of Probability		
	Understand independence and conditional probability and use them to interpret data	
	1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	
	2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	
	3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	
	4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	**Problem solving and data analysis** Probability and conditional probability
	5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	Use the rules of probability to compute probabilities of compound events in a uniform probability model	
	6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	
	7. Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model.	

Table 16: SAT Math Test Alignment: SAT to AZ

The following table details the SAT-Arizona alignment using SAT content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

SAT Math Test		Arizona Math Standards
SAT HEART OF ALGEBRA		
	Linear equations in one variable	
	• Create and use linear equations in one variable to solve problems in a variety of contexts. • Create a linear equation in one variable, and when in context interpret solutions in terms of the context. • Solve a linear equation in one variable making strategic use of algebraic structure. • For a linear equation in one variable, o interpret a constant, variable, factor or term in a context; o determine the conditions under which the equation has no solution, a unique solution, or infinitely many solutions. • Fluently solve a linear equation in one variable.	A-CED.A.1 A-REI.B.3 See also these relevant precursors: 8-EE.C.7
	Linear functions	
	• Create and use linear functions to solve problems in a variety of contexts. • Create a linear function to model a relationship between two quantities. • For a linear function that represents a context a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. • Make connections between verbal, tabular, algebraic, and graphical representations of a linear function, by a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation. • Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.	A-SSE.A.1 A-SSE.A.2 A-SSE.A.2 F-BF.A.1 F-IF.C.8 A-CED.A.2 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7a F-IF.C.9 F-BF.A.1b F-LE.A.1b F-LE.A.2 F-LE.B.5
	Linear equations in two variables	

	SAT Math Test	Arizona Math Standards
	• Create and use a linear equation in two variables to solve problems in a variety of contexts. • Create a linear equation in two variables to model a constraint or condition on two quantities. • For a linear equation in two variables that represents a context o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o given a value of one quantity in the relationship, find a value of the other, if it exists. • Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by o deriving one representation from the other; o identifying features of one representation given the other representation; o determining how a graph is affected by a change to its equation. • Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.	A-SSE.A.1 A-SSE.A.2 A-CED.A.3 A-REI.D.10 G-GPE.B.5 S-AZ.C.7
	Systems of two linear equations in two variables	
	• Create and use a system of two linear equations in two variables to solve problems in a variety of contexts. • Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context. • Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other. • Solve a system of two linear equations in two variables making strategic use of algebraic structure. • For a system of linear equations in two variables, o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o determine the conditions under which the system has no solution, a unique solution, or infinitely many solutions. • Fluently solve a system of linear equations in two variables.	A.REI.C.6
	Linear inequalities in one or two variables	

	SAT Math Test	Arizona Math Standards
	• Create and use linear inequalities in one or two variables to solve problems in a variety of contexts. • Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. • For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. • Make connections between tabular, algebraic, and graphical representations of linear inequalities in one or two variables by deriving one from the other. Given a linear inequality or system of linear inequalities, interpret a point in the solution set.	A-CED.A.1 A-CED.A.3 A-REI.B.3 A.REI.D.12
SAT PROBLEM SOLVING AND DATA ANALYSIS		
	Ratios, rates, proportional relationships, and units	
	Items will requires students to solve problems by using a proportional relationship between quantities, calculating or using a ratio or rate, and/or using units, derived units, and unit conversion. • Apply proportional relationships, ratios, rates and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences. • Solve problems involving o derived units including those that arise from products (e.g., kilowatt-hours) and quotients (e.g., population per square kilometer); o unit conversion including currency exchange and conversion between different measurement systems. • Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.	A-REI.B.3 F-LE.1 N-Q.A.1 G-MG.A.2 Modeling See also these relevant precursors: 6-RP.A.3b; 6-RP.A.3c; 6-RP.A.3d; 7-RP.A.1; 7-RP.A.2b; 7-RP.A.3.
	Percentages	
	• Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities. • Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.	Modeling; See also these relevant precursors: 6.RP.A.3c; 7-RP.A.3
	One variable data: Distributions and measures of center and spread	
	• Choose an appropriate graphical representation for a given data set. • Interpret information from a given representation of data in context. • Analyze and interpret numerical data distributions	S-AZ.A.1 S-AZ.A.2 S-AZ.A.3 F-IF.C.7

SAT Math Test		Arizona Math Standards
	represented with frequency tables, histograms, dot plots, and boxplots. • For quantitative variables, calculate, compare, and interpret mean, median, and range. Interpret (but don't calculate) standard deviation. • Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations and ones with the same mean and different standard deviations. • Understand and describe the effect of outliers on mean and median. • Given an appropriate data set, calculate the mean.	
	Two-variable data: Models and scatterplots	
	• Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set. • Interpret the slope and intercepts of the line of best fit in context. • Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship. • Analyze and interpret data represented in a scatterplot or line graph; fit linear, quadratic, and exponential models. • Select a graph that represents a context, identify a value on a graph, or interpret information on the graph. • For a given function type (linear, quadratic, exponential), choose the function of that type that best fits given data. • Compare linear and exponential growth. • Estimate the line of best fit for a given scatterplot; use the line to make predictions.	A-REI.B.3 F-LE.1 S-AZ.B.6a S-AZ.B.6c S-AZ.C.7
	Probability and conditional probability	
	Use one- and two-way tables, tree diagrams, area models, and other representations to find relative frequency, probabilities, and conditional probabilities. • Compute and interpret probability and conditional probability in simple contexts. • Understand formulas for probability, and conditional probability in terms of frequency.	S-AZ.B.5 S-CP.A.4
	Inference from sample statistics and margin of error	
	• Use sample mean and sample proportion to estimate population mean and population proportion. Utilize, but do not calculate, margin of error. • Interpret margin of error; understand that a larger sample size generally leads to a smaller margin of error.	S-IC.A.1
	Evaluating statistical claims: Observational studies and experiments	

	SAT Math Test	Arizona Math Standards
	• With random samples, describe which population the results can be extended to. • Given a description of a study with or without random assignment, determine whether there is evidence for a causal relationship. • Understand why random assignment provides evidence for a causal relationship. • Understand why a result can be extended only to the population from which the sample was selected.	S-IC.B.6
SAT PASSPORT TO ADVANCED MATH		
	Equivalent expressions	
	• Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including o rewriting simple rational expressions; o rewriting expressions with rational exponents and radicals; o factoring polynomials. • Fluently add, subtract, and multiply polynomials.	N-RN.A.2 A-SSE.A.1a A-SSE.A.2 A-APR.A.1 A-APR.D.6
	Nonlinear equations in one variable and systems of equations in two variables	
	• Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to o solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, 1 real solution, or 2 real solutions; o solve simple rational and radical equations in one variable; o identify when the procedures used to solve a simple rational or radical equation in one variable lead to an equation with solutions that do not satisfy the original equation (extraneous solutions); o solve polynomial equations in one variable that are written in factored form; o solve linear absolute value equations in one variable; o solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. • Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage. • Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest.	A-SSE.A.1 A-SSE.A.2 A-APR.B.3 A-CED.A.4 A-REI.A.2 A-REI.B.4 A.REI.C.7

	SAT Math Test	Arizona Math Standards
	• Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.	
	Nonlinear functions	
	• Create and use quadratic or exponential functions to solve problems in a variety of contexts. • For a quadratic or exponential function, o identify or create an appropriate function to model a relationship between quantities; o use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; o for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o determine the most suitable form of the expression representing the output of the function to display key features of the context, including selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value; selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time; o make connections between tabular, algebraic, and graphical representations of the function, by given one representation, selecting another representation; identifying features of one representation given the another representation, including maximum and minimum values of the function; determining how a graph is affected by a change to its equation, including a vertical shift or scaling of the graph. • For a factorable or factored polynomial or simple rational function, o use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; o understand and use the fact that for the graph of y = f(x), the solutions to f(x) = 0 correspond to x-intercepts of the graph and f(0) corresponds to the y-intercept of the graph; interpret these key features in terms of a context; o identify the graph given an algebraic representation of the function and an algebraic representation given the graph (with or without a context).	A-SSE.A.1 A-SSE.A.2 A-SSE.B.3 A-APR.B.2 A-REI.D.10 A-REI.D.1 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7b F-IF.C.7c F-IF.C.7e F-IF.C.8a F-IF.C.8b F-IF.C.9 F-BF.A.1a F-LE.A.1a F-LE.A.1c F-LE.A.2 F-LE.B.5
SAT ADDITIONAL TOPICS IN MATH		
	Area and volume	

	SAT Math Test	Arizona Math Standards
	• Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume. o Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, changes all areas by a factor of k2, and changes all volumes by a factor of k3. o Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.	G-GMD.A.3
	Lines, angles, and triangles	
	• Use concepts and theorems relating to congruence and similarity of triangles to solve problems. • Determine which statements may be required to prove certain relationships or to satisfy a given theorem. • Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, but angle measures remain unchanged. • Know and directly apply relevant theorems such as o the vertical angle theorem; o triangle similarity and congruence criteria; o triangle angle sum theorem; o the relationship of angles formed when a transversal cuts parallel lines.	G-CO.A.1 G-CO.C.9 G-CO.C.10 G-SRT.B.4 G-SRT.B.5
	Right triangles and trigonometry	
	• Solve problems in a variety of contexts using o the Pythagorean theorem; o right triangle trigonometry; o properties of special right triangles. • Use similarity to calculate values of sine, cosine, and tangent. • Understand that when given one side length and one acute angle measure in a right triangle, the remaining values can be determined. • Solve problems using the relationship between sine and cosine of complementary angles. • Fluently apply properties of special right triangles to determine side-lengths and calculate trigonometric ratios of 30, 45, and 60 degrees.	G-CO.A.1 G-SRT.C.6 G-SRT.C.7 G-SRT.C.8
	Circles	

	SAT Math Test	Arizona Math Standards
	• Use definitions, properties, and theorems relating to circles and parts of circles, such as radii, diameters, tangents, angles, arcs, arc lengths, and sector areas to solve problems. • Solve problems using o radian measure; o trigonometric ratios in the unit circle. • Create an equation to represent a circle in the xy-plane. • Describe how o a change to the equation representing a circle in the xy-plane affects the graph of the circle; o a change in the graph of the circle affects the equation of the circle. • Understand that the ordered pairs that satisfy an equation of the form (x – h)2 + (y – k)2 = r2 form a circle when plotted in the xy-plane. • Convert between angle measures in degrees and radians. • Complete the square in an equation representing a circle to determine properties of the circle when it is graphed in the xy-plane, and use the distance formula in problems related to circles.	F-TF.A.1 F-TF.A.2 G-CO.A.1 G-C.A.2 G-C.A.3 G-C.B.5 G-GPE.A.1
	Complex numbers	
	• Apply knowledge and understanding of the complex number system to add, subtract, multiply and divide with complex numbers and solve problems.	N-CN.A.1 N-CN.A.2

Section 5: State Standards Alignment Tables—PSAT/NMSQT and PSAT 10

The detailed results of the alignments conducted between Arizona's standards and the knowledge and skills assessed by the redesigned PSAT/NMSQT and PSAT 10 are presented in this section. The English Language Arts/Literacy alignment results are presented in tables 17 through 25 and are followed by the Math alignment results in tables 26 and 27. Tables 17 through 23 (English Language Arts/Literacy) and table 26 (Math) show Arizona's standards in the left-hand column and aligned PSAT/NMSQT and PSAT 10 content specifications in the right-hand column. Tables 24 and 25 (English Language Arts/Literacy) and table 27 (Math) present the PSAT/NMSQT and PSAT 10 content specifications in the left-hand column and aligned Arizona standards in the right-hand column.

English Language Arts/Literacy Alignment: Arizona's Standards to PSAT/NMSQT and PSAT 10
Tables 17 through 23 detail the PSAT/NMSQT and PSAT 10–Arizona alignment using Arizona's standards as the organizing principle. In selected cases, a partial or otherwise qualified alignment was noted through the use of red text. A partial or qualified alignment was indicated only when College Board staff felt that doing so identified an essential agreement that respected the spirit of the element being incompletely aligned to. Additional explanatory notes (also in red, in the right-hand column) are included to help illuminate College Board's methodology.

Table 17: Reading Standards for Literature 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Reading Standards for Literature Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.

Arizona Reading Standards for Literature Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
2. Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
3. Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style.
4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.

Arizona Reading Standards for Literature Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
5. Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. *Works of literature on the test may be authored by people from or outside the United States. Prior knowledge of world literature is not directly assessed.*
7. Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden's "Musée des Beaux Arts" and Breughel's Landscape with the Fall of Icarus).	
8. (Not applicable to literature)	
9. Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).	
10. By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9-10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 9-10 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9–12.

Table 18: Reading Standards for Informational Text 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Reading Standards for Informational Text Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.
2. Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.

Arizona Reading Standards for Informational Text Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.
5. Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). *Reading Test passages are too short to have defined "larger portions."*
6. Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
7. Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.	

Arizona Reading Standards for Informational Text Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. *Sufficiency is a subjective judgment not assessed by the multiple-choice Reading Test questions. Students are not asked to identify "false statements," which would require external validation. Students may be asked to recognize weaknesses or inconsistencies in authors' reasoning but not to identify fallacies by name.*
9. Analyze seminal U.S. documents of historical and literary significance (e.g., Arizona's Farewell Address, the Gettysburg Address, Roosevelt's Four Freedoms speech, King's "Letter from Birmingham Jail"), including how they address related themes and concepts.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *The Reading Test includes either a selection or pair from a US founding document or documents, or a selection or pair from a text or texts in the Great Global Conversation.*

Arizona Reading Standards for Informational Text Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
10. By the end of grade 9, read and comprehend literacy nonfiction in the grades 9-10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9-10 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9–12.

Table 19: Writing Standards 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes.

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Writing and Language items address topics, not texts. Sufficiency is a subjective judgment not assessed by the multiple-choice Writing and Language Test questions. The Writing and Language Test does not directly address the particular audience concerns identified in (b), above. Writing and Language passages are too short to have distinct sections.
2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. *Formatting and multimedia are not used in the Writing and Language Test. Sufficiency is a subjective judgment not assessed by the multiple-choice Writing and Language Test questions. The Writing and Language Test does not directly address the particular audience concern identified in (b), above. Writing and Language passages are too short to have distinct sections.*
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	within a text or to improve the match of style and tone to purpose. *Fictional narratives are not included on the Writing and Language Test.*
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun number and person: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (its, your, their), contractions (it's, you're, they're), and adverbs (there) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., accept/except, allusion/illusion).

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. *The Writing and Language Test is a test of revision and editing.*
6. Use technology, including the Internet, to produce, publish, and update individual or shared	

Arizona Writing Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	
9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grades 9-10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]"). b. Apply *grades 9-10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").	
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	

Note: The Speaking and Listening standards 9–10 are not included here as neither the PSAT/NMSQT nor PSAT 10 measures speaking and listening and therefore neither aligns with any of these standards.

Table 20: Language Standards 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Language Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test PSAT/NMSQT and PSAT 10 Writing and Language Test
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Use parallel structure.* b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.	Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). *Speaking and presentations are not assessed.*
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses. b. Use a colon to introduce a list or quotation. c. Spell correctly.	Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. *Capitalization and spelling are not assessed on the Writing and Language Test.*
3. Apply knowledge of language to understand how language functions in different contexts, to	

Arizona Language Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test PSAT/NMSQT and PSAT 10 Writing and Language Test
make effective choices for meaning or style, and to comprehend more fully when reading or listening. a. Write and edit work so that it conforms to the guidelines in a style manual (e.g., *MLA Handbook*, Turabian's *Manual for Writers*) appropriate for the discipline and writing type.	
4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grades 9–10 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., *analyze, analysis, analytical; advocate, advocacy*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. *Students are assessed on passages, not directly on content. Students' flexible use of strategies is not directly assessed. Reference materials are not available to students.*
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text. b. Analyze nuances in the meaning of words with similar denotations.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine

Arizona Language Standards Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test PSAT/NMSQT and PSAT 10 Writing and Language Test
	how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice.
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. *Speaking and listening are not assessed.* *Acquisition of vocabulary knowledge is not directly assessed.*

Table 21: Reading Standards for Literacy in History/Social Studies 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Reading Standards for Literacy in History/Social Studies Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text.
3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).
4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context.
5. Analyze how a text uses structure to emphasize	Analyzing overall text structure: The student will

Arizona Reading Standards for Literacy in History/Social Studies Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
key points or advance an explanation or analysis.	describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing multiple texts: The student will synthesize information and ideas from paired texts *Passages from US founding documents and texts in the Great Global Conversation may be (but are not necessarily) paired. Social science passages are not paired.*
7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Purely digital texts do not appear on the Reading Test, though print versions of digitally published texts do.*
8. Assess the extent to which the reasoning and evidence in a text support the author's claims.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.
9. Compare and contrast treatments of the same topic in several primary and secondary sources.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts.

Arizona Reading Standards for Literacy in History/Social Studies Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
	The Reading Test contains one pair of passages.
10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9–12.

Table 22: Reading Standards for Literacy in Science and Technical Subjects 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Reading Standards for Literacy in Science and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. *While Reading Test passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as	Determining explicit meanings: The student will identify information and ideas explicitly stated in

Arizona Reading Standards for Literacy in Science and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.	text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. *Students are assessed on passages, not directly on topics.*
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence). Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Students must draw information and ideas from graphics but do not graphically represent information and ideas. Mathematical representations are not assessed.*
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness.

Arizona Reading Standards for Literacy in Science and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Reading Test
	Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9–12. *While Reading Test passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*

Table 23: Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 9–10: AZ to PSAT/NMSQT and PSAT 10

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
1. Write arguments focused on *discipline-specific content*. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. *The Writing and Language Test does not directly address the particular audience concerns identified*

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	in (b), above. Writing and Language passages are too short to have distinct sections.
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Formatting and multimedia are not used in the Writing and Language Test. The Writing and Language Test does not directly address such audience concerns as identified in (b) and (d), above. Writing and Language passages are too short to have distinct sections.
3. (Not applicable as a separate requirement)	
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
new approach, focusing on addressing what is most significant for a specific purpose and audience.	sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Sentence formation: These questions focus on editing text to correct problems with forming grammatically complete and standard sentences. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Inappropriate shifts in construction: These questions focus on editing text to correct inappropriate shifts in verb tense, voice, and mood and pronoun person and number. Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun number and pronoun: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (its, your, their), contractions (it's, you're, they're), and adverbs (there) are confused with each other.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., accept/except, allusion/illusion). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series.

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9–10	PSAT/NMSQT and PSAT 10 Writing and Language Test
	Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. *The Writing and Language Test is a test of revision and editing.*
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	
7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	
9. Draw evidence from informational texts to support analysis, reflection, and research.	
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	

English Language Arts/Literacy Alignment: PSAT/NMSQT and PSAT 10 to Arizona's Standards
Tables 24 and 25 detail the PSAT/NMSQT and PSAT 10–Arizona alignment using PSAT/NMSQT and PSAT 10 content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

Table 24: PSAT/NMSQT and PSAT 10 Reading Test: PSAT/NMSQT and PSAT 10 to AZ

PSAT/NMSQT and PSAT 10 Reading Test	Arizona Standards
Text Complexity The passages/pair on the PSAT/NMSQT and PSAT 10 Reading Tests represent a specified range of text complexities from grades 9–12.	RL.9–10.10 AZ.9–10.10 RH.9–10.10 RST.9–10.10
Information and Ideas	
The student will identify information and ideas explicitly stated in text.	RL.9–10.1 RL.9–10.4 AZ.9–10.1 AZ.9–10.4 AZ.9–10.9 L.9–10.4a L.9–10.5a L.9–10.6 RH.9–10.1 RH.9–10.4 RST.9–10.1 RST.9–10.4
The student will draw reasonable inferences and logical conclusions from text.	RL.9–10.1 RL.9–10.4 AZ.9–10.1 AZ.9–10.4 AZ.9–10.9 L.9–10.4a L.9–10.5a L.9–10.6 RH.9–10.1 RH.9–10.4 RST.9–10.1 RST.9–10.4
The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation.	RL.9–10.1 AZ.9–10.1 AZ.9–10.9 RH.9–10.1 RST.9–10.1
The student will cite the textual evidence that best supports a given claim or point.	RL.9–10.1 AZ.9–10.1 RH.9–10.1 RST.9–10.1

PSAT/NMSQT and PSAT 10 Reading Test	Arizona Standards
The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text.	RL.9–10.2 AZ.9–10.2 AZ.9–10.9 RH.9–10.2 RST.9–10.2
The student will identify a reasonable summary of a text or of key information and ideas in text.	RL.9–10.2 AZ.9–10.2 RH.9–10.2 RST.9–10.2
The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).	RL.9–10.3 AZ.9–10.3 RH.9–10.3 RST.9–10.2 RST.9–10.5
The student will determine the meaning of words and phrases in context.	RL.9–10.4 AZ.9–10.4 L.9–10.4a L.9–10.5a L.9–10.5b L.9–10.6 RH.9–10.4
Rhetoric	
The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.	RL.9–10.4 AZ.9–10.4 L.9–10.5a L.9–10.6
The student will describe the overall structure of a text.	RL.9–10.3 RL.9–10.5 AZ.9–10.5 RH.9–10.5 RST.9–10.5
The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.	RL.9–10.2 RL.9–10.3 RL.9–10.5 AZ.9–10.2 AZ.9–10.3 AZ.9–10.5 L.9–10.5a L.9–10.6 RH.9–10.5 RH.9–10.6 RST.9–10.5 RST.9–10.6

PSAT/NMSQT and PSAT 10 Reading Test	Arizona Standards
The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style.	RL.9–10.3 RL.9–10.6 AZ.9–10.6 RH.9–10.6
The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).	AZ.9–10.5 AZ.9–10.6 RST.9–10.6
The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text.	AZ.9–10.8 RH.9–10.8 RST.9–10.8
The student will assess an author's reasoning for soundness.	AZ.9–10.8 RH.9–10.8 RST.9–10.8
The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.	AZ.9–10.8 RH.9–10.8 RST.9–10.8
Synthesis	
The student will synthesize information and ideas from paired texts. (Note: These skills listed may be tested with either single or paired passages.)	AZ.9–10.9 RH.9–10.6 RH.9–10.9
The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text.	RH.9–10.7 RST.9–10.7

Table 25: PSAT/NMSQT and PSAT 10 Writing and Language Test: PSAT/NMSQT and PSAT 10 to AZ

PSAT/NMSQT and PSAT 10 Writing and Language Test	Arizona Standards
Text Complexity The passages on the PSAT/NMSQT and PSAT 10 Writing and Language Tests represent a specified range of text complexities from grades 9–12.	
Expression of Ideas	
The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.	W.9–10.1a W.9–10.2a W.9–10.3a W.9–10.4 W.9–10.5 WHST.9–10.1a WHST.9–10.2a WHST.9–10.4 WHST.9–10.5
The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text.	W.9–10.1b W.9–10.2b W.9–10.3b W.9–10.3d W.9–10.4 W.9–10.5 WHST.9–10.1b WHST.9–10.2b WHST.9–10.4 WHST.9–10.5
The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose.	W.9–10.1b W.9–10.2b W.9–10.3b W.9–10.3d W.9–10.4 W.9–10.5 WHST.9–10.2b WHST.9–10.4 WHST.9–10.5
The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text.	W.9–10.1b W.9–10.2b W.9–10.4 W.9–10.5 WHST.9–10.1b WHST.9–10.2b WHST.9–10.4 WHST.9–10.5

PSAT/NMSQT and PSAT 10 Writing and Language Test	Arizona Standards
The student will revise text as needed to ensure that information and ideas are presented in the most logical order.	W.9–10.1a W.9–10.2a W.9–10.3a W.9–10.3c W.9–10.4 W.9–10.5 WHST.9–10.1a WHST.9–10.2a WHST.9–10.4 WHST.9–10.5
The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas.	W.9–10.1a W.9–10.1c W.9–10.1e W.9–10.2a W.9–10.2c W.9–10.2f W.9–10.3a W.9–10.3c W.9–10.3e W.9–10.4 W.9–10.5 WHST.9–10.1a WHST.9–10.1c WHST.9–10.1e WHST.9–10.2a WHST.9–10.2c WHST.9–10.2f WHST.9–10.4 WHST.9–10.5
The student will revise text as needed to improve the exactness or content appropriateness of word choice.	W.9–10.1c W.9–10.2d W.9–10.3d W.9–10.5 L.3.3a—progressive L.7.3a—progressive L.9–10.1b L.9–10.5b L.9–10.6 WHST.9–10.1c WHST.9–10.2d WHST.9–10.5
The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy).	W.9–10.5 L.7.3a—progressive WHST.9–10.5

PSAT/NMSQT and PSAT 10 Writing and Language Test	Arizona Standards
The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.	W.9–10.1d W.9–10.2e W.9–10.3d W.9–10.4 W.9–10.5 L.6.3b—progressive L.9–10.1b WHST.9–10.1d WHST.9–10.2d WHST.9–10.2e WHST.9–10.4 WHST.9–10.5
The student will use various sentence structures to accomplish needed rhetorical purposes.	W.9–10.1c W.9–10.2c W.9–10.5 W.9–10.5b L.6.3a—progressive L.9–10.1b WHST.9–10.1c WHST.9–10.2c WHST.9–10.5
Standard English Conventions	
The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).	W.9–10.5 L.4.1f—progressive L.6.1e—progressive L.9–10.1b WHST.9–10.5
The student will recognize and correct problems in coordination and subordination in sentences.	W.9–10.5 L.6.1e—progressive L.9–10.1b WHST.9–10.5
The student will recognize and correct problems in parallel structure in sentences.	W.9–10.5 L.6.1e—progressive L.9–10.1a L.9–10.1b WHST.9–10.5
The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).	W.9–10.5 L.6.1e—progressive L.7.1c—progressive L.9–10.1b WHST.9–10.5
The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences.	W.9–10.5 L.5.1d—progressive L.6.1e—progressive L.8.1d—progressive WHST.9–10.5

PSAT/NMSQT and PSAT 10 Writing and Language Test	Arizona Standards
The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences.	W.9–10.5 L.6.1c—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct pronouns with unclear or ambiguous antecedents.	W.9–10.5 L.6.1d—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct cases in which possessive determiners (*its, your, their*), contractions (*it's, you're, they're*), and adverbs (*there*) are confused with each other.	W.9–10.5 L.4.1g—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct lack of agreement between pronoun and antecedent.	W.9–10.5 L.3.1f—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct lack of agreement between subject and verb.	W.9–10.5 L.3.1f—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct lack of agreement between nouns.	W.9–10.5 L.6.1e—progressive WHST.9–10.5
The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept/except*, *allusion/illusion*).	W.9–10.5 L.4.1g—progressive L.6.1e—progressive WHST.9–10.5
The student will recognize and correct cases in which unlike terms are compared.	W.9–10.5 L.6.1e—progressive WHST.9–10.5
The student will recognize and correct cases in which a given expression is inconsistent with standard written English.	W.9–10.5 L.6.1e—progressive WHST.9–10.5
The student will recognize and correct inappropriate uses of ending punctuation in cases in which the content makes the intent clear.	W.9–10.5 L.4.3b—progressive L.6.1e—progressive WHST.9–10.5
The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences.	W.9–10.5 L.4.3b—progressive L.6.1e—progressive L.9–10.2a L.9–10.2b WHST.9–10.5
The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms.	W.9–10.5 L.6.1e—progressive WHST.9–10.5

PSAT/NMSQT and PSAT 10 Writing and Language Test	Arizona Standards
The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series.	W.9–10.5 L.6.1e—progressive L.9–10.1a WHST.9–10.5
The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation.	W.9–10.5 L.6.1e—progressive L.6.2a—progressive WHST.9–10.5
The student will recognize and correct cases in which unnecessary punctuation appears in a sentence.	W.9–10.5 L.6.1e—progressive WHST.9–10.5

Math Alignment: Arizona's Standards and PSAT/NMSQT and PSAT 10

The alignment between the Arizona Standards for High School Mathematics and the PSAT/NMSQT and PSAT 10 Math Test is shown in tables 26 and 27. Table 26, Arizona High School Math Standards Alignment: AZ to PSAT/NMSQT and PSAT 10, details the Arizona–PSAT/NMSQT and PSAT 10 alignment using Arizona's standards as the organizing principle. A standard is considered aligned if the content covered by the Arizona standard is measured on the PSAT/NMSQT and PSAT 10. For those standards that are covered, the PSAT/NMSQT and PSAT 10 content dimensions are presented in the right-hand column. If the PSAT/NMSQT and PSAT 10 column is blank, the knowledge or skill covered by the standard is not assessed on the PSAT/NMSQT or PSAT 10.

Table 27, Arizona High School Math Standards Alignment: PSAT/NMSQT and PSAT 10 to AZ, shows the PSAT/NMSQT and PSAT 10–Arizona alignment using PSAT/NMSQT and PSAT 10 content specifications as the organizing principle. In this table, the complete PSAT/NMSQT and PSAT 10 content specifications are shown with the relevant Arizona standards aligned to each PSAT/NMSQT and PSAT 10 content dimension.

Table 26: Arizona High School Math Standards Alignment: AZ to PSAT/NMSQT and PSAT 10

Arizona High School Math Standards: Number and Quantity	PSAT/NMSQT and PSAT 10 Math Test
N-RN The Real Number System	
Extend the properties of exponents to rational exponents.	
1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
Use properties of rational and irrational numbers.	
3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	
N-Q Quantities	
Reason quantitatively and use units to solve problems.	
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Define appropriate quantities for the purpose of descriptive modeling.	
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	
N-CN The Complex Number System	
Perform arithmetic operations with complex numbers.	

Arizona High School Math Standards: Number and Quantity	PSAT/NMSQT and PSAT 10 Math Test
1. Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
Use complex numbers in polynomial identities and equations.	
7. Solve quadratic equations with real coefficients that have complex solutions.	

Arizona High School Math Standards: Algebra	PSAT/NMSQT and PSAT 10 Math Test
A-SSE Seeing Structure in Expressions	
Interpret the structure of expressions	
1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	**Heart of algebra** Linear functions Linear equations in two variables **Passport to advanced math** Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
2. Use the structure of an expression to identify ways to rewrite it.	**Heart of algebra** Linear functions Linear equations in two variables **Passport to advanced math** Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
Write expressions in equivalent forms to solve problems	

Arizona High School Math Standards: Algebra	PSAT/NMSQT and PSAT 10 Math Test
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions.	**Passport to advanced math** Nonlinear functions
4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.	
A-APR Arithmetic with Polynomials and Rational Expressions	
Perform arithmetic operations on polynomials	
1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**Passport to advanced math** Equivalent expressions
Understand the relationship between zeros and factors of polynomials	
2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	
3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	
Use polynomial identities to solve problems	
4. Prove polynomial identities and use them to describe numerical relationships.	
Rewrite rational expressions	
6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/ b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	
A-CED Creating Equations	
Create equations that describe numbers or relationships	
1. Create equations and inequalities in one variable and use them to solve problems.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables

Arizona High School Math Standards: Algebra		PSAT/NMSQT and PSAT 10 Math Test
	2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**Heart of algebra** Linear functions
	3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	**Heart of algebra** Linear equations in two variables Linear inequalities in one or two variables
	4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
A-REI Reasoning with Equations and Inequalities		
	Understand solving equations as a process of reasoning and explain the reasoning	
	1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	
	2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Solve equations and inequalities in one variable	
	3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables **Problem solving and data analysis** Ratios, rates, proportional relationships, and units Two-variable data: Models and scatterplots

	Arizona High School Math Standards: Algebra	PSAT/NMSQT and PSAT 10 Math Test
	4. Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Solve systems of equations	
	5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
	6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	**Heart of algebra** Systems of two linear equations in two variables
	7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Represent and solve equations and inequalities graphically	
	10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**Heart of algebra** Linear equations in two variables **Passport to advanced math** Nonlinear functions
	11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	
	12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	**Heart of algebra** Linear inequalities in one or two variables

	Arizona High School Math Standards: Functions	PSAT/NMSQT and PSAT 10 Math Test
F-IF Interpreting Functions		
	Understand the concept of a function and use function notation	

	Arizona High School Math Standards: Functions	PSAT/NMSQT and PSAT 10 Math Test
	1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	
	Interpret functions that arise in applications in terms of the context	
	4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	
	6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
	Analyze functions using different representations	
	7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**Heart of algebra** Linear functions **Problem solving and data analysis** One variable data: Distributions and measures of center and spread **Passport to advanced math** Nonlinear functions
	8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions

Arizona High School Math Standards: Functions	PSAT/NMSQT and PSAT 10 Math Test
expressions for exponential functions.	
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-BF Building Functions	
Build a function that models a relationship between two quantities	
1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
Build new functions from existing functions	
3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
4. Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	
F-LE Linear, Quadratic, and Exponential Models	
Construct and compare linear, quadratic, and exponential models and solve problems	
1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	**Heart of algebra** Linear functions **Problem solving and data analysis** Ratios, rates, proportional relationships, and units Two-variable data: Models and scatterplots **Passport to advanced math** Nonlinear functions

	Arizona High School Math Standards: Functions	PSAT/NMSQT and PSAT 10 Math Test
	2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	
	4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	
	Interpret expressions for functions in terms of the situation they model	
	5. Interpret the parameters in a linear or exponential function in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-TF Trigonometric Functions		
	Extend the domain of trigonometric functions using the unit circle	
	1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	
	2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	
	Model periodic phenomena with trigonometric functions	
	5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	
	Prove and apply trigonometric identities	
	8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	

Arizona High School Math Standards: Modeling	PSAT/NMSQT and PSAT 10 Math Test
Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol.	An emphasis on modeling is apparent throughout the redesigned PSAT 10 Math Test. See for example **Problem solving and data analysis** Ratios, rates, proportional relationships, and units

	Percentages

Arizona High School Math Standards: Geometry		PSAT/NMSQT and PSAT 10 Math Test
G-CO Congruence		
	Experiment with transformations in the plane	
	1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Additional topics in math Lines, angles, and triangles Right angles and trigonometry
	2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	
	3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	
	4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	
	5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	
	Understand congruence in terms of rigid motions	
	6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	
	7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	
	8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	
	Prove geometric theorems	
	9. Prove theorems about lines and angles.	Additional topics in math Lines, angles, and triangles
	10. Prove theorems about triangles.	Additional topics in math Lines, angles, and triangles
	11. Prove theorems about parallelograms.	

Arizona High School Math Standards: Geometry		PSAT/NMSQT and PSAT 10 Math Test
	Make geometric constructions	
	12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	
	13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	
G-SRT Similarity, Right Triangles, and Trigonometry		
	Understand similarity in terms of similarity transformations	
	1. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	
	2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	
	3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	
	Prove theorems involving similarity	
	4. Prove theorems about triangles.	Additional topics in math Lines, angles, and triangles
	5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Additional topics in math Lines, angles, and triangles
	Define trigonometric ratios and solve problems involving right triangles	
	6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	
	7. Explain and use the relationship between the sine and cosine of complementary angles.	
	8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Additional topics in math Right triangles and trigonometry
G-C Circles		
	Understand and apply theorems about circles	
	1. Prove that all circles are similar.	
	2. Identify and describe relationships among inscribed angles, radii, and chords.	

Arizona High School Math Standards: Geometry		PSAT/NMSQT and PSAT 10 Math Test
	3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	
	Find arc lengths and areas of sectors of circles	
	5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	
G-GPE Expressing Geometric Properties with Equations		
	Translate between the geometric description and the equation for a conic section	
	1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	
	2. Derive the equation of a parabola given a focus and directrix.	
	Use coordinates to prove simple geometric theorems algebraically	
	4. Use coordinates to prove simple geometric theorems algebraically.	
	5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	**Heart of algebra** Linear equations in two variables
	6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	
	7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	
G-GMD Geometric Measurement and Dimension		
	Explain volume formulas and use them to solve problems	
	1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	
	3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Additional topics in math Area and volume
	Visualize relationships between two-dimensional and three-dimensional objects	
	4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	
G-MG Modeling with Geometry		
	Apply geometric concepts in modeling situations	
	1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	

Arizona High School Math Standards: Geometry		PSAT/NMSQT and PSAT 10 Math Test
	2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
	3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	

Arizona High School Math Standards: Statistics and Probability		PSAT/NMSQT and PSAT 10 Math Test
S-ID Interpreting Categorical and Quantitative Data		
	Summarize, represent, and interpret data on a single count or measurement variable	
	1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	
	Summarize, represent, and interpret data on two categorical and quantitative variables	
	5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**Problem solving and data analysis** Probability and conditional probability

	Arizona High School Math Standards: Statistics and Probability	PSAT/NMSQT and PSAT 10 Math Test
	6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	**Problem solving and data analysis** Two variable data: Models and scatterplots
	Interpret linear models	
	7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**Problem solving and data analysis** Two variable data: Models and scatterplots **Heart of algebra** Linear equations in two variables
	8. Compute (using technology) and interpret the correlation coefficient of a linear fit.	
	9. Distinguish between correlation and causation.	
S-IC Making Inferences and Justifying Conclusions		
	Understand and evaluate random processes underlying statistical experiments	
	1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	
	2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	
	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	
	3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
	4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	
	5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	
	6. Evaluate reports based on data.	
S-CP Conditional Probability and the Rules of Probability		
	Understand independence and conditional probability and use them to interpret data	

	Arizona High School Math Standards: Statistics and Probability	PSAT/NMSQT and PSAT 10 Math Test
	1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	
	2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	
	3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	
	4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	
	5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
	Use the rules of probability to compute probabilities of compound events in a uniform probability model	
	6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	
	7. Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model.	

Table 27: PSAT/NMSQT and PSAT 10 Math Test Alignment: PSAT/NMSQT and PSAT 10 to AZ

The following table details the PSAT/NMSQT and PSAT 10–Arizona alignment using PSAT/NMSQT and PSAT 10 content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
PSAT/NMSQT and PSAT 10 HEART OF ALGEBRA	
Linear equations in one variable	
• Create and use linear equations in one variable to solve problems in a variety of contexts. • Create a linear equation in one variable, and when in context interpret solutions in terms of the context. • Solve a linear equation in one variable making strategic use of algebraic structure. • For a linear equation in one variable, o interpret a constant, variable, factor or term in a context; o determine the conditions under which the equation has no solution, a unique solution, or infinitely many solutions. • Fluently solve a linear equation in one variable.	A-CED.A.1 A-REI.B.3 See also these relevant precursors: 6.EE.A.2a 6.EE.A.2b 6.EE.A.2c 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE.C.7a 8-EE.C.7b
Linear functions	
• Create and use linear functions to solve problems in a variety of contexts. • Create a linear function to model a relationship between two quantities. • For a linear function that represents a context a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. • Make connections between verbal, tabular, algebraic, and graphical representations of a linear function, by a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation. • Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.	A-SSE.A.1 A-SSE.A.2 A-SSE.A.2 F-BF.A.1 F-IF.C.8 A-CED.A.2 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7a F-IF.C.9 F-BF.A.1b F-LE.A.1b F-LE.A.2 F-LE.B.5 See also these relevant precursors: 6.EE.A.2a 6.EE.A.2b 6.EE.A.2c 6-EE.B.6

	PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
		6-EE.B.7 6-EE.C.9 7-EE.A.1 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE-B.5 8-EE.B.6 8-F.A.1 8-F.A.2 8-F.A.3 8-F.B.4 8-F.B.5
	Linear equations in two variables	
	• Create and use a linear equation in two variables to solve problems in a variety of contexts. • Create a linear equation in two variables to model a constraint or condition on two quantities. • For a linear equation in two variables that represents a context o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o given a value of one quantity in the relationship, find a value of the other, if it exists. • Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by o deriving one representation from the other; o identifying features of one representation given the other representation; o determining how a graph is affected by a change to its equation. • Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.	A-SSE.A.1 A-SSE.A.2 A-CED.A.3 A-REI.D.10 G-GPE.B.5 S-AZ.C.7 See also these relevant precursors: 6-EE.A.3 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE-B.5 8-EE.B.6 8-EE.B.8a 8-EE.B.8b 8-EE.B.8c
	Systems of two linear equations in two variables	

PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
• Create and use a system of two linear equations in two variables to solve problems in a variety of contexts. • Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context. • Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other. • Solve a system of two linear equations in two variables making strategic use of algebraic structure. • For a system of linear equations in two variables, o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o determine the conditions under which the system has no solution, a unique solution, or infinitely many solutions. • Fluently solve a system of linear equations in two variables.	A.REI.C.6 See also these relevant precursors: 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b
Linear inequalities in one or two variables	
• Create and use linear inequalities in one or two variables to solve problems in a variety of contexts. • Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. • For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. • Make connections between tabular, algebraic, and graphical representations of linear inequalities in one or two variables by deriving one from the other. Given a linear inequality or system of linear inequalities, interpret a point in the solution set.	A-CED.A.1 A-CED.A.3 A-REI.B.3 A.REI.D.12 See also these relevant precursors: 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b
PSAT/NMSQT and PSAT 10 PROBLEM SOLVING AND DATA ANALYSIS	
Ratios, rates, proportional relationships, and units	

	PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
	Items will requires students to solve problems by using a proportional relationship between quantities, calculating or using a ratio or rate, and/or using units, derived units, and unit conversion. • Apply proportional relationships, ratios, rates and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences. • Solve problems involving o derived units including those that arise from products (e.g., kilowatt-hours) and quotients (e.g., population per square kilometer); o unit conversion including currency exchange and conversion between different measurement systems. • Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then the other also changes by the same scale factor.	A-REI.B.3 F-LE.A.1 N-Q.A.1, G-MG.A.2 Modeling See also these relevant precursors: 6-RP.A.3a; 6-RP.A.3b; 6-RP.A.3c; 6-RP.A.3d; 7-RP.A.1; 7-RP.A.2a; 7-RP.A.2b; 7-RP.A.2c; 7-RP.A.2d; 7-RP.A.3. 7-G.A.1
	Percentages	
	• Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities. • Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.	Modeling; See also these relevant precursors: 6.RP.A.3c; 7-RP.A.3
	One variable data: Distributions and measures of center and spread	
	• Choose an appropriate graphical representation for a given data set. • Interpret information from a given representation of data in context. • Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots. • For quantitative variables, calculate, compare, and interpret mean, median, and range. Interpret (but don't calculate) standard deviation. • Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations and ones with the same mean and different standard deviations. • Understand and describe the effect of outliers on mean and median. • Given an appropriate data set, calculate the mean.	S-AZ.A.1 S-AZ.A.2 S-AZ.A.3 F-IF.C.7 See also these relevant precursors: 6-SP.A.2 6-SP.A.3 6-SP.B.4 6-SP.B.5a 6-SP.B.5b 6-SP.B.5c 7-SP.B.3 7-SP.B.4
	Two-variable data: Models and scatterplots	

	PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
	• Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set. • Interpret the slope and intercepts of the line of best fit in context. • Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship. • Analyze and interpret data represented in a scatterplot or line graph; fit linear models. • Select a graph that represents a context, identify a value on a graph, or interpret information on the graph. • For a given function type (linear, quadratic, exponential), choose the function of that type that best fits given data. • Compare linear and exponential growth. • Estimate the line of best fit for a given scatterplot; use the line to make predictions.	A-REI.B.3 F-LE.A.1 S-AZ.B.6a S-AZ.B.6c S-AZ.C.7 See also these relevant precursors: 8-SP.A.1 8-SP.A.2 8-SP.A.3
	Probability and conditional probability	
	Use one- and two-way tables, tree diagrams, area models, and other representations to find relative frequency, probabilities, and conditional probabilities. • Compute and interpret probability and conditional probability in simple contexts.	S-AZ.B.5, See also these relevant precursors: 7-SP.C.5 7-SP.C.6 7-SP.C.7a 7-SP.C.7b 7-SP.C.8a 7-SP.C.8b 7-SP.C.8c
	Inference from sample statistics and margin of error	
	• Use sample mean and sample proportion to estimate population mean and population proportion.	See also these relevant precursors: 7-SP.A.1 7-SP.A.2
PSAT/NMSQT and PSAT 10 PASSPORT TO ADVANCED MATH		
	Equivalent expressions	
	• Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including factoring polynomials. • Fluently add, subtract, and multiply polynomials.	A-SSE.A.1a A-SSE.A.2 A-APR.A.1 See also these relevant precursors: 6-EE.A.4 7-EE.A.1 8-EE.A.1 8-EE.A.2
	Nonlinear equations in one variable and systems of equations in two variables	

PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
• Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to o solve quadratic equations in one variable presented in a wide variety of forms; determine the conditions under which a quadratic equation has no real solutions, 1 real solution, or 2 real solutions; o solve simple rational and radical equations in one variable; o solve linear absolute value equations in one variable; o solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. • Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage. • Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest. • Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.	A-SSE.A.1 A-SSE.A.2 A-CED.A.4 A-REI.A.2 A-REI.B.4 A.REI.C.7
Nonlinear functions	
• Create and use quadratic or exponential functions to solve problems in a variety of contexts. • For a quadratic or exponential function, o identify or create an appropriate function to model a relationship between quantities; o use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; o for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o determine the most suitable form of the expression representing the output of the function to display key features of the context, including (i) selecting the form of a quadratic that displays the initial value, the zeros, or the extreme value; (ii) selecting the form of an exponential that displays the initial value, the end-behavior (for exponential decay), or the doubling or halving time; o make connections between tabular, algebraic, and graphical representations of the function, by (i) given one representation, selecting another representation;	A-SSE.A.1 A-SSE.A.2 A-SSE.B.3 A-REI.D.10 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7b F-IF.C.7e F-IF.C.8a F-IF.C.8b F-IF.C.9 F-BF.A.1a F-LE.A.1a F-LE.A.1c F-LE.A.2 F-LE.B.5 See also these relevant precursors: 7-EE.A.2 8-F.A.1 8-F.A.2

PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
(ii) identifying features of one representation given the another representation, including maximum and minimum values of the function.	8-F.B.5
PSAT/NMSQT and PSAT 10 ADDITIONAL TOPICS IN MATH	
Area and volume	
• Solve real-world and mathematical problems about a geometric figure or an object that can be modeled by a geometric figure using given information such as length, area, surface area, or volume. o Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, changes all areas by a factor of k^2, and changes all volumes by a factor of k^3. o Demonstrate procedural fluency by selecting the correct area or volume formula and correctly calculating a specified value.	G-GMD.A.3
Lines, angles, and triangles	
• Use concepts and theorems relating to congruence and similarity of triangles to solve problems. • Determine which statements may be required to prove certain relationships or to satisfy a given theorem. • Apply knowledge that changing by a scale factor of k changes all lengths by a factor of k, but angle measures remain unchanged. • Know and directly apply relevant theorems such as o the vertical angle theorem; o triangle similarity and congruence criteria; o triangle angle sum theorem; o the relationship of angles formed when a transversal cuts parallel lines.	G-CO.A.1 G-CO.C.9 G-CO.C.10 G-SRT.B.4 G-SRT.B.5
Right triangles and trigonometry	

PSAT/NMSQT and PSAT 10 Math Test	Arizona Math Standards
• Solve problems in a variety of contexts using the Pythagorean theorem; • Fluently apply properties of special right triangles to determine side-lengths and calculate trigonometric ratios of 30, 45, and 60 degrees.	G-CO.A.1

Section 6: State Standards Alignment Tables—PSAT 8/9

The detailed results of the alignments conducted between Arizona's standards and the knowledge and skills assessed by the redesigned PSAT 8/9 are presented in this section. The English Language Arts/Literacy alignment results are presented in tables 28 through 36 and are followed by the Math alignment results in tables 37 and 38. Tables 28 through 34 (English Language Arts/Literacy) and table 37 (Math) show Arizona's standards in the left-hand column and aligned PSAT 8/9 content specifications in the right-hand column. Tables 35 and 36 (English Language Arts/Literacy) and table 38 (Math) present the PSAT 8/9 content specifications in the left-hand column and aligned Arizona standards in the right-hand column.

English Language Arts/Literacy Alignment: Arizona's Standards to PSAT 8/9
Tables 28 through 34 detail the PSAT 8/9–Arizona alignment using Arizona's standards as the organizing principle. In selected cases, a partial or otherwise qualified alignment was noted through the use of red text. A partial or qualified alignment was indicated only when College Board staff felt that doing so identified an essential agreement that respected the spirit of the element being incompletely aligned to. Additional explanatory notes (also in red, in the right-hand column) are included to help illuminate College Board's methodology.

Table 28: Reading Standards for Literature 8: AZ to PSAT 8/9

Arizona Reading Standards for Literature Grade 8	PSAT 8/9 Reading Test
1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.

Arizona Reading Standards for Literature Grade 8	PSAT 8/9 Reading Test
2. Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
3. Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. *Drama is not assessed.*
4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. *The outside knowledge required to test allusions to other texts is not part of the Reading Test domain.*
5. Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts.

Arizona Reading Standards for Literature Grade 8	PSAT 8/9 Reading Test
6. Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. *Such texts are within the Reading Test domain but not guaranteed to appear in any given test administration.*
7. Analyze the extent to which a filmed or live production of a story or drama stays faithful to or departs from the text or script, evaluating the choices made by the director or actors.	
8. (Not applicable to literature)	
9. Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new.	
10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6–8 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6–10.

Table 29: Reading Standards for Informational Text 8: AZ to PSAT 8/9

Arizona Reading Standards for Informational Text Grade 8	PSAT 8/9 Reading Test
1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.
2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).	Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).

Arizona Reading Standards for Informational Text Grade 8	PSAT 8/9 Reading Test
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. *The outside knowledge required to test allusions to other texts is not part of the Reading Test domain.*
5. Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs). Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.

Arizona Reading Standards for Informational Text Grade 8	PSAT 8/9 Reading Test
7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.	
8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim. *Sufficiency is a subjective judgment not assessed by the multiple-choice Reading Test questions. Reading Test passages generally do not contain irrelevant evidence, as the test's passage selection criteria favor well-reasoned arguments.*
9. Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *The paired passages that appear on the Reading Test may or may not contain conflicting information.*
10. By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6-8 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6–10.

Table 30: Writing Standards 8: AZ to PSAT 8/9

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
1. Write arguments to support claims with clear reasons and relevant evidence a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. *The Writing and Language Test does not ask*

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	students to evaluate the accuracy and credibility of sources. Writing and Language items address topics, not texts. Writing and Language passages are too short to have distinct sections.
2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes.

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	Formatting and multimedia are not used in the Writing and Language Test. Writing and Language passages are too short to have distinct sections.
3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. *Fictional narratives are not included on the Writing and Language Test.*
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun number and person: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (*its*, *your*, *their*), contractions (*it's*, *you're*, *they're*), and adverbs (*there*) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept*/*except*, *allusion*/*illusion*). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear.

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
	Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. *Guidance and support are not available on the summative Writing and Language Test. The Writing and Language Test is a test of revision and editing.*
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.	
7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	
8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a	

Arizona Writing Standards Grade 8	PSAT 8/9 Writing and Language Test
standard format for citation.	
9. Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new"). b. Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").	
10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	

Note: The Speaking and Listening 8 standards are not included here as the PSAT 8/9 does not measure speaking and listening and therefore does not align with any of these standards.

Table 31: Language Standards 8: AZ to PSAT 8/9

Arizona Language Standards Grade 8	PSAT 8/9 Reading Test and PSAT 8/9 Writing and Language Test
1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences. b. Form and use verbs in the active and passive voice. c. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood. d. Recognize and correct inappropriate shifts in verb voice and mood.	Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons). Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. *Speaking is not assessed. Students are expected to understand but not directly explain the function of verbals in general or in particular sentences.*
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break. b. Use an ellipsis to indicate an omission. c. Spell correctly.	Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. *Ellipsis use is not directly assessed on the Writing and Language Test. Capitalization and spelling are not assessed on the Writing and Language Test.*
3. Use knowledge of language and its conventions when writing, speaking, reading, or listening. a. Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact).	Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. *Speaking and listening are not assessed. Despite the wording of the testing point, items may sometimes ask students to make appropriate shifts as well.*
4. Determine or clarify the meaning of unknown	Determining explicit meanings: The student will

Arizona Language Standards Grade 8	PSAT 8/9 Reading Test and PSAT 8/9 Writing and Language Test
and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies. a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *precede, recede, secede*). c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech. d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. *Students are assessed on passages, not directly on content. Students' flexible use of strategies is not directly assessed. Reference materials are not available to students.*
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. a. Interpret figures of speech (e.g. verbal irony, puns) in context. b. Use the relationship between particular words to better understand each of the words. c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *bullheaded*, *willful*, *firm*, *persistent*, *resolute*).	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice.

Arizona Language Standards Grade 8	PSAT 8/9 Reading Test and PSAT 8/9 Writing and Language Test
6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context. Analyzing word choice: The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. *Acquisition of vocabulary knowledge is not directly assessed.*

Table 32: Reading Standards for Literacy in History/Social Studies 6–8: AZ to PSAT 8/9

Arizona Reading Standards for Literacy in History/Social Studies Grades 6–8	PSAT 8/9 Reading Test
1. Cite specific textual evidence to support analysis of primary and secondary sources.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text.
3. Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).	Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text. Understanding relationships: The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).

Arizona Reading Standards for Literacy in History/Social Studies Grades 6–8	PSAT 8/9 Reading Test
4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Interpreting words and phrases in context: The student will determine the meaning of words and phrases in context.
5. Describe how a text presents information (e.g., sequentially, comparatively, causally).	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).	Analyzing point of view: The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text. *Purely digital texts do not appear on the Reading Test, though print versions of digitally published texts do.*
8. Distinguish among fact, opinion, and reasoned judgment in a text.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a

Arizona Reading Standards for Literacy in History/Social Studies Grades 6–8	PSAT 8/9 Reading Test
	claim or counterclaim.
9. Analyze the relationship between a primary and secondary source on the same topic.	Analyzing multiple texts: The student will synthesize information and ideas from paired texts. *The Reading Test includes one passage pair as well as a number of items requiring cross-text "bridging." Pairing may involve either primary and secondary sources or both, depending on test administration.*
10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.	Text complexity: The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6–10.

Table 33: Reading Standards for Literacy in Science and Technical Subjects 6–8: AZ to PSAT 8/9

Arizona Reading Standards for Literacy in Science and Technical Subjects Grades 6–8	PSAT 8/9 Reading Test
1. Cite specific textual evidence to support analysis of science and technical texts.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. Using analogical reasoning: The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation. Citing textual evidence: The student will cite the textual evidence that best supports a given claim or point. *While Reading passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*
2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	Determining central ideas and themes: The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text. Summarizing: The student will identify a reasonable summary of a text or of key information and ideas in text.
3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	
4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics*.	Determining explicit meanings: The student will identify information and ideas explicitly stated in text. Determining implicit meanings: The student will draw reasonable inferences and logical conclusions from text. *Students are assessed on passages, not directly on topics.*

Arizona Reading Standards for Literacy in Science and Technical Subjects Grades 6–8	PSAT 8/9 Reading Test
5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	Analyzing overall text structure: The student will describe the overall structure of a text. Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	Analyzing part-whole relationships: The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text. Analyzing purpose: The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).
7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	Analyzing quantitative information: The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text.
8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	Analyzing claims and counterclaims: The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text. Assessing reasoning: The student will assess an author's reasoning for soundness. Analyzing evidence: The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.
9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	
10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6–10. *While Reading passages often do include technical elements, they are better understood as being narrative, informative/explanatory, or argumentative in genre.*

Table 34: Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–8: AZ to PSAT 8/9

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
1. Write arguments focused on *discipline-specific content*. a. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
	structures to accomplish needed rhetorical purposes. *Writing and Language items address topics, not texts. The Writing and Language Test does not ask students to evaluate the credibility of sources. Writing and Language passages are too short to have distinct sections.*

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style and objective tone. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. *Formatting and multimedia are not used in the Writing and Language Test. Writing and Language passages are too short to have distinct sections.*
3. (Not applicable as a separate requirement)	

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.
5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	Proposition: The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively. Support: The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
	text. Focus: The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose. Quantitative information: The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text. Logical sequence: The student will revise text as needed to ensure that information and ideas are presented in the most logical order. Introductions, conclusions, and transitions: The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas. Precision: The student will revise text as needed to improve the exactness or content appropriateness of word choice. Concision: The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy). Style and tone: The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose. Syntax: The student will use various sentence structures to accomplish needed rhetorical purposes. Sentence boundaries: The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
	Subordination and coordination: The student will recognize and correct problems in coordination and subordination in sentences. Parallel structure: The student will recognize and correct problems in parallel structure in sentences. Modifier placement: The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers). Verb tense, mood, and voice: The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences. Pronoun number and pronoun: The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences. Pronoun clarity: The student will recognize and correct pronouns with unclear or ambiguous antecedents. Possessive determiners: The student will recognize and correct cases in which possessive determiners (its, your, their), contractions (it's, you're, they're), and adverbs (there) are confused with each other. Pronoun-antecedent agreement: The student will recognize and correct lack of agreement between pronoun and antecedent. Subject-verb agreement: The student will recognize and correct lack of agreement between subject and verb. Noun agreement: The student will recognize and correct lack of agreement between nouns. Frequently confused words: The student will recognize and correct instances in which a word or phrase is confused with another (e.g.,

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
	accept/except, allusion/illusion). Logical comparison: The student will recognize and correct cases in which unlike terms are compared. Conventional expression: The student will recognize and correct cases in which a given expression is inconsistent with standard written English. End-of-sentence punctuation: The student will recognize and correct inappropriate uses of ending punctuation in cases in which the context makes the intent clear. Within-sentence punctuation: The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences. Possessive nouns and pronouns: The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms. Items in a series: The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series. Nonrestrictive and parenthetical elements: The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation. Unnecessary punctuation: The student will recognize and correct cases in which unnecessary punctuation appears in a sentence. *Guidance and support are not available on the*

Arizona Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 6–8	PSAT 8/9 Writing and Language Test
	summative Writing and Language Test. The Writing and Language Test is a test of revision and editing.
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	
7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	
8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	
9. Draw evidence from informational texts to support analysis, reflection, and research.	
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	

English Language Arts/Literacy Alignment: PSAT 8/9 to Arizona's Standards
Tables 35 and 36 detail the PSAT 8/9-Arizona alignment using PSAT 8/9 content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

Table 35: PSAT 8/9 Reading Test: PSAT 8/9 to AZ

PSAT 8/9 Reading Test	Arizona Standards
Text Complexity The passages/pair on the PSAT 8/9 Reading Test represent a specified range of text complexities from grades 6–10.	RL.8.10 AZ.8.10 RH.8.10 RST.8.10
Information and Ideas	
The student will identify information and ideas explicitly stated in text.	RL.8.1 RL.8.4 AZ.8.1 AZ.8.4 L.8.4a L.8.5a L.8.5b L.8.6 RH.8.1 RH.8.4 RST.8.1 RST.8.4
The student will draw reasonable inferences and logical conclusions from text.	RL.8.1 RL.8.4 AZ.8.1 AZ.8.4 L.8.4a L.8.5a L.8.5b L.8.6 RH.8.1 RH.8.4 RST.8.1 RST.8.4
The student will extrapolate in a reasonable way from the information and ideas in a text or apply information and ideas in a text to a new, analogous situation.	RL.8.1 AZ.8.1 RH.8.1 RST.8.1
The student will cite the textual evidence that best supports a given claim or point.	RL.8.1 AZ.8.1 RH.8.1 RST.8.1

PSAT 8/9 Reading Test	Arizona Standards
The student will identify explicitly stated central ideas or themes in text and determine implicit central ideas or themes from text.	RL.8.2 AZ.8.2 RH.8.2 RST.8.2
The student will identify a reasonable summary of a text or of key information and ideas in text.	RL.8.2 AZ.8.2 RH.8.2 RH.8.3 RST.8.2
The student will identify explicitly stated relationships or determine implicit relationships between and among individuals, events, or ideas (e.g., cause-effect, comparison-contrast, sequence).	AZ.8.3 RH.8.3
The student will determine the meaning of words and phrases in context.	RL.8.4 AZ.8.4 L.8.4a L.8.5a L.8.5b L.8.5c L.8.6 RH.8.4
Rhetoric	
The student will determine how the selection of specific words and phrases or the use of patterns of words and phrases shapes meaning and tone in text.	RL.8.4 AZ.8.4 L.8.5b L.8.6
The student will describe the overall structure of a text.	RL.8.3 RH.8.5 RST.8.5
The student will analyze the relationship between a particular part of a text (e.g., a sentence) and the whole text.	RL.8.2 RL.8.3 AZ.8.2 AZ.8.5 L.8.5b L.8.6 RH.8.5 RST.8.5 RST.8.6
The student will determine the point of view or perspective from which a text is related or the influence this point of view or perspective has on content and style.	RL.8.3 RL.8.6 AZ.8.6 RH.8.6
The student will determine the main or most likely purpose of a text or of a particular part of a text (typically, one or more paragraphs).	RL.8.3 AZ.8.6 RH.8.6 RST.8.6

PSAT 8/9 Reading Test	Arizona Standards
The student will identify claims and counterclaims explicitly stated in text or determine implicit claims and counterclaims from text.	AZ.8.6 AZ.8.8 RH.8.6 RH.8.8 RST.8.8
The student will assess an author's reasoning for soundness.	AZ.8.6 AZ.8.8 RH.8.6 RH.8.8 RST.8.8
The student will assess how an author uses or fails to use evidence to support a claim or counterclaim.	AZ.8.6 AZ.8.8 RH.8.6 RH.8.8 RST.8.8
Synthesis	
The student will synthesize information and ideas from paired texts. (Note: These skills listed may be tested with either single or paired passages.)	RL.8.5 AZ.8.9 RH.8.9
The student will analyze information presented quantitatively in such forms as graphs, tables, and charts and/or relate that information to information presented in text.	RH.8.7 RST.8.7

Table 36: PSAT 8/9 Writing and Language Test: PSAT 8/9 to AZ

PSAT 8/9 Writing and Language Test	Arizona Standards
Text Complexity The passages on the PSAT 8/9 Writing and Language Test represent a specified range of text complexities from grades 6–10.	
Expression of Ideas	
The student will add, revise, or retain central ideas, main claims, counterclaims, topic sentences, and the like to structure text and convey arguments, information, and ideas clearly and effectively.	W.8.1a W.8.2a W.8.3a W.8.4 W.8.5 WHST.8.1a WHST.8.2a WHST.8.4 WHST.8.5
The student will add, revise, or retain information and ideas (e.g., details, facts, statistics) intended to support claims or points in text.	W.8.1b W.8.2b W.8.3b W.8.3d W.8.4 W.8.5 WHST.8.1b WHST.8.2b WHST.8.4 WHST.8.5
The student will add, revise, retain, or delete information and ideas in text for the sake of relevance to topic and purpose.	W.8.1b W.8.2b W.8.3b W.8.3d W.8.4 W.8.5 WHST.8.1b WHST.8.2b WHST.8.4 WHST.8.5
The student will relate information presented quantitatively in such forms as graphs, charts, and tables to information presented in text.	W.8.1b W.8.2b W.8.4 W.8.5 WHST.8.1b WHST.8.2b WHST.8.4 WHST.8.5

PSAT 8/9 Writing and Language Test	Arizona Standards
The student will revise text as needed to ensure that information and ideas are presented in the most logical order.	W.8.1a W.8.2a W.8.3a W.8.4 W.8.5 WHST.8.1a WHST.8.1e WHST.8.2a WHST.8.2f WHST.8.4 WHST.8.5
The student will revise text as needed to improve the beginning or ending of a text or paragraph to ensure that transition words, phrases, or sentences are used effectively to connect information and ideas.	W.8.1a W.8.1c W.8.1e W.8.2a W.8.2c W.8.2f W.8.3a W.8.3c W.8.3e W.8.4 W.8.5 WHST.8.1a WHST.8.1c WHST.8.1e WHST.8.2a WHST.8.2c WHST.8.2f WHST.8.4 WHST.8.5
The student will revise text as needed to improve the exactness or content appropriateness of word choice.	W.8.1c W.8.2d W.8.3d W.8.5 L.3.3a—progressive L.7.3a—progressive L.8.5c L.8.6 WHST.8.1c WHST.8.2d WHST.8.5
The student will revise text as needed to improve the economy of word choice (i.e., to eliminate wordiness and redundancy).	W.8.5 L.7.3a—progressive WHST.8.5

PSAT 8/9 Writing and Language Test	Arizona Standards
The student will revise text as necessary to ensure consistency of style and tone within a text or to improve the match of style and tone to purpose.	W.8.1d W.8.2e W.8.3d W.8.4 W.8.5 L.6.3b—progressive WHST.8.1d WHST.8.2e WHST.8.4 WHST.8.5
The student will use various sentence structures to accomplish needed rhetorical purposes.	W.8.1c W.8.2c W.8.5 L.6.3a—progressive WHST.8.1c WHST.8.2c WHST.8.5
Standard English Conventions	
The student will recognize and correct grammatically incomplete sentences (e.g., rhetorically inappropriate fragments and run-ons).	W.8.5 L.4.1f—progressive L.6.1e—progressive L.8.1a WHST.8.5
The student will recognize and correct problems in coordination and subordination in sentences.	W.8.5 L.6.1e—progressive L.8.1a WHST.8.5
The student will recognize and correct problems in parallel structure in sentences.	W.8.5 L.6.1e—progressive L.8.1a WHST.8.5
The student will recognize and correct problems in modifier placement (e.g., misplaced or dangling modifiers).	W.8.5 L.6.1e—progressive L.7.1c—progressive L.8.1a WHST.8.5
The student will recognize and correct inappropriate shifts in verb tense, voice, and mood within and between sentences.	W.8.5 L.5.1d—progressive L.6.1e—progressive L.8.1b L.8.3a WHST.8.5
The student will recognize and correct inappropriate shifts in pronoun person and number within and between sentences.	W.8.5 L.6.1c—progressive L.6.1e—progressive WHST.8.5

PSAT 8/9 Writing and Language Test	Arizona Standards
The student will recognize and correct pronouns with unclear or ambiguous antecedents.	W.8.5 L.6.1d—progressive L.6.1e—progressive WHST.8.5
The student will recognize and correct cases in which possessive determiners (*its, your, their*), contractions (*it's, you're, they're*), and adverbs (*there*) are confused with each other.	W.8.5 L.4.1g—progressive L.6.1e—progressive WHST.8.5
The student will recognize and correct lack of agreement between pronoun and antecedent.	W.8.5 L.3.1f—progressive L.6.1e—progressive WHST.8.5
The student will recognize and correct lack of agreement between subject and verb.	W.8.5 L.3.1f—progressive L.6.1e—progressive WHST.8.5
The student will recognize and correct lack of agreement between nouns.	W.8.5 L.6.1e—progressive WHST.8.5
The student will recognize and correct instances in which a word or phrase is confused with another (e.g., *accept/except*, *allusion/illusion*).	W.8.5 L.4.1g—progressive L.6.1e—progressive WHST.8.5
The student will recognize and correct cases in which unlike terms are compared.	W.8.5 L.6.1e—progressive WHST.8.5
The student will recognize and correct cases in which a given expression is inconsistent with standard written English.	W.8.5 L.6.1e—progressive WHST.8.5
The student will recognize and correct inappropriate uses of ending punctuation in cases in which the content makes the intent clear.	W.8.5 L.4.3b—progressive L.6.1e—progressive WHST.8.5
The student will correctly use and recognize and correct inappropriate uses of colons, semicolons, and dashes to indicate sharp breaks in thought within sentences.	W.8.5 L.4.3b—progressive L.6.1e—progressive L.8.2a WHST.8.5
The student will recognize and correct inappropriate uses of possessive nouns and pronouns as well as differentiate between possessive and plural forms.	W.8.5 L.6.1e—progressive WHST.8.5
The student will correctly use and recognize and correct inappropriate uses of punctuation (commas and sometimes semicolons) to separate items in a series.	W.8.5 L.5.2a—progressive L.6.1e—progressive WHST.8.5

PSAT 8/9 Writing and Language Test	Arizona Standards
The student will correctly use punctuation (commas, parentheses, dashes) to set off nonrestrictive and parenthetical sentence elements as well as recognize and correct cases in which restrictive or essential sentence elements are inappropriately set off with punctuation.	W.8.5 L.6.1e—progressive L.6.2a—progressive WHST.8.5
The student will recognize and correct cases in which unnecessary punctuation appears in a sentence.	W.8.5 L.6.1e—progressive WHST.8.5

Math Alignment: Arizona's Standards and PSAT 8/9

The alignment between the Arizona Standards for Mathematics, Grades 6, 7, 8, and High School, and the PSAT 8/9 Math Test is shown in tables 37 and 38. Table 37, Arizona Math Standards Alignment: AZ to PSAT 8/9, details the Arizona-PSAT 8/9 alignment using Arizona's standards as the organizing principle. A standard is considered aligned if the content covered by the Arizona standard is measured on the PSAT 8/9. For those standards that are covered, the PSAT 8/9 content dimensions are presented in the right-hand column. If the PSAT 8/9 column is blank, the knowledge or skill covered by the standard is not assessed on the PSAT 8/9.

Table 38, Arizona Math Standards Alignment: PSAT 8/9 to AZ, shows the PSAT 8/9-Arizona alignment using PSAT 8/9 content specifications as the organizing principle. In this table, the complete PSAT 8/9 content specifications are shown with the relevant Arizona standards aligned to each PSAT 8/9 content dimension.

Table 37: Arizona Math Standards Alignment: AZ to PSAT 8/9

Arizona Grade 6 Math Standards to PSAT 8/9

Arizona Grade 6 Math Standards: Ratios and Proportional Relationships	PSAT 8/9 Math Test
Understand ratio concepts and use ratio reasoning to solve problems.	
1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*[1]	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units

Arizona Grade 6 Math Standards: Ratios and Proportional Relationships	PSAT 8/9 Math Test
3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?* *c.* Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units Percentages

[1] Expectations for unit rates in this grade are limited to non-complex fractions.

Arizona Grade 6 Math Standards: The Number System	PSAT 8/9 Math Test
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	
1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and*	

Arizona Grade 6 Math Standards: The Number System	PSAT 8/9 Math Test
area 1/2 square mi?.	
Compute fluently with multi-digit numbers and find common factors and multiples.	
2. Fluently divide multi-digit numbers using the standard algorithm.	
3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	
4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*	
Apply and extend previous understandings of numbers to the system of rational numbers.	
5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	
6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and	

Arizona Grade 6 Math Standards: The Number System	PSAT 8/9 Math Test
other rational numbers on a coordinate plane.	
7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right*. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write -3 ^{o}C > -7 ^{o}C to express the fact that -3 ^{o}C is warmer than -7 ^{o}C*. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars*. d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars*.	
8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	

Arizona Grade 6 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
Apply and extend previous understandings of arithmetic to algebraic expressions.	
1. Write and evaluate numerical expressions involving whole-number exponents.	
2. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation*	**Heart of algebra** Linear equations in one variable Linear functions

Arizona Grade 6 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
"Subtract y from 5" as 5 - y. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2*.	
3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y*.	**Heart of algebra** Linear equations in two variables
4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*	**Passport to advanced math** Equivalent Expressions
Reason about and solve one-variable equations and inequalities.	
5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	**Heart of algebra** Linear equations in one variable Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables
6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending	**Heart of algebra** Linear equations in one variable Linear functions

Arizona Grade 6 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
on the purpose at hand, any number in a specified set.	Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables
7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	**Heart of algebra** Linear equations in one variable Linear functions Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables
8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x <$ c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	**Heart of algebra** Linear inequalities in one or two variables
Represent and analyze quantitative relationships between dependent and independent variables.	
9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	**Heart of algebra** Linear equations in one variable Linear functions Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables

Arizona Grade 6 Math Standards: Geometry	PSAT 8/9 Math Test
Solve real-world and mathematical problems involving area, surface area, and volume.	
1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\,w\,h$ and $V = b$	

Arizona Grade 6 Math Standards: Geometry	PSAT 8/9 Math Test
h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	
3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	
4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	

Arizona Grade 6 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
Develop understanding of statistical variability.	
1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages*.	
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	**Problem solving and data analysis** One variable data
3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	**Problem solving and data analysis** One variable data
Summarize and describe distributions.	
4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	**Problem solving and data analysis** One variable data
5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	**Problem solving and data analysis** One variable data

Arizona Grade 6 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	

Arizona Grade 7 Math Standards to PSAT 8/9

Arizona Grade 7 Math Standards: Ratios & Proportional Relationships	PSAT 8/9 Math Test
Analyze proportional relationships and use them to solve real-world and mathematical problems.	
1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction* $^{1/2}/_{1/4}$ *miles per hour, equivalently 2 miles per hour*.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn*. d. Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where r is the unit rate.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units Percentages

Arizona Grade 7 Math Standards: The Number System	PSAT 8/9 Math Test
Apply and extend previous understandings of operations with fractions.	
1. Apply and extend previous understandings of addition and subtraction to add and subtract	

Arizona Grade 7 Math Standards: The Number System	PSAT 8/9 Math Test
rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged*. b. Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. d. Apply properties of operations as strategies to add and subtract rational numbers.	
2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.	

Arizona Grade 7 Math Standards: The Number System	PSAT 8/9 Math Test
c. Apply properties of operations as strategies to multiply and divide rational numbers. d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	
3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1]	

[1] Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

Arizona Grade 7 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
Use properties of operations to generate equivalent expressions.	
1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	**Passport to advanced math** Equivalent expressions
2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation*.	**Heart of algebra** Linear equations in one variable Linear functions Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables
4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve	**Heart of algebra** Linear equations in one variable

Arizona Grade 7 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
problems by reasoning about the quantities. a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?* b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions*.	Linear functions Linear equations in two variables Systems of two linear equations in two variables Linear inequalities in one or two variables

Arizona Grade 7 Math Standards: Geometry	PSAT 8/9 Math Test
Draw construct, and describe geometrical figures and describe the relationships between them.	
1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	
3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	
4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	
5. Use facts about supplementary,	

Arizona Grade 7 Math Standards: Geometry	PSAT 8/9 Math Test
complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	
6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	

Arizona Grade 7 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
Use random sampling to draw inferences about a population.	
1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	**Problem solving and data analysis** Inference from sample statistics and margin of error
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be*.	**Problem solving and data analysis** Inference from sample statistics and margin of error
Draw informal comparative inferences about two populations.	
3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable*.	**Problem solving and data analysis** One variable data
4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide*	**Problem solving and data analysis** One variable data

Arizona Grade 7 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	
Investigate chance processes and develop, use, and evaluate probability models.	
5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	**Problem solving and data analysis** Probability and conditional probability
6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times*.	**Problem solving and data analysis** Probability and conditional probability
7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected*. b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*	**Problem solving and data analysis** Probability and conditional probability
8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	**Problem solving and data analysis** Probability and conditional probability

Arizona Grade 7 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	

<u>Arizona Grade 8 Math Standards to PSAT 8/9</u>

Arizona Grade 8 Math Standards: The Number System	PSAT 8/9 Math Test
Know that there are numbers that are not rational, and approximate them by rational numbers.	
1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	
2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*.	

Arizona Grade 8 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
Work with radicals and integer exponents.	

Arizona Grade 8 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	**Passport to advanced math** Equivalent Expressions
2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	**Passport to advanced math** Equivalent Expressions
3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 times 10^8 and the population of the world as 7 times 10^9, and determine that the world population is more than 20 times larger*.	
4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	
Understand the connections between proportional relationships, lines, and linear equations.	
5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	**Heart of algebra** Linear functions Linear equations in two variables
6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.	**Heart of algebra** Linear functions Linear equations in two variables
Analyze and solve linear equations and pairs of simultaneous linear equations.	
7. Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many	**Heart of algebra** Linear equations in one variable

Arizona Grade 8 Math Standards: Expressions and Equations	PSAT 8/9 Math Test
solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	
8. Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6*. c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair*.	**Heart of algebra** Systems of two linear equations in two variables

Arizona Grade 8 Math Standards: Functions	PSAT 8/9 Math Test
Define, evaluate, and compare functions.	
1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[1]	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
2. Compare properties of two functions each	**Heart of algebra**

Arizona Grade 8 Math Standards: Functions	PSAT 8/9 Math Test
represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change*.	Linear functions **Passport to advanced math** Nonlinear functions
3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line*.	**Heart of algebra** Linear functions
Use functions to model relationships between quantities.	
4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	**Heart of algebra** Linear functions
5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions

[1] Function notation is not required for Grade 8.

Arizona Grade 8 Math Standards: Geometry	PSAT 8/9 Math Test
Understand congruence and similarity using physical models, transparencies, or geometry software.	
1. Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.	
2. Understand that a two-dimensional figure is congruent to another if the second can be	

Arizona Grade 8 Math Standards: Geometry	PSAT 8/9 Math Test
obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	
3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	
4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	
5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so*.	
Understand and apply the Pythagorean Theorem.	
6. Explain a proof of the Pythagorean Theorem and its converse.	
7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	
8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	

Arizona Grade 8 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
Investigate patterns of association in bivariate data.	
1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**Problem solving and data analysis** Two variable data

Arizona Grade 8 Math Standards: Statistics and Probability	PSAT 8/9 Math Test
2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.	**Problem solving and data analysis** Two variable data
3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height*.	**Problem solving and data analysis** Two variable data
4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	

<u>Arizona High School Math Standards to PSAT 8/9</u>

	Arizona High School Math Standards: Number and Quantity	PSAT 8/9 Math Test
N-RN The Real Number System		
	Extend the properties of exponents to rational exponents.	
	1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	
	2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.	
	Use properties of rational and irrational numbers.	
	3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational	

Arizona High School Math Standards: Number and Quantity	PSAT 8/9 Math Test
number and an irrational number is irrational.	
N-Q Quantities	
Reason quantitatively and use units to solve problems.	
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
2. Define appropriate quantities for the purpose of descriptive modeling.	
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	
N-CN The Complex Number System	
Perform arithmetic operations with complex numbers.	
1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	
2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	
Use complex numbers in polynomial identities and equations.	
7. Solve quadratic equations with real coefficients that have complex solutions.	

Arizona High School Math Standards: Algebra	PSAT 8/9 Math Test
A-SSE Seeing Structure in Expressions	
Interpret the structure of expressions	
1. Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	**Heart of algebra** Linear functions Linear equations in two variables **Passport to advanced math** Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
2. Use the structure of an expression to identify ways to rewrite it.	**Heart of algebra** Linear functions Linear equations in two variables

Arizona High School Math Standards: Algebra		PSAT 8/9 Math Test
		Passport to advanced math Equivalent expressions Nonlinear equations in one variable and systems of equations in two variables Nonlinear functions
	Write expressions in equivalent forms to solve problems	
	3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions.	**Passport to advanced math** Nonlinear functions
	4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.	
A-APR Arithmetic with Polynomials and Rational Expressions		
	Perform arithmetic operations on polynomials	
	1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**Passport to advanced math** Equivalent expressions
	Understand the relationship between zeros and factors of polynomials	
	2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	
	3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	
	Use polynomial identities to solve problems	
	4. Prove polynomial identities and use them to describe numerical relationships.	
	Rewrite rational expressions	
	6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/ b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	
A-CED Creating Equations		

	Arizona High School Math Standards: Algebra	PSAT 8/9 Math Test
	Create equations that describe numbers or relationships	
	1. Create equations and inequalities in one variable and use them to solve problems.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables
	2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**Heart of algebra** Linear functions
	3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	**Heart of algebra** Linear equations in two variables Linear inequalities in one or two variables
	4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
A-REI Reasoning with Equations and Inequalities		
	Understand solving equations as a process of reasoning and explain the reasoning	
	1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	
	2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	
	Solve equations and inequalities in one variable	
	3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**Heart of algebra** Linear equations in one variable Linear inequalities in one or two variables **Problem solving and data analysis** Ratios, rates, proportional relationships, and units Two-variable data: Models and scatterplots

Arizona High School Math Standards: Algebra		PSAT 8/9 Math Test
	4. Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Solve systems of equations	
	5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	
	6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	**Heart of algebra** Systems of two linear equations in two variables
	7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	**Passport to advanced math** Nonlinear equations in one variable and systems of equations in two variables
	Represent and solve equations and inequalities graphically	
	10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**Heart of algebra** Linear equations in two variables **Passport to advanced math** Nonlinear functions
	11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.	
	12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	

Arizona High School Math Standards: Functions		PSAT 8/9 Math Test
F-IF Interpreting Functions		
	Understand the concept of a function and use function notation	

Arizona High School Math Standards: Functions	PSAT 8/9 Math Test
1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	
Interpret functions that arise in applications in terms of the context	
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	
Analyze functions using different representations	
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**Heart of algebra** Linear functions **Problem solving and data analysis** One variable data: Distributions and measures of center and spread **Passport to advanced math** Nonlinear functions
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions

Arizona High School Math Standards: Functions	PSAT 8/9 Math Test
expressions for exponential functions.	
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-BF Building Functions	
Build a function that models a relationship between two quantities	
1. Write a function that describes a relationship between two quantities. a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.	
Build new functions from existing functions	
3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	
4. Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.	

Arizona High School Math Standards: Functions		PSAT 8/9 Math Test
F-LE Linear, Quadratic, and Exponential Models		
	Construct and compare linear, quadratic, and exponential models and solve problems	
	1. Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	
	2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
	3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	
	4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	
	Interpret expressions for functions in terms of the situation they model	
	5. Interpret the parameters in a linear or exponential function in terms of a context.	**Heart of algebra** Linear functions **Passport to advanced math** Nonlinear functions
F-TF Trigonometric Functions		
	Extend the domain of trigonometric functions using the unit circle	
	1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	
	2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	
	Model periodic phenomena with trigonometric functions	
	5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.	
	Prove and apply trigonometric identities	
	8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and	

Arizona High School Math Standards: Functions		PSAT 8/9 Math Test
	the quadrant of the angle.	

Arizona High School Math Standards: Modeling	PSAT 8/9 Math Test
Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol.	An emphasis on modeling is apparent throughout the redesigned PSAT 8/9 Math Test. See for example **Problem solving and data analysis** Percentages

Arizona High School Math Standards: Geometry		PSAT 8/9 Math Test
G-CO Congruence		
	Experiment with transformations in the plane	
	1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	
	2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	
	3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	
	4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	
	5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	
	Understand congruence in terms of rigid motions	
	6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	
	7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	

Arizona High School Math Standards: Geometry		PSAT 8/9 Math Test
	8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	
	Prove geometric theorems	
	9. Prove theorems about lines and angles.	
	10. Prove theorems about triangles.	
	11. Prove theorems about parallelograms.	
	Make geometric constructions	
	12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).	
	13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	
G-SRT Similarity, Right Triangles, and Trigonometry		
	Understand similarity in terms of similarity transformations	
	1. Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	
	2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	
	3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	
	Prove theorems involving similarity	
	4. Prove theorems about triangles.	
	5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	
	Define trigonometric ratios and solve problems involving right triangles	
	6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	
	7. Explain and use the relationship between the sine and cosine of complementary angles.	
	8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	

Arizona High School Math Standards: Geometry		PSAT 8/9 Math Test
G-C Circles		
	Understand and apply theorems about circles	
	1. Prove that all circles are similar.	
	2. Identify and describe relationships among inscribed angles, radii, and chords.	
	3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	
	Find arc lengths and areas of sectors of circle	
	5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	
G-GPE Expressing Geometric Properties with Equations		
	Translate between the geometric description and the equation for a conic section	
	1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	
	2. Derive the equation of a parabola given a focus and directrix.	
	Use coordinates to prove simple geometric theorems algebraically	
	4. Use coordinates to prove simple geometric theorems algebraically.	
	5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	**Heart of algebra** Linear equations in two variables
	6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	
	7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	
G-GMD Geometric Measurement and Dimension		
	Explain volume formulas and use them to solve problems	
	1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	
	3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	
	Visualize relationships between two-dimensional and three-dimensional objects	
	4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	

Arizona High School Math Standards: Geometry		PSAT 8/9 Math Test
G-MG Modeling with Geometry		
	Apply geometric concepts in modeling situations	
	1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	
	2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	**Problem solving and data analysis** Ratios, rates, proportional relationships, and units
	3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).	

Arizona High School Math Standards: Statistics and Probability		PSAT 8/9 Math Test
S-ID Interpreting Categorical and Quantitative Data		
	Summarize, represent, and interpret data on a single count or measurement variable	
	1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	**Problem solving and data analysis** One variable data: Distributions and measures of center and spread
	4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	
	Summarize, represent, and interpret data on two categorical and quantitative variables	

	Arizona High School Math Standards: Statistics and Probability	PSAT 8/9 Math Test
	5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**Problem solving and data analysis** Probability and conditional probability
	6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	**Problem solving and data analysis** Two variable data: Models and scatterplots
	Interpret linear models	
	7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**Problem solving and data analysis** Two variable data: Models and scatterplots **Heart of algebra** Linear equations in two variables
	8. Compute (using technology) and interpret the correlation coefficient of a linear fit.	
	9. Distinguish between correlation and causation.	
S-IC Making Inferences and Justifying Conclusions		
	Understand and evaluate random processes underlying statistical experiments	
	1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	
	2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.	
	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	
	3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	
	4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	
	5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	

Arizona High School Math Standards: Statistics and Probability	PSAT 8/9 Math Test
6. Evaluate reports based on data.	
S-CP Conditional Probability and the Rules of Probability	
Understand independence and conditional probability and use them to interpret data	
1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	
2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	
3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.	
4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.	
5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.	
Use the rules of probability to compute probabilities of compound events in a uniform probability model	
6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.	
7. Apply the Addition Rule, *P*(*A* or *B*) = *P*(*A*) + *P*(*B*) – *P*(*A* and *B*), and interpret the answer in terms of the model.	

Table 38: PSAT 8/9 Math Test Alignment: PSAT 8/9 to AZ

The following table details the PSAT 8/9-Arizona alignment using PSAT 8/9 content specifications as the organizing principle. In the interest of brevity, the Arizona standards in the right-hand column are presented in their abbreviated form (consistent with how they are numbered and lettered in Arizona standards documents).

PSAT 8/9 Math Test	Arizona Math Standards
PSAT 8/9 HEART OF ALGEBRA	
Linear equations in one variable	
• Create and use linear equations in one variable to solve problems in a variety of contexts. • Create a linear equation in one variable, and when in context interpret solutions in terms of the context. • Solve a linear equation in one variable making strategic use of algebraic structure. • For a linear equation in one variable, o interpret a constant, variable, factor or term in a context; • Fluently solve a linear equation in one variable.	6.EE.A.2a 6.EE.A.2b 6.EE.A.2c 6-EE.B.5 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE.C.7a 8-EE.C.7b A-CED.A.1 A-REI.B.3
Linear functions	
• Create and use linear functions to solve problems in a variety of contexts. • Create a linear function to model a relationship between two quantities. • For a linear function that represents a context a. interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; b. given an input value, find and/or interpret the output value using the given representation; c. given an output value, find and/or interpret the input value using the given representation, if it exists. • Make connections between verbal, tabular, algebraic, and graphical representations of a linear function, by a. deriving one representation from the other; b. identifying features of one representation given another representation; c. determining how a graph is affected by a change to its equation.	6.EE.A.2a 6.EE.A.2b 6.EE.A.2c 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.A.2 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE-B.5 8-EE.B.6 8-F.A.1 8-F.A.2 8-F.A.3 8-F.B.4 8-F.B.5

	PSAT 8/9 Math Test	Arizona Math Standards
	• Write the rule for a linear function given two input/output pairs or one input/output pair and the rate of change.	A-SSE.A.1a A-SSE.A.1b A-SSE.A.2 F-BF.A.1a A-CED.A.2 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7a F-IF.C.8b F-IF.C.9 F-LE.A.2 F-LE.B.5
	Linear equations in two variables	
	• Create and use a linear equation in two variables to solve problems in a variety of contexts. • Create a linear equation in two variables to model a constraint or condition on two quantities. • For a linear equation in two variables that represents a context o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o given a value of one quantity in the relationship, find a value of the other, if it exists. • Make connections between tabular, algebraic, and graphical representations of a linear equation in two variables by o deriving one representation from the other; o identifying features of one representation given the other representation; o determining how a graph is affected by a change to its equation. • Write an equation for a line given two points on the line, one point and the slope of the line, or one point and a parallel or perpendicular line.	6-EE.A.3 6-EE.B.5 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE-B.5 8-EE.B.6 A-SSE.A.1 A-SSE.A.2 A-CED.A.3 A-REI.D.10 G-GPE.B.5 S-AZ.C.7
	Systems of two linear equations in two variables	

PSAT 8/9 Math Test	Arizona Math Standards
• Create and use a system of two linear equations in two variables to solve problems in a variety of contexts. • Create a system of linear equations in two variables, and when in context interpret solutions in terms of the context. • Make connections between tabular, algebraic, and graphical representations of the system by deriving one representation from the other. • Solve a system of two linear equations in two variables making strategic use of algebraic structure. • For a system of linear equations in two variables, o interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; • Fluently solve a system of linear equations in two variables.	6-EE.B.5 6-EE.B.6 6-EE.B.7 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b 8-EE.C.8 A.REI.C.6
Linear inequalities in one or two variables	
• Create and use linear inequalities in two variable to solve problems in a variety of contexts. • Create linear inequalities in one or two variables, and when in context interpret the solutions in terms of the context. • For linear inequalities in one or two variables, interpret a constant, variable, factor, or term, including situations where seeing structure provides an advantage. • Given a linear inequality interpret a point in the solution set.	6-EE.B.5 6-EE.B.6 6-EE.B.7 6-EE.B.8 6-EE.C.9 7-EE.B.3 7-EE.B.4a 7-EE.B.4b A-CED.A.1 A-CED.A.3 A-REI.B.3
PSAT 8/9 PROBLEM SOLVING AND DATA ANALYSIS	
Ratios, rates, proportional relationships, and units	
Items will requires students to solve problems by using a proportional relationship between quantities, calculating or using a ratio or rate, and/or using units, derived units, and unit conversion. • Apply proportional relationships, ratios, rates and units in a wide variety of contexts. Examples include but are not limited to scale drawings and problems in the natural and social sciences. • Solve problems involving o derived units including those that arise from quotients (e.g., population per square kilometer) o unit conversion including currency exchange and conversion between different measurement systems. • Understand and use the fact that when two quantities are in a proportional relationship, if one changes by a scale factor, then	6-RP.A.1 6-RP.A.2 6-RP.A.3b 6-RP.A.3c 6-RP.A.3d 7-RP.A.1 7-RP.A.2b 7-RP.A.3 7-G.A.1 A-REI.B.3 N-Q.A.1 G-MG.A.2

	PSAT 8/9 Math Test	Arizona Math Standards
	the other also changes by the same scale factor.	
	Percentages	
	• Use percentages to solve problems in a variety of contexts. Examples include, but are not limited to, discounts, interest, taxes, tips, and percent increases and decreases for many different quantities. • Understand and use the relationship between percent change and growth factor (5% and 1.05, for example); include percentages greater than or equal to 100%.	6.RP.A.3c 7-RP.A.3 Modeling
	One variable data: Distributions and measures of center and spread	
	• Choose an appropriate graphical representation for a given data set. • Interpret information from a given representation of data in context. • Analyze and interpret numerical data distributions represented with frequency tables, histograms, dot plots, and boxplots. • For quantitative variables, calculate, compare, and interpret mean, median, and range. • Compare distributions using measures of center and spread, including distributions with different means and the same standard deviations. • Understand and describe the effect of outliers on mean and median. • Given an appropriate data set, calculate the mean.	6-SP.A.2 6-SP.A.3 6-SP.B.4 6-SP.B.5a 6-SP.B.5b 6-SP.B.5c 7-SP.B.3 7-SP.B.4 S-AZ.A.1 S-AZ.A.2 S-AZ.A.3 F-IF.C.7
	Two-variable data: Models and scatterplots	
	• Using a model that fits the data in a scatterplot, compare values predicted by the model to values given in the data set. • Interpret the slope and intercepts of the line of best fit in context. • Given a relationship between two quantities, read and interpret graphs and tables modeling the relationship. • Analyze and interpret data represented in a scatterplot or line graph; fit linear models. • Select a graph that represents a context, identify a value on a graph, or interpret information on the graph. • Estimate the line of best fit for a given scatterplot; use the line to make predictions.	8-SP.A.1 8-SP.A.2 8-SP.A.3 A-REI.B.3 S-AZ.B.6a S-AZ.B.6c S-AZ.C.7
	Probability and conditional probability	
	Use one- and two-way tables, tree diagrams, area models, and other representations to find relative frequency, probabilities, and conditional probabilities. • Compute and interpret probability and conditional probability in simple contexts.	7-SP.C.5 7-SP.C.6 7-SP.C.7a 7-SP.C.7b 7-SP.C.8a

PSAT 8/9 Math Test	Arizona Math Standards
	7-SP.C.8b S-AZ.B.5
Inference from sample statistics and margin of error	
• Use sample mean and sample proportion to estimate population mean and population proportion.	7-SP.A.1 7-SP.A.2
PSAT 8/9 PASSPORT TO ADVANCED MATH	
Equivalent expressions	
• Make strategic use of algebraic structure and the properties of operations to identify and create equivalent expressions, including factoring polynomials. • Fluently add, subtract, and multiply polynomials.	6-EE.A.4 7-EE.A.1 8-EE.A.1 8-EE.A.2 A-SSE.A.1a A-SSE.A.2 A-APR.A.1
Nonlinear equations in one variable and systems of equations in two variables	
• Make strategic use of algebraic structure, the properties of operations, and reasoning about equality to o solve quadratic equations in one variable presented in a wide variety of forms o solve systems of linear and nonlinear equations in two variables, including relating the solutions to the graphs of the equations in the system. • Given a nonlinear equation in one variable that represents a context, interpret a solution, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage. • Given an equation or formula in two or more variables that represents a context, view it as an equation in a single variable of interest where the other variables are parameters and solve for the variable of interest. • Fluently solve quadratic equations in one variable, written as a quadratic expression in standard form equal to zero, where using the quadratic formula or completing the square is the most efficient method for solving the equation.	A-SSE.A.1 A-SSE.A.2 A-CED.A.4 A-REI.B.4b A.REI.C.7
Nonlinear functions	

PSAT 8/9 Math Test	Arizona Math Standards
• For a quadratic or exponential function, o use function notation to represent and interpret input/output pairs in terms of a context and points on the graph; o for a function that represents a context, interpret the meaning of an input/output pair, constant, variable, factor, or term based on the context, including situations where seeing structure provides an advantage; o make connections between tabular, algebraic, and graphical representations of the function, by i. given one representation, selecting another representation; ii. identifying features of one representation given the another representation	7-EE.A.2 8-F.A.1 8-F.A. 8-F.B.5 A-SSE.A.1 A-SSE.A.2 A-SSE.B.3 A-REI.D.10 F-IF.A.1 F-IF.A.2 F-IF.B.4 F-IF.C.7 F-IF.C.8b F-IF.C.9 F-BF.A.1 F-LE.A.2 F-LE.B.5