

**Arizona Standard Setting for the ACT**  
**June 6, 2019**  
**Technical Report**

Prepared June, 2019

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## **Introduction**

ACT staff conducted an empirical standard setting at the request of the Arizona Department of Education (ADE) on June 6, 2019. The process resulted in three recommended cut scores (Level 2, Level 3, and Level 4) on the ACT, defining four performance levels (Level 1, Level 2, Level 3, and Level 4) for three subject areas: Mathematics, English+Reading,<sup>1</sup> and Science. Following the standard setting meeting, the cut score recommendations were provided to the Arizona State Board of Education for review and approval. The final cut scores have not been approved at the time this report was prepared. The cut scores are intended to be applied to results from the spring 2019 administration of the ACT for the Menu of Assessments (MOA).

## **Context for New Cut Scores**

In 2016, the Arizona state legislature passed a law providing flexibility in testing for Local Education Agencies (LEAs) at the high school level.<sup>2</sup> Beginning in the 2018–2019 school year, LEAs can choose to administer a high school assessment from the MOA in lieu of the AzMERIT statewide assessment, including the ACT and SAT. The law requires that an assessment on the MOA must meet or exceed the level of rigor of the state academic standards and result in comparable student performance levels.

The ADE requested that ACT conduct a standard setting to establish cut scores on the ACT for their state accountability system. The resulting cut scores can then be used in conjunction with the ACT-SAT concordance tables to find comparable cut scores on the SAT. The purpose of the standard setting was not to satisfy federal accountability requirements of the Every Student Succeeds Act (ESSA), but to establish performance levels for the state accountability system.

## **Methodology**

Recommended cut scores for the ACT were determined using an empirical standard setting process, rather than a traditional content-based standard setting. In a content-based standard setting, like that used to establish AzMERIT cut scores and performance level descriptors, cut scores and performance levels are established based on test content and content standards, and they are described in that context. In an empirical standard setting, panelists make judgments based on established relationships between test scores and a variety of educational outcomes. To inform the selection of ACT cut scores for Arizona 11<sup>th</sup> graders, panelists viewed comparative evidence from the ACT, AzMERIT, AIMS Science, and NAEP, impact on the percentages of

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<sup>1</sup> ACT's ELA score is a combination of the ACT English, reading, and writing scores. The ADE opted to use the English+Reading score equal to the sum of the ACT English and reading tests on a 2–72 scale. This score allows the ADE to use the concordance between the ACT and SAT (<https://www.act.org/content/act/en/products-and-services/the-act/scores/act-sat-concordance.html>).

<sup>2</sup> <https://www.azleg.gov/ars/15/00741-02.htm>

students classified in different performance levels for several ACT-tested student populations, and impact on college success outcomes. This evidence is described in detail in the *Orientation, Context, and Discussion* section below.

Empirical standard setting approaches have been the primary method used to establish cut scores and benchmarks on admissions tests for several reasons. The primary purpose of college admissions tests is to identify students who are likely to succeed in postsecondary academic environments. Such assessments are used for admissions, placement, recruitment, and talent identification because they predict GPA and grades in specific college courses. Educators in secondary schools use the tests to determine if students are on track to being college ready at the end of high school, to identify academic weaknesses that can be addressed, and to aid in postsecondary planning for students. This type of evidence prioritizes the empirical relationship between test scores and outcomes such as postsecondary enrollment, course grades, GPA, and retention. College readiness benchmarks for the ACT and SAT have been established exclusively on such empirical relationships (e.g., 50% chance of a B or higher in college algebra), and ACT has employed empirical standard setting methods when assisting states to set upper and lower cut scores, as well as validating or establishing their own College Readiness Benchmarks.

To determine the cut scores for use in the Stat Accountability System, ACT and ADE collaborated and decided to use a modified Empirical Standard Setting Approach. This approach was reviewed by ADE's Technical Advisory Committee (TAC) Chair. Much of the same information was presented to panelists; the main difference was in the size and makeup of the panel and the amount of time allotted to the standard setting process. A typical panel consists of 8–12 participants per subject area, including a mix of teachers, administrators, and higher education faculty. Panelists are selected to represent the state in terms of the variety of school districts (including large and small, urban and rural) and panelist expertise including content, special education, and English language learners. Typically, the standard setting meeting lasts two days and involves multiple rounds of ratings.

The modified standard setting approach for Arizona included four panelists, selected for their experience and expertise working with the state accountability system and familiarity with assessment data. Panelists were presented with relevant information about the ACT and other assessments, discussed the evidence, and participated in three rounds of ratings, resulting in their final recommended cut scores.

### **ACT College Readiness Benchmarks**

The primary evidentiary sources for standard setting on the ACT are the ACT College Readiness Benchmarks and the probabilities of earning a grade of C or higher, B or higher, or A in first-year college courses derived in the research undergirding the development of the Benchmarks.

In 2005, ACT established College Readiness Benchmarks reflecting the ACT assessment scores of students in 11<sup>th</sup> and 12<sup>th</sup> grade associated with a 50% chance of earning a B or higher grade in common first-year credit-bearing courses at a typical postsecondary institution (Allen & Sconing, 2005). The Benchmarks also correspond to an approximate 75% chance of earning a C or higher grade in these courses. The first-year credit-bearing courses studied were English Composition, College Algebra, Social Science courses (including American History, Other History, Psychology, Sociology, Political Science, and Economics), and Biology. The original

Benchmarks corresponded to scores of 18 on the English test, 22 in Mathematics, 21 in Reading, and 24 in Science.

The Benchmarks were updated in fall 2013 (Allen, 2013) to address possible changes in college grading standards, student performance, course taking patterns of first-year college students, and alignment between secondary and postsecondary course content that transpired since the original benchmarks were established. Using a large sample of first-year students attending two- and four-year institutions, the study detected no changes in the English and Mathematics Benchmarks (18 and 22, respectively), the Reading Benchmark increased from 21 to 22, and the Science Benchmark decreased from 24 to 23.

The Benchmark development sample included more institutions in states that typically enroll higher proportions of ACT-tested students (i.e., states in the South and Midwest) and fewer institutions from states that typically enroll fewer ACT-tested students (i.e., states on the East and West coasts). Compared to ACT-tested students nationally who enroll in college, students in the course samples were more likely to be female, less likely to be Hispanic or African American, less likely to have extreme ACT Composite scores, and more likely to have higher high school GPAs. Moreover, fewer students in the samples enrolled at selective and highly selective institutions. To address this issue, the samples were adjusted statistically to make results approximate what would be observed with a nationally representative sample of ACT-tested college-going students. Table 1 summarizes the characteristics of the institutions used in the 2013 study.

Table 1  
*Institutional Samples Used in Benchmark Development*

Characteristic	College course			
	English Composition I	College Algebra	Social Science	Biology
N (Institutions)	136	125	129	90
N (Students)	96,583	70,461	130,954	41,651
Type:				
2-year	50%	42%	42%	44%
Less selective 4-year	43%	48%	49%	46%
More selective 4-year	7%	10%	9%	10%
Control:				
Public	88%	92%	92%	87%
Private	13%	8%	8%	13%

Table 2 illustrates the overall success rates by course, which ranged from 47% in Biology (ACT Science benchmark) to 59% in English Composition I (ACT English benchmark) for the B or

higher criterion and from 72% in College Algebra (ACT Math benchmark) to 81% in English Composition I for the C or higher criterion. Across all courses, B was the modal course grade. For additional details about the regression models, see Allen (2013).

Table 2  
*Success Rates by Course*

College course type	Percentage of course grades					Success criteria	
	A	B	C	D	F	≥B	≥C
English Composition I	27%	32%	22%	7%	13%	59%	81%
College Algebra	24%	25%	23%	11%	18%	49%	72%
Social Science	25%	27%	23%	10%	14%	53%	76%
Biology	20%	27%	26%	12%	16%	47%	73%

ACT uses the B or higher grade criterion for the benchmarks for several reasons. First, the statistical models used to develop the benchmarks are affected by courses and institutions where grades below a C are uncommon. In particular, courses in English and the social sciences frequently have 80% to 90% of students earning grades of C or higher. In addition, establishing a policy wherein students with only a 50% chance of earning a C or higher are placed into a class could be problematic because students would also have a 50% chance of earning a D or F. Moreover, the B or higher criterion best reproduces the original grade distribution.

In 2015, ACT began reporting an English Language Arts (ELA) score, which is the average of the ACT English, Reading, and Writing scores (after the Writing score is transformed from a 2–12 scale to a 1–36 scale). Students must take the ACT Writing test to obtain an ELA score. In 2017, ACT developed an ELA Benchmark (Radunzel, Westrick, Bassiri, & Li, 2017). The methodology used to develop the ELA Benchmark was similar to that used to develop the benchmarks for the four ACT subject tests. The ELA Benchmark is the score associated with a 50% chance of earning a B or higher grade in English Composition I, American History, Other History, Psychology, Sociology, Political Science, and Economics courses (the same courses used to develop the English and Reading Benchmarks, respectively). The ELA Benchmark also corresponds to an approximate 75% chance of earning a C or higher grade in these courses. The resulting ELA Benchmark is a score of 20. Table 3 contains a summary of the institutional samples used to develop the ELA Benchmark. The institutions represented in ACT research used to set the benchmarks approximately reflected the composition of colleges and universities in the U.S. in terms of selectivity and 2-year vs. 4-year institutions. It should be noted that few differences have been detected between 2-year and 4-year institutions in setting college readiness benchmarks (e.g., Steedle, Radunzel, & Mattern, 2019).

For the Arizona standard setting, an English+Reading score was used instead of the ACT ELA score. The English+Reading score is a sum of the ACT English and reading subject area tests (not including writing), on a 2–72 scale. The English+Reading score was used for the ACT-SAT concordance study (<https://www.act.org/content/act/en/products-and-services/the-act/scores/act-sat-concordance.html>) and can be used to convert scores on the ACT to the SAT scale and vice versa. The same data sample used to develop the ACT ELA Benchmark was used to calculate the probabilities of success associated with first-year college grades for the English+Reading score. The English+Reading score associated with a 50% chance of earning a B or higher was a 41.

Table 3  
*Institutional Samples Used in ELA Benchmark Development*

Characteristic	College course		
	English Composition I	Combined Social Science	Total Sample
N (Institutions)	200	154	233
N (Students)	107,142	91,133	198,275
Type			
2-year	42%	43%	40%
Less selective 4-year	51%	50%	53%
More selective 4-year	7%	7%	7%
Control			
Public	89%	94%	88%
Private	11%	6%	12%

Table 4 shows the overall success rates by course in the ELA benchmark study. Across all courses, B was the modal grade. The overall percentage of students earning a B or higher was approximately 52%, and the overall percentage of students earning a C or higher was approximately 77%.

Table 4  
*Success Rates by Course*

College course type	Percentage of course grades					Success criteria	
	A	B	C	D	F	≥B	≥C
English Composition I	20%	35%	26%	7%	12%	55%	81%
Social Science	21%	28%	25%	11%	16%	49%	73%
Total Sample	20%	32%	25%	9%	14%	52%	77%

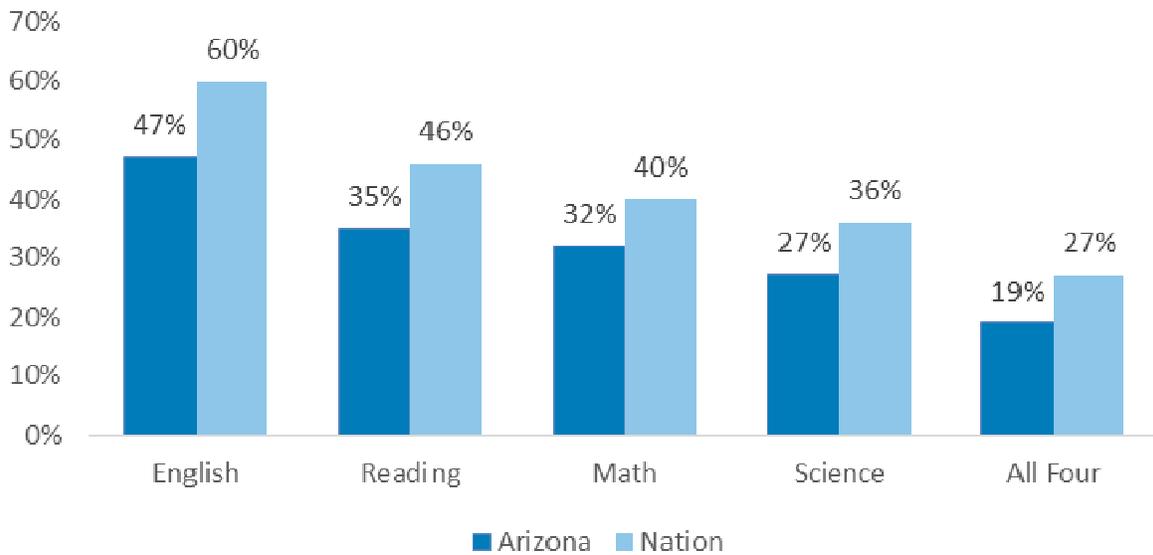
### ACT Performance in Arizona

Figure 1 shows a comparison of the percentages of students in the 2018 ACT-tested high school graduating cohort<sup>3</sup> who met or exceeded the Benchmarks in Arizona and the nation. Sixty-six percent of Arizona’s 2018 graduates took the ACT. Arizona’s average performance was lower than the national average. Note that the Arizona-specific graduating cohort results included the most recent test scores of all students completing the ACT (n=45,468), not just students testing in 11<sup>th</sup> grade. This distinction is important to consider when comparing the 2018 Arizona high school graduates to students testing in 11<sup>th</sup> grade in 2018. *The Condition of College & Career Readiness 2018* state report contains additional information about how Arizona graduates performed on the ACT (ACT, 2018).

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<sup>3</sup> The graduation cohort represents all students in a state or the nation who completed the ACT at any point during high school. This includes students attending private or public high schools. The last (most recent) ACT test score is used when reporting results for cohorts. Therefore, results from the Arizona graduating cohort differ from results reported for all juniors who tested in public schools as part of the MOA.

## Percent of 2018 ACT-Tested High School Graduates Meeting ACT College Readiness Benchmarks by Subject



*Figure 1.* Percentages of 2018 Arizona and national ACT-tested high school graduates meeting ACT’s College Readiness Benchmarks by subject.

### Panelists

The ADE was responsible for all logistical details such as identifying panelists, communicating with panelists about the event, stipends and travel reimbursements, and meeting coordination. Panelists were invited via email to participate during the spring of 2019. This process provided four panelists, including district/LEA representatives and an Arizona Technical Advisory Committee (TAC) member. A second TAC member participated in the standard setting process and discussions but did not provide ratings. Both TAC members participated via Webex. Seven observers from the Arizona State Department of Education and Board of Education also attended; they provided clarifying information but did not provide ratings. A list of panelists, participants, and observers can be found in the Appendix.

In terms of demographics, the panel was 75% male and 100% non-Hispanic White. The panel was highly educated, with all panelists having a Ph.D., and all panelists had 16+ years of experience working in education. The background questionnaire and summary of results can be found in the Appendix.

### Process

The standard setting process was structured as follows:

- Context for standard setting (MOA)
- Empirical standard setting methodology
- ACT College Readiness Benchmarks and probabilities of success in first-year college courses

- Training to identify borderline achievement in terms of probability of success
- Ratings Round 1: Level 3 (College ready)
- Results of Round 1 ratings
- Impact and comparative impact data (percent at/above each score point on the ACT, AzMERIT, AIMS Science, and NAEP assessments)
- Discussion
- Definitions of Level 2 (lower cut) and Level 4 (upper cut)
- Discussion
- Ratings Round 2: Level 2 and Level 4
- Review results of Round 2 ratings
- Discussion
- Final ratings for all 3 cut scores
- Present final results
- Final discussion, concluding comments

An agenda, slides, and other reference materials presented during the standard setting can be found in the Appendix.

### ***Orientation, Context, and Discussion***

The standard setting meeting began with introductions of the key organizations and staff, followed by panelist introductions. The purpose and context of the meeting was summarized by ADE staff, as described above. ACT staff described the empirical standard setting methodology and information about the ACT test and the standard setting task.

ACT staff presented several sources of information to provide context about why college readiness is important, including the percentages of ACT-tested 2018 high school graduates enrolled in college in Arizona (53%) and nationally (65%). Additional evidence included median earnings of students who completed high school (\$30,500) or attained associate (\$36,900), bachelor's (\$50,000), or a master's degree or higher (\$60,000), obtained from *The Condition of Education 2017* report from the National Center for Education Statistics (McFarland, Hussar, de Brey, Snyder, Wang, Wilkinson-Flicker, Gebrekristos, Zhang, Rathbun, Barmer, Bullock Mann, and Hinz, 2017), and remedial coursework rates in college (25% of students at 4-year colleges and 61% of students at 2-year colleges), obtained from *The Condition of Education 2004* report (U.S. Department of Education, National Center for Education Statistics, 2004) and a research report from ACT (Noble and Sawyer, 2013). Bureau of Labor Statistics information was also provided, showing larger projected growth in employment for occupations requiring at least some postsecondary education as compared to occupations requiring a high school diploma or less,<sup>4</sup> and showing the positive relationship between educational attainment and median earnings and the negative relationship between educational attainment and unemployment rates.<sup>5</sup>

ACT provided a summary of the ACT scores used for postsecondary course placement, both nationally and in a sample of Arizona colleges. The national data were obtained from a published study (Fields & Parsad, 2012) in which 23% of institutions reported using ACT Math scores for

<sup>4</sup><https://www.bls.gov/opub/ted/2017/37-percent-of-may-2016-employment-in-occupations-typically-requiring-postsecondary-education.htm>

<sup>5</sup><https://www.bls.gov/emp/chart-unemployment-earnings-education.htm>

placement, and 16% reported using ACT Reading scores for placement. Arizona-specific data were gathered by searching the websites of postsecondary institutions in Arizona using the terms “ACT” and “placement.” Five institutions were found that reported the ACT scores used for first-year course placement. The sample included two large community college systems and three four-year public institutions. The results indicate that College Algebra placement scores are typically close to the ACT College Readiness Benchmark of 22 in math, while lower scores of 18–21 could place a student into lower level credit-bearing math courses. In English, placement scores for first-year Composition were close to or higher than the ACT College Readiness Benchmarks of 18 in English. It should be noted that the Arizona-specific data were a small convenience sample of all of Arizona’s 2-year and 4-year colleges and may not be representative of all Arizona postsecondary institutions.

ACT also summarized a study conducted by AIR to link AzMERIT scores to ACT scores.<sup>6</sup> Data included a large sample of students who took grade 11 AzMERIT ELA and Algebra II tests in spring 2015 and took the ACT “at an appropriate time for graduation in 2016.” An equipercentile approach was used to link scores on the ACT to the AzMERIT scale. Table 5 and Table 6 contain the ACT scores in reading and math corresponding to the AzMERIT grade 11 ELA and high school Algebra II cut scores.<sup>7</sup> The ACT reading score associated with the AzMERIT Level 3 cut score in ELA was at the ACT reading benchmark of 22, and the ACT math score associated with the AzMERIT Level 3 cut score in Algebra II was 21, which was one point below the ACT math benchmark of 22.

Table 5  
*AzMERIT 11<sup>th</sup> Grade ELA Scores Linked to ACT Reading*

Performance Level	AzMERIT 11th Grade ELA	ACT Reading
Level 4	2608–2675	29–36
Level 3	2585–2607	22–28
Level 2	2569–2584	19–21
Level 1	2465–2568	1–18

Table 6  
*AzMERIT Algebra II Scores Linked to ACT Math*

Performance Level	AzMERIT 11th Grade Algebra II	ACT Math
Level 4	3751–3839	26–36
Level 3	3711–3750	21–25
Level 2	3690–3710	18–20
Level 1	3629–3689	5–17

ACT staff presented background information to the panelists about the ACT College Readiness Benchmarks, as described above. ACT staff then presented the probabilities of earning a grade of

<sup>6</sup> <https://cms.azed.gov/home/GetDocumentFile?id=57f689b5aadebf0a04b267c9>  
<sup>7</sup> <https://cms.azed.gov/home/GetDocumentFile?id=5b9bda051dcb260b5c235ee8>

A, B or higher, or C or higher in first-year credit-bearing mathematics, science, and English and social science courses. The probabilities for math and science were developed as part of the Benchmark update study (Allen, 2013), and a subsequent analysis calculated the probabilities for English+Reading using the same sample used to develop the ACT ELA Benchmark (Radunzel, Westrick, Bassiri, & Li, 2017). Slides were presented focusing on the distinction between the probabilities of success and the impact data because an understanding of these elements is vital to the standard setting task.

**Round 1 Rating**

Instructions were given for the first round of making cut score judgments. Table 7 contains an excerpt from the Round 1 Rating Form for math; the full form and corresponding forms for English+Reading and science can be found in the Appendix. Panelists were instructed to think about their conception of a minimally Level 3 (proficient or college ready) student in each subject area and to highlight the row of corresponding probabilities. After the panelists made their judgements, the session ended and the panelists broke for lunch. The first rating task was completed without access to how the probabilities of success correspond to ACT scores or impact data. ACT feels it is important to have initial ratings based on grades and probabilities of success to ensure that initial ratings are not overly influenced by rater’s perceptions about the meaning of specific ACT scores or the impact data.

Table 7  
*Sample from Round 1 Rating Sheet: Mathematics*

Probabilities of Success		
ACT Subject: Mathematics		
College Course: Algebra		
Probability of Success		
A prob	B or higher prob	C or higher prob
0.29	0.60	0.79
0.27	0.58	0.78
0.25	0.56	0.77
0.24	0.54	0.76
0.22	0.52	0.74
0.20	0.50	0.73
0.19	0.48	0.72
0.17	0.46	0.71
0.16	0.44	0.69
0.15	0.42	0.68
0.13	0.40	0.67

**Round 1 Results and Discussion**

The afternoon session began with a review of the Round 1 results, followed by a review of the subject area-specific comparative and impact evidence. Figure 1 and Table 8 show the results of the first round of ratings. Median probability ratings were calculated within subject areas, and in the case of a tie, the higher value was used. The resulting medians reflected some variability across subject areas. The median probability of earning a B or higher grade was .48 for Mathematics, .48 for Science, and .54 for English+Reading. Probabilities of earning an A or C or higher grade were also provided in the data books (see Table 7 or the Appendix), and panelists were instructed to use the probabilities that made the most sense to them when making judgements. Because panelists were instructed to highlight the entire row on the rating form, it ultimately did not matter in terms of the medians which probability (A, B or higher, or C or higher) was their focus.

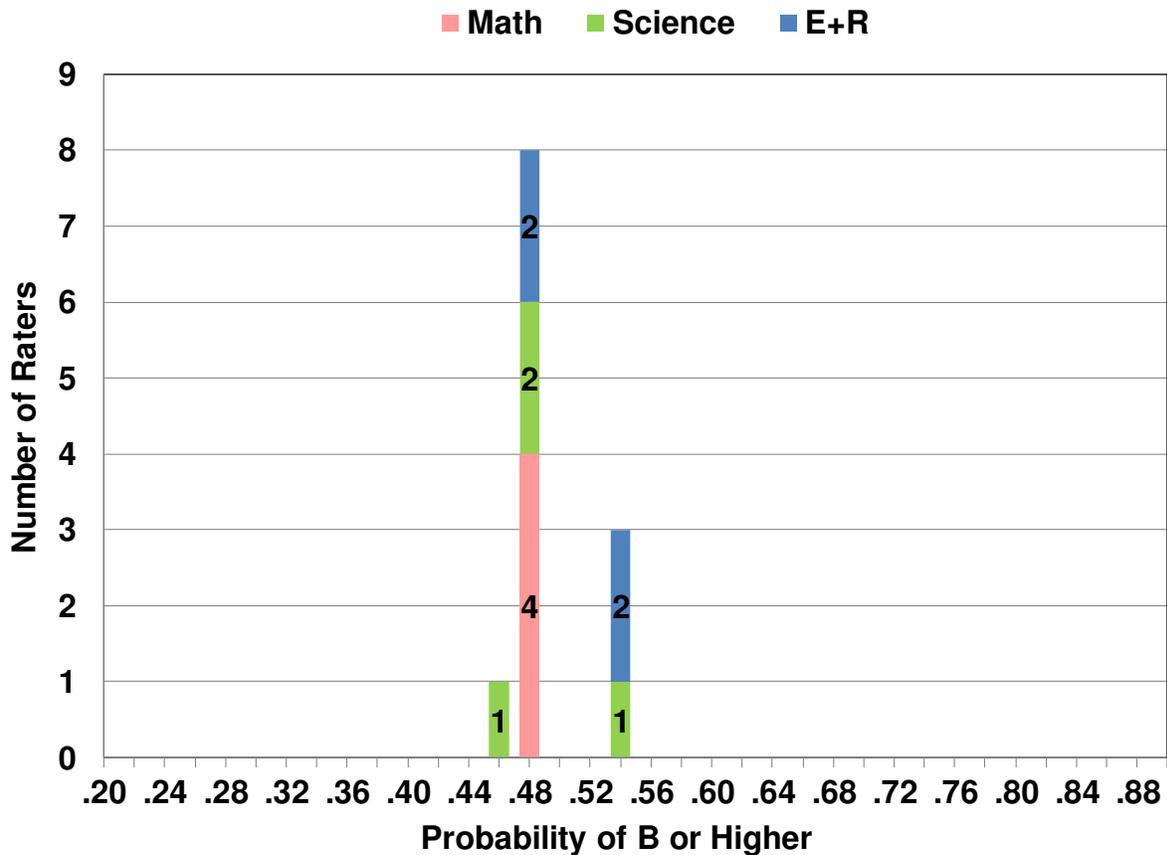


Figure 1. Round 1 Level 3 ratings by B or higher grade probabilities.

Table 8 shows the median Round 1 ratings, the ACT scores associated with those ratings, and impact data for several ACT-tested populations. All evidence presented *after* the Round 1 ratings was anchored to ACT scores rather than the success probabilities because the ultimate objective was to choose ACT cut scores for to the Approaching, On Track, and Exceeding achievement levels.

Table 8  
*Round 1 Level 3 Ratings with ACT Scores and Impact Data*

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State 2018	All AZ Juniors 2018	All AZ Juniors 2017	Census States Juniors 2018	National Grad Class 2018
		<b>Mathematics</b>							
Round 1	22	0.19	0.48	0.72	31	30	30	25	40
		<b>Science</b>							
Round 1	23	0.17	0.48	0.76	27	25	26	24	38
		<b>English + Reading</b>							
Round 1	43	0.16	0.54	0.79	27	27	28	27	43

Data books were provided to panelists after the Round 1 rating. The data books contained impact evidence by subject area and ACT test score, as well as descriptive information about the impact data samples, and comparative impact on the AzMERIT, AIMS Science, and NAEP assessments. The data books contained secure information and panelists were not allowed to remove them from the meeting rooms, but they could reference them and take notes in them throughout the standard setting process. Complete data books are included in the Appendix.

The ACT impact data samples were based on several ACT-tested student populations of interest:

- 2018 ACT-tested juniors in Arizona (census tested schools/districts)
- 2018 and 2017 all ACT-tested juniors in Arizona (national, district, and state testing)
- 2018 ACT-tested juniors in census-tested states<sup>8</sup>
- 2018 national ACT-tested graduate cohort

Table 9 contains descriptive statistics for the impact data samples, including demographics, percent meeting the ACT Benchmarks, and average ACT scores. The 2018 ACT-tested juniors in Arizona (census tested schools/districts) was a population of primary interest since this was likely to be most similar to the data that will be reported for state accountability purposes. Sixteen percent of Arizona juniors took the ACT as part of state testing in 2018. Those students represented urban and rural, small and large, disadvantaged and affluent schools and districts. However, the extent to which this sample is representative of the total population of Arizona juniors is unknown.

Impact for all ACT-tested Arizona juniors in 2017 and 2018 were also provided for comparison. This sample included all students who tested in 11<sup>th</sup> grade in 2017 or 2018, as part of state, district, or national testing. In 2018, 59% of Arizona juniors took the ACT, up from 49% in 2017. Multiple years of data were provided to illustrate how impact data can fluctuate from year

<sup>8</sup> This included nine states that administered the ACT to virtually all 11<sup>th</sup> grade students in the state (Alabama, Arkansas, Louisiana, Mississippi, Nebraska, Nevada, North Dakota, Wisconsin, and Wyoming).

to year due to differences in the student cohorts and to prevent panelists from overly focusing on a specific percentage. Table 9 shows that performance of the Arizona state-tested juniors was similar to the performance of all Arizona juniors in 2018 and 2017, despite some differences in student demographics. However, because these samples comprised approximately one-half to one-third of the full population of Arizona juniors, they may not be representative of the full population.

Table 9  
*Summary of Demographic and Test Results by Student Population*

		<b>AZ Juniors State</b>	<b>All AZ Juniors</b>	<b>All AZ Juniors</b>	<b>Census State Juniors</b>	<b>National Grad Class</b>
		<b>2018</b>	<b>2018</b>	<b>2017</b>	<b>2018</b>	<b>2018</b>
N	Count	13,136	47,150	40,514	305,299	1,914,460
Participation Rate	Percent	16%	57%	49%	100%	55%
Tested 11th Grade		100%	100%	100%	100%	53%
Female		50%	52%	51%	49%	53%
Black/African American		3%	4%	4%	22%	13%
American Indian		3%	3%	3%	1%	1%
White		54%	37%	34%	54%	55%
Hispanic/Latino		29%	46%	49%	13%	17%
Asian		3%	3%	3%	3%	5%
Two or more races		5%	4%	4%	5%	5%
Met ACT English Benchmark		44%	43%	44%	45%	60%
Met ACT Reading Benchmark		32%	31%	31%	29%	46%
Met ACT Math Benchmark		30%	29%	29%	24%	40%
Met ACT Science Benchmark		25%	23%	25%	23%	36%
ACT Composite (1-36)	Mean	18.8	18.7	18.8	18.5	20.8
ACT English (1-36)		17.6	17.5	17.6	17.8	20.2
ACT Reading (1-36)		19.1	19.0	19.0	18.7	21.3
ACT Math (1-36)		19.1	19.0	19.1	18.4	20.5
ACT Science (1-36)		18.9	18.8	18.9	18.7	20.7
ACT English + Reading (2-72)		36.7	36.5	36.6	36.5	41.5

Another comparison group was ACT-tested juniors from census-tested states. This sample comprised 11<sup>th</sup> grade students in nine states that administered the ACT to virtually all juniors in 2018. While Arizona was not included, this comparison group provided an estimate of statewide performance on the ACT for states that administer the test statewide. Table 9 shows that the average performance of students in the census-tested states was slightly lower than the performance of the Arizona juniors samples.

Finally, the 2018 ACT-tested national graduate cohort (or “grad class”) was presented as another comparison group. This sample included all ACT-tested high school graduates of 2018, and it

reflected their most recent test scores if they took the ACT more than once. Fifty-five percent of the national 2018 graduate cohort was included in this sample. The graduate cohort was not an ideal comparison sample as it tends to include more able, college-bound students such as those from states with low ACT participation rates where only higher achieving students typically take the ACT. However, the graduation cohort may be more familiar to the public since it is described by ACT's annual *Condition of College and Career Readiness* reports (ACT, 2018). Table 9 shows that the grad class sample was indeed higher performing than the other impact data samples.

Panelists reviewed impact data from AzMERIT, including the percentages of students scoring at or above each cut score in grade 8 in math and in high school Algebra I, Geometry, and Algebra II in 2017 and 2018, as well as grades 8 and 11 in ELA in 2017 and 2018. Impact for AIMS Science in grades 8 and high school in 2017 and 2018 was also provided. It was noted that in the 2020 cohort, students who tested in 2017 were likely a smaller sample of high achieving 9<sup>th</sup> grade students, whereas students in the 2020 cohort who tested in 2018 were a larger, more representative sample of 10<sup>th</sup> grade students. NAEP impact data for math, science, and reading was also provided, including Arizona grade 8 students in 2017, national grade 8 students in 2017, and national 12<sup>th</sup> grade students in 2015. The impact data from AzMERIT, AIMS Science, and NAEP can be found in the Appendix.

After the comparative and impact evidence were presented, panelists were given the opportunity to discuss their ratings and the evidence. Panelists were instructed to focus their discussion on how their cut score judgements compared to others in a given subject area and across subject areas, how the impact information may cause them to reconsider their initial cut score judgements, and which information is the most important in deciding the Level 3 cut score.

After the discussion, panelists were told that they would have an opportunity to provide another rating for Level 3 at the end of the standard setting meeting. In a typical standard setting, panelists would provide a second round of ratings on the Proficient/College Ready cut score before proceeding to the upper and lower cuts, but this round was eliminated due to time constraints of the modified standard setting.

### ***Round 2: Level 2 and Level 4—Identifying Borderline Achievement by Probability of Success and ACT Score***

After discussion of the Round 1 ratings, the meeting transitioned to setting the upper (Level 4) and lower (Level 2) cut scores. Similar to setting the first round of cut scores, panelists were asked to consider what it means to be at the borderline between levels with respect to their probabilities of success in first-year credit-bearing college courses.

The Round 2 ratings process followed the same general procedure as the Round 1 ratings with panelists highlighting two rows of scores and their associated probabilities on the rating sheet, one for the Level 2 cut score and one for the Level 4 cut score. The rating sheets for Round 2 differed from the rating sheets for Round 1 in that each row represented a unique ACT score, with the probabilities of success and percentages at or above anchored to the ACT scores. Impact data were also included for each of the five ACT data samples. An excerpt from the Round 2 math rating sheet can be seen in Table 10, and the full rating sheets for Round 2 can be found in the Appendix.

Table 10  
*Sample Round 2 Rating Sheet: Mathematics*

Probabilities of Success and Percentage of Students At or Above Each ACT Score								
ACT Subject: Mathematics								
College Course: Algebra								
ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
28	0.51	0.77	0.87	6	7	7	5	12
27	0.45	0.73	0.85	9	10	10	7	17
26	0.39	0.69	0.83	12	13	14	10	21
25	0.34	0.64	0.80	18	18	17	14	26
24	0.29	0.59	0.78	23	22	22	18	31
23	0.23	0.55	0.75	25	25	26	20	35
22	<b>0.20</b>	<b>0.51</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>24</b>	<b>40</b>
21	0.16	0.46	0.70	33	32	33	27	43
20	0.13	0.40	0.66	36	35	36	30	48
19	0.11	0.35	0.63	42	41	42	35	52
18	0.09	0.30	0.60	48	47	48	41	60

***Round 2 Results and Discussion***

Panelists reviewed the Round 2 results as shown in Figure 2 and Table 11. Panelists reached consensus on the Level 2 cuts for math and science, and near consensus on the Level 4 cuts for math and science. Ratings were less consistent on English+Reading.

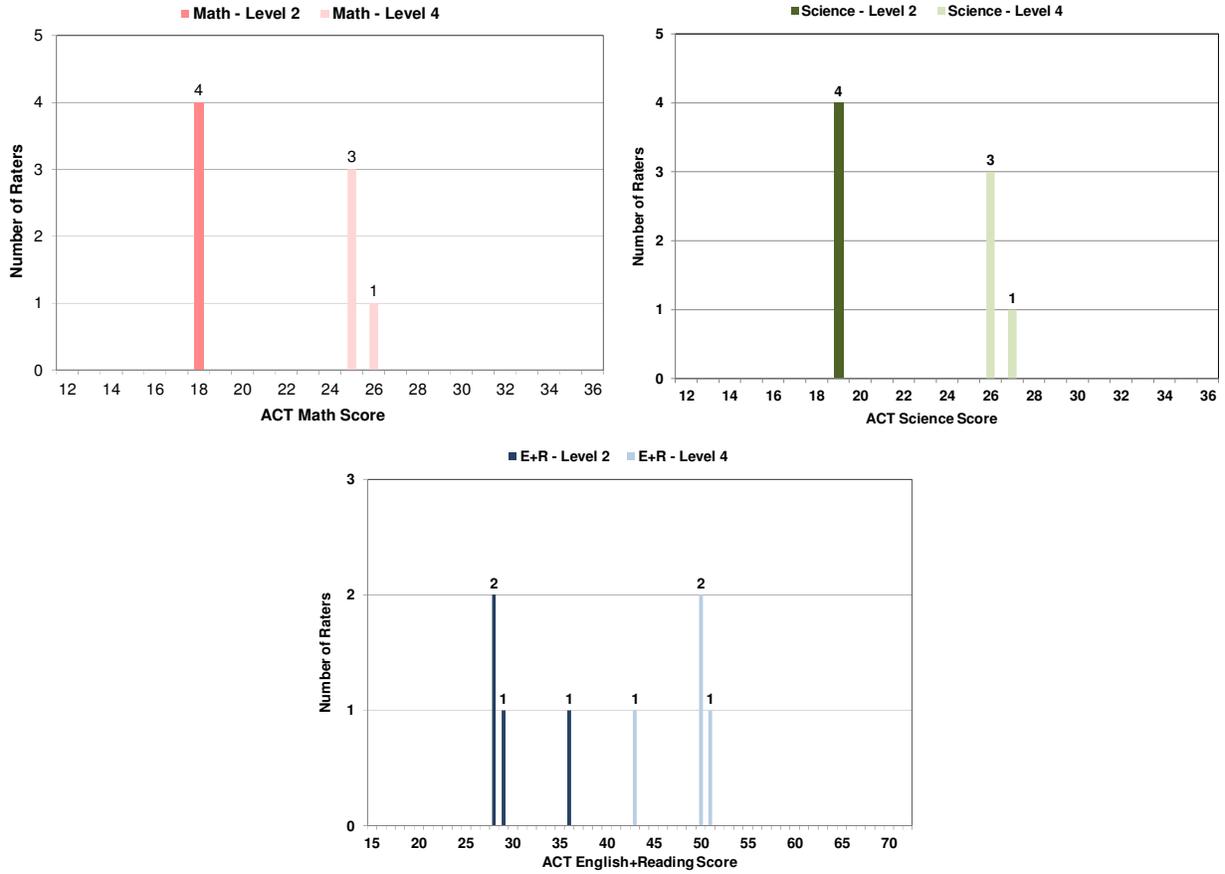


Figure 2. Round 2 Level 2 and Level 4 ratings by ACT score.

Table 11

Probabilities of Success and Impact Data associated with Round 1 and Round 2 Cut Scores

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State 2018	All AZ Juniors 2018	All AZ Juniors 2017	Census States Juniors 2018	National Grad Class 2018
<b>Mathematics</b>									
Level 4	25	0.34	0.64	0.80	18	18	17	14	26
Level 3 (R1)	22	0.19	0.48	0.72	31	30	30	25	40
Level 2	18	0.09	0.30	0.60	48	47	48	41	60
<b>Science</b>									
Level 4	26	0.30	0.64	0.86	10	10	10	9	18
Level 3 (R1)	23	0.17	0.48	0.76	27	25	26	24	38
Level 2	19	0.08	0.31	0.65	51	48	49	48	63
<b>ELA</b>									
Level 4	50	0.32	0.66	0.83	14	15	16	14	27
Level 3 (R1)	43	0.16	0.54	0.79	27	27	28	27	43
Level 2	28	0.09	0.31	0.60	77	74	73	75	84

Panelists discussed how their ratings compared within and across subject areas, how the impact data influenced their ratings, and which data were most influential in making their ratings. An important consideration to the panelists was the requirement in state law that assessments used in the MOA result in comparable student performance levels. This requirement reflects concern that if the impact is not comparable across assessments, it may incentivize schools or districts to select an assessment based on impact, rather than the merits of the assessment. The performance levels will be one criteria used to assign schools an A–F letter grade, but students will not see their individual performance levels; therefore, students would not receive conflicting information from ACT if the ACT Benchmarks were not selected as the Level 3 cut scores. Panelists also acknowledged that the cut scores would need to be reevaluated in a few years to satisfy federal accountability requirements.

### ***Final Ratings and Results***

After discussion, ACT staff gave instructions for the final round of ratings, where panelists would provide their recommendations for ACT cut scores for all three levels in each subject area. The rating sheets for Round 3 were identical to those used for Round 2 and can be found in the Appendix. Panelists were instructed to highlight three rows: one for their Level 2 rating, one for their Level 3 rating, and one for their Level 4 rating.

Figure 3 shows the distributions of the final ratings. Complete consensus was reached in math for all three cut scores. Near consensus was reached in science, with 75% consensus for each cut score. There was less consensus for English+Reading, with 50% consensus for Levels 2 and 3, and 0% consensus for Level 4, although the cut score ratings were generally within one or two points.

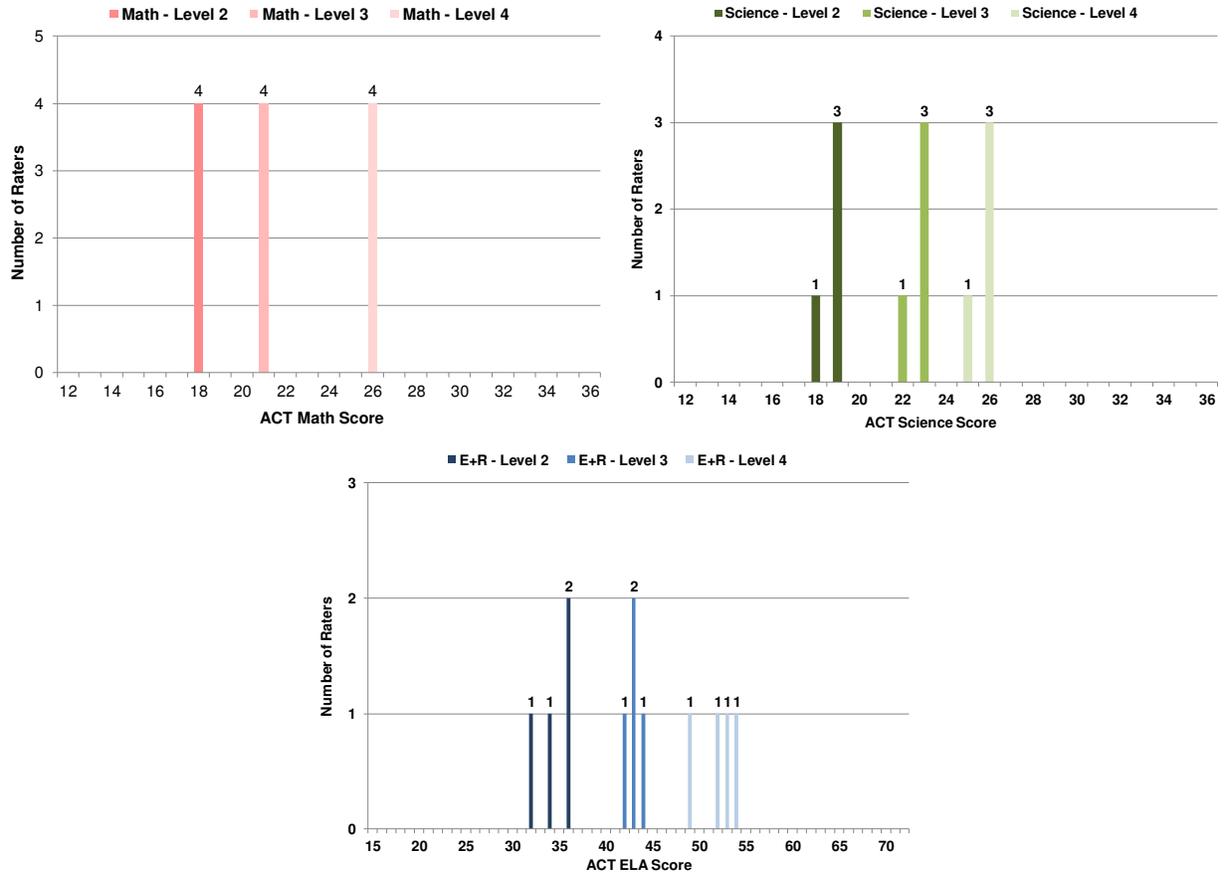


Figure 3. Final Level 2, Level 3, and Level 4 ratings by ACT score.

Table 12 contains the final recommended cut scores, based on the median rating. For math, the Level 2 cut score did not change, the Level 3 cut score dropped by one point, from 22 in the first round of ratings to 21 in the final round, and the Level 4 cut score increased by one point, from 25 to 26. The cut scores for science did not change from the earlier rounds of ratings. For English+Reading, the Level 2 cut increased by 7 points, from 28 to 35, and the Level 4 cut score increased by 3 points, from 50 to 53. The Level 3 cut score did not change. The recommended cut scores result in similar percentages of students performing at or above each performance level across the ACT and AzMERIT and AIMS Science assessments. After presenting the final results, panelists were given an opportunity to voice any comments or concerns prior to adjourning the meeting. Panelists indicated that they were satisfied with the final recommendations.

Table 12  
*Final Cut Score Recommendations*

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census States Juniors	National Grad Class
					2018	2018	2017	2018	2018
<b>Mathematics</b>									
Level 4	26	0.39	0.69	0.83	12	13	14	10	21
Level 3	21	0.16	0.46	0.70	33	32	33	27	43
Level 2	18	0.09	0.30	0.60	48	47	48	41	60
<b>Science</b>									
Level 4	26	0.30	0.64	0.86	10	10	10	9	18
Level 3	23	0.18	0.51	0.79	25	23	25	23	36
Level 2	19	0.08	0.31	0.65	51	48	49	48	63
<b>ELA</b>									
Level 4	53	0.37	0.70	0.85	10	11	12	10	22
Level 3	43	0.22	0.54	0.77	28	28	29	28	44
Level 2	35	0.13	0.41	0.69	52	49	50	50	65

### Process Evaluation Questionnaire Results

After completing the final round of ratings, all panelists completed a Process Evaluation Questionnaire. This questionnaire was intended to gauge the level of understanding of panelists, evaluate the standard setting process, and gather feedback that can be used to improve the process in future studies. Panelists responded to the questionnaire items on a 1–5 scale. In general, panelists reported that they understood the purpose and the process, and most found the resulting cut scores to be defensible and reasonable. A copy of the evaluation form and full results can be found in the Appendix.

### Adoption of Cut Scores

The recommended cut scores were approved by the Arizona State Board of Education on June 24, 2019.

### Summary and Conclusions

ACT conducted a standard setting for Arizona on June 6, 2019, to set recommended cut scores on the ACT for use in the state’s accountability system. Four panelists participated in the standard setting and reviewed information about the ACT, including probabilities of success in first-year, credit-bearing college courses and impact data for several samples of ACT-tested students in Arizona and nationally. Comparative impact data were also considered for the AzMERIT, AIMS Science, and NAEP assessments. Panelists provided recommendations for three cut scores defining four performance levels in math, science, and English+Reading. The recommended cut scores were selected to be generally comparable with respect to the percentage of students performing at or above each performance level on AzMERIT and AIMS Science, and were approved by the Arizona State Board of Education on June 24, 2019.

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## **List of Participants**

### Facilitators:

- Wayne Camara – ACT
- Joann Moore – ACT

### District/LEA Representatives:

- Robert Hagstrom (panelist) -- Flagstaff Unified School District
- Matt Strom (panelist) -- Queen Creek Unified School District
- Harriet Caruso (panelist) -- Charter School Representative

### TAC Members:

- Jerry D'Agostino (panelist) -- Ohio State University
- Derek Briggs (participant) -- University of Colorado at Boulder

### Observers:

- Audra Ahumada -- ADE Deputy Associate Superintendent of Assessment
- Callie Kozlak -- ADE Associate Superintendent of Policy and Government Relations
- Lisa Oliver -- ADE -- Achievement Assessment Developer -- Math
- Niharika Yennum -- ADE -- Director of Psychometrics
- Xiaoyuan Tan-ADE -- Senior Research Scientist
- Catcher Baden -- State Board of Education Deputy Director
- Alicia William -- State Board of Education Executive Director

**Background Questionnaire  
Arizona Standard Setting 6/6/2019**

<b>Question</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>N</b>
1. What is your gender?	Female 1 25%	Male 3 75%	Prefer not to respond 0				4 100%
2. What is your ethnicity?	Hispanic or Latino 0 0%	Not Hispanic or Latino 4 100%	Prefer not to respond 0 0%				4 100%
3. What is your race?	American Indian or Alaskan Native 0 0%	Asian 0 0%	Black or African American 0 0%	Native Hawaiian or Other Pac Islander 0 0%	White 4 100%	Prefer not to respond 0 0%	4 100%
4. Which of the following best describes you?	Principal/Administrator 2 50%	District Curriculum/Assessment Coordinator 1 25%	Counselor 0 0%	Classroom Teacher 0 0%	Higher Ed Faculty* 3 75%	Other / NDE 0 0%	4 100%
5. How many years have you worked in education?	Less than 1 year 0 0%	1-5 years 0 0%	6-10 years 0 0%	11-15 years 0 0%	16-20 years 1 25%	20+ years 3 75%	4 100%
6. How many years have you worked in Arizona?	Less than 1 year 0 0%	1-5 years 0 0%	6-10 years 1 25%	11-15 years 0 0%	16-20 years 2 50%	20+ years 1 25%	4 100%
7. How many years have you been in your current position?	Less than 1 year 1 25%	1-5 years 0 0%	6-10 years 0 0%	11-15 years 2 50%	16-20 years 1 25%	20+ years 0 0%	4 100%
8. Indicate the highest degree you hold.	Associate degree 0 0%	Bachelor's degree 0 0%	Master's degree 0 0%	Professional degree 0 0%	Doctoral degree 4 100%		4 100%

\* Departments of Educational Psychology, Mathematics, and Quantitative Research Methods

**Probabilities of Success**  
**ACT Subject: Mathematics**  
**College Course: Algebra**

**Round 1 Rating Sheet**

Probability of Success		
A prob	B or higher prob	C or higher prob
0.79	0.90	0.94
0.74	0.88	0.93
0.70	0.86	0.92
0.66	0.84	0.91
0.62	0.82	0.90
0.58	0.80	0.89
0.54	0.78	0.88
0.51	0.76	0.87
0.48	0.74	0.86
0.45	0.72	0.85
0.42	0.70	0.84
0.39	0.68	0.83
0.36	0.66	0.82
0.34	0.64	0.81
0.32	0.62	0.80
0.29	0.60	0.79
0.27	0.58	0.78
0.25	0.56	0.77
0.24	0.54	0.76
0.22	0.52	0.74
<b>0.20</b>	<b>0.50</b>	<b>0.73</b>
0.19	0.48	0.72
0.17	0.46	0.71
0.16	0.44	0.69
0.15	0.42	0.68
0.13	0.40	0.67
0.12	0.38	0.65
0.11	0.36	0.64
0.10	0.34	0.62
0.09	0.32	0.60
0.08	0.30	0.59
0.07	0.28	0.57
0.07	0.26	0.55
0.06	0.24	0.53
0.05	0.22	0.51
0.04	0.20	0.48

**Probabilities of Success**  
**ACT Subject: Science**  
**College Course: Biology**

**Round 1 Rating Sheet**

Probability of Success		
A prob	B or higher prob	C or higher prob
0.74	0.90	0.96
0.70	0.88	0.95
0.65	0.86	0.94
0.61	0.84	0.94
0.57	0.82	0.93
0.53	0.80	0.92
0.50	0.78	0.91
0.46	0.76	0.90
0.43	0.74	0.90
0.41	0.72	0.89
0.38	0.70	0.88
0.35	0.68	0.87
0.33	0.66	0.86
0.31	0.64	0.85
0.29	0.62	0.84
0.27	0.60	0.83
0.25	0.58	0.82
0.23	0.56	0.81
0.22	0.54	0.80
0.20	0.52	0.79
<b>0.19</b>	<b>0.50</b>	<b>0.78</b>
0.17	0.48	0.76
0.16	0.46	0.75
0.15	0.44	0.74
0.14	0.42	0.73
0.13	0.40	0.71
0.12	0.38	0.70
0.11	0.36	0.68
0.10	0.34	0.66
0.09	0.32	0.65
0.08	0.30	0.63
0.07	0.28	0.61
0.06	0.26	0.59
0.06	0.24	0.57
0.05	0.22	0.54
0.04	0.20	0.52

**Probabilities of Success**

**Round 1 Rating Sheet**

**ACT Subject: ELA (English + Reading)**

**College Course: English Composition I and Social Sciences**

Probability of Success		
A prob	B or higher prob	C or higher prob
0.62	0.90	0.95
0.57	0.88	0.94
0.52	0.86	0.93
0.48	0.84	0.92
0.44	0.82	0.91
0.41	0.80	0.90
0.38	0.78	0.90
0.35	0.76	0.89
0.32	0.74	0.88
0.30	0.72	0.87
0.28	0.70	0.86
0.26	0.68	0.85
0.24	0.66	0.84
0.22	0.64	0.83
0.21	0.62	0.83
0.19	0.60	0.82
0.18	0.58	0.81
0.17	0.56	0.80
0.16	0.54	0.79
0.14	0.52	0.77
<b>0.13</b>	<b>0.50</b>	<b>0.76</b>
0.13	0.48	0.75
0.12	0.46	0.74
0.11	0.44	0.73
0.10	0.42	0.72
0.09	0.40	0.70
0.08	0.38	0.69
0.08	0.36	0.67
0.07	0.34	0.66
0.07	0.32	0.64
0.06	0.30	0.63
0.05	0.28	0.61
0.05	0.26	0.59
0.04	0.24	0.57
0.04	0.22	0.55
0.03	0.20	0.53

## Rating Sheet Rounds 2 and 3

### Probabilities of Success and Percentage of Students At or Above Each ACT Score

ACT Subject: Mathematics

College Course: Algebra

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
36	0.89	0.94	0.96	0	0	0	0	0
35	0.86	0.93	0.95	0	1	1	0	1
34	0.83	0.92	0.95	1	1	1	1	2
33	0.78	0.90	0.94	1	1	1	1	3
32	0.74	0.88	0.92	1	2	2	1	4
31	0.70	0.86	0.91	2	3	3	2	5
30	0.64	0.83	0.90	3	3	4	2	7
29	0.58	0.80	0.89	4	5	5	3	9
28	0.51	0.77	0.87	6	7	7	5	12
27	0.45	0.73	0.85	9	10	10	7	17
26	0.39	0.69	0.83	12	13	14	10	21
25	0.34	0.64	0.80	18	18	17	14	26
24	0.29	0.59	0.78	23	22	22	18	31
23	0.23	0.55	0.75	25	25	26	20	35
<b>22</b>	<b>0.20</b>	<b>0.51</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>24</b>	<b>40</b>
21	0.16	0.46	0.70	33	32	33	27	43
20	0.13	0.40	0.66	36	35	36	30	48
19	0.11	0.35	0.63	42	41	42	35	52
18	0.09	0.30	0.60	48	47	48	41	60
17	0.07	0.26	0.56	62	58	58	53	69
16	0.05	0.22	0.51	76	73	73	69	80
15	0.04	0.19	0.46	88	85	87	83	90
14	0.03	0.16	0.43	96	95	96	95	97
13	0.02	0.13	0.39	98	98	98	98	99
12	0.02	0.11	0.35	99	99	99	99	100
N-count	70,461			13,136	47,150	40,514	305,299	1,914,460

## Rating Sheet Rounds 2 and 3

### Probabilities of Success and Percentage of Students At or Above Each ACT Score

ACT Subject: Science

College Course: Biology

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
36	0.83	0.93	0.97	0	0	0	0	1
35	0.79	0.92	0.97	0	1	1	0	2
34	0.75	0.90	0.96	1	1	1	1	3
33	0.70	0.88	0.95	1	2	2	1	4
32	0.65	0.86	0.95	2	2	2	2	5
31	0.59	0.83	0.93	3	3	3	2	6
30	0.53	0.80	0.92	3	3	4	3	8
29	0.47	0.77	0.91	4	5	5	4	10
28	0.41	0.73	0.89	5	6	7	5	12
27	0.36	0.69	0.88	6	7	8	6	14
26	0.30	0.64	0.86	10	10	10	9	18
25	0.25	0.60	0.84	12	13	14	11	23
24	0.21	0.55	0.81	19	19	19	17	29
<b>23</b>	<b>0.18</b>	<b>0.51</b>	<b>0.79</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>23</b>	<b>36</b>
22	0.14	0.46	0.75	31	29	30	28	43
21	0.12	0.41	0.71	38	36	36	35	50
20	0.10	0.36	0.68	42	41	42	40	56
19	0.08	0.31	0.65	51	48	49	48	63
18	0.06	0.27	0.61	55	54	57	55	70
17	0.05	0.23	0.57	65	63	62	63	75
16	0.04	0.19	0.52	75	72	71	73	82
15	0.03	0.16	0.47	80	78	78	80	86
14	0.03	0.14	0.42	84	83	85	85	90
13	0.02	0.11	0.38	92	90	89	91	94
12	0.02	0.09	0.34	95	94	92	94	96
N-count	41,651			13,136	47,150	40,514	305,299	1,914,460

## Rating Sheet Rounds 2 and 3

### Probabilities of Success and Percentage of Students At or Above Each ACT Score

ACT Subject: ELA (English + Reading)

College Course: English Composition I and Social Sciences

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
72	0.68	0.89	0.94	0	0	0	0	0
71	0.66	0.89	0.94	0	0	0	0	1
70	0.65	0.88	0.94	0	1	1	1	2
69	0.63	0.87	0.93	0	1	1	1	3
68	0.62	0.87	0.93	1	1	2	1	4
67	0.60	0.86	0.92	1	2	2	1	5
66	0.58	0.85	0.92	1	2	2	2	6
65	0.57	0.84	0.92	2	3	3	2	7
64	0.55	0.83	0.91	2	3	3	3	8
63	0.53	0.82	0.91	2	4	4	3	9
62	0.51	0.82	0.90	3	4	4	4	10
61	0.50	0.80	0.90	3	5	5	4	11
60	0.48	0.79	0.89	4	5	6	5	12
59	0.47	0.78	0.89	4	6	7	5	13
58	0.45	0.77	0.88	5	7	7	6	14
57	0.43	0.75	0.88	6	8	8	7	16
56	0.42	0.74	0.87	7	8	9	8	17
55	0.40	0.73	0.87	8	9	10	8	19
54	0.38	0.72	0.86	9	10	11	9	20
53	0.37	0.70	0.85	10	11	12	10	22
52	0.35	0.68	0.85	11	12	13	11	23
51	0.33	0.67	0.84	12	14	14	13	25
50	0.32	0.66	0.83	14	15	16	14	27
49	0.30	0.64	0.82	15	16	17	15	29
48	0.29	0.62	0.81	17	18	19	17	31
47	0.27	0.61	0.81	19	20	21	19	33
46	0.26	0.59	0.80	21	22	23	21	36
45	0.24	0.57	0.79	23	24	25	23	39
44	0.23	0.56	0.78	26	26	27	25	41
43	0.22	0.54	0.77	28	28	29	28	44
42	0.21	0.52	0.76	31	31	32	30	47
41	0.20	0.51	0.75	34	33	34	33	49
<b>40</b>	<b>0.18</b>	<b>0.49</b>	<b>0.74</b>	<b>37</b>	<b>36</b>	<b>36</b>	<b>35</b>	<b>52</b>
39	0.17	0.47	0.73	40	38	39	38	55
38	0.16	0.46	0.72	43	41	41	41	57
37	0.15	0.44	0.71	46	43	44	44	60

### Rating Sheet Rounds 2 and 3

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
36	0.14	0.43	0.70	49	46	47	47	63
35	0.13	0.41	0.69	52	49	50	50	65
34	0.12	0.40	0.68	56	52	53	53	68
33	0.12	0.38	0.66	59	56	56	57	71
32	0.11	0.37	0.65	63	59	59	60	73
31	0.10	0.35	0.64	66	63	63	64	76
30	0.10	0.33	0.63	70	66	66	68	79
29	0.09	0.32	0.61	73	70	70	72	81
28	0.09	0.31	0.60	77	74	73	75	84
27	0.08	0.29	0.59	81	77	77	79	86
26	0.07	0.28	0.58	84	81	80	83	89
25	0.07	0.27	0.57	88	85	84	86	91
24	0.06	0.26	0.55	91	88	88	90	93
23	0.06	0.24	0.54	93	91	91	93	95
22	0.06	0.23	0.52	95	94	93	95	97
21	0.05	0.22	0.51	97	96	95	97	98
20	0.05	0.21	0.50	98	97	97	98	99
19	0.05	0.20	0.49	99	98	98	99	99
18	0.04	0.19	0.47	99	99	99	99	99
17	0.04	0.18	0.46	99	99	99	100	100
16	0.04	0.18	0.45	100	99	99	100	100
15	0.04	0.17	0.44	100	100	100	100	100
N-count	198,275			13,136	47,150	40,514	305,299	1,914,460

## Descriptives for Impact Data Samples

		AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
		2018	2018	2017	2018	2018
N	Count	13,136	47,150	40,514	305,299	1,914,460
Participation Rate	Percent	16%	57%	49%	100%	55%
Tested 11th Grade		100%	100%	100%	100%	53%
Female		50%	52%	51%	49%	53%
Black/African American		3%	4%	4%	22%	13%
American Indian		3%	3%	3%	1%	1%
White		54%	37%	34%	54%	55%
Hispanic/Latino		29%	46%	49%	13%	17%
Asian		3%	3%	3%	3%	5%
Two or more races		5%	4%	4%	5%	5%
Met ACT English Benchmark		44%	43%	44%	45%	60%
Met ACT Reading Benchmark		32%	31%	31%	29%	46%
Met ACT Math Benchmark		30%	29%	29%	24%	40%
Met ACT Science Benchmark		25%	23%	25%	23%	36%
ACT Composite (1-36)	Mean	18.8	18.7	18.8	18.5	20.8
ACT English (1-36)		17.6	17.5	17.6	17.8	20.2
ACT Reading (1-36)		19.1	19.0	19.0	18.7	21.3
ACT Math (1-36)		19.1	19.0	19.1	18.4	20.5
ACT Science (1-36)		18.9	18.8	18.9	18.7	20.7
ACT English + Reading (2-72)		36.7	36.5	36.6	36.5	41.5

**Probabilities of Success and Percentage of Students At or Above Each ACT Score**  
**ACT Subject: Mathematics**  
**College Course: Algebra**

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
33	0.79	0.90	0.94	1	1	1	1	3
32	0.74	0.88	0.93	1	2	2	1	4
31	0.70	0.86	0.92	2	3	3	2	5
30	0.66	0.84	0.91	2	3	3	2	7
30	0.62	0.82	0.90	3	4	4	3	8
29	0.58	0.80	0.89	4	5	5	3	9
28	0.54	0.78	0.88	5	6	6	4	11
28	0.51	0.76	0.87	6	7	8	5	13
27	0.48	0.74	0.86	8	9	9	7	15
27	0.45	0.72	0.85	10	11	11	8	18
26	0.42	0.70	0.84	11	12	13	9	20
26	0.39	0.68	0.83	13	14	15	10	22
25	0.36	0.66	0.82	16	16	16	12	24
25	0.34	0.64	0.81	18	18	18	14	26
25	0.32	0.62	0.80	20	20	20	15	28
24	0.29	0.60	0.79	22	21	22	17	30
24	0.27	0.58	0.78	24	23	23	18	32
23	0.25	0.56	0.77	25	24	25	19	34
23	0.24	0.54	0.76	26	25	26	20	36
23	0.22	0.52	0.74	28	27	28	22	37
<b>22</b>	<b>0.20</b>	<b>0.50</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>23</b>	<b>39</b>
22	0.19	0.48	0.72	31	30	30	25	40
21	0.17	0.46	0.71	32	31	31	26	42
21	0.16	0.44	0.69	33	32	33	27	43
21	0.15	0.42	0.68	34	33	34	28	45
20	0.13	0.40	0.67	35	35	36	29	47
20	0.12	0.38	0.65	37	37	38	31	49
19	0.11	0.36	0.64	40	39	40	33	51
19	0.10	0.34	0.62	42	41	42	36	53
18	0.09	0.32	0.60	45	44	45	38	56
18	0.08	0.30	0.59	48	47	48	41	60
18	0.07	0.28	0.57	55	52	53	47	64
17	0.07	0.26	0.55	62	58	58	53	68
16	0.06	0.24	0.53	69	66	66	61	74
16	0.05	0.22	0.51	77	74	74	70	81
15	0.04	0.20	0.48	84	81	82	78	87

**Probabilities of Success and Percentage of Students At or Above Each ACT Score**  
**ACT Subject: Science**  
**College Course: Biology**

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
34	0.74	0.90	0.96	1	1	1	1	3
33	0.70	0.88	0.95	1	2	2	1	4
32	0.65	0.86	0.94	2	2	2	2	5
31	0.61	0.84	0.94	2	3	3	2	6
31	0.57	0.82	0.93	3	3	3	2	7
30	0.53	0.80	0.92	3	3	4	3	8
29	0.50	0.78	0.91	3	4	5	3	9
29	0.46	0.76	0.90	4	5	5	4	10
28	0.43	0.74	0.90	4	6	6	4	11
28	0.41	0.72	0.89	5	6	7	5	12
27	0.38	0.70	0.88	6	7	8	6	14
27	0.35	0.68	0.87	7	8	9	7	15
26	0.33	0.66	0.86	8	9	10	8	16
26	0.31	0.64	0.85	10	10	10	9	18
26	0.29	0.62	0.84	11	11	12	10	20
25	0.27	0.60	0.83	12	13	14	11	22
25	0.25	0.58	0.82	14	14	16	13	25
24	0.23	0.56	0.81	17	17	18	15	27
24	0.22	0.54	0.80	20	19	20	18	30
24	0.20	0.52	0.79	22	21	22	20	33
<b>23</b>	<b>0.19</b>	<b>0.50</b>	<b>0.78</b>	<b>24</b>	<b>23</b>	<b>24</b>	<b>22</b>	<b>35</b>
23	0.17	0.48	0.76	27	25	26	24	38
22	0.16	0.46	0.75	29	27	28	26	41
22	0.15	0.44	0.74	32	30	30	29	43
22	0.14	0.42	0.73	34	32	33	32	46
21	0.13	0.40	0.71	37	35	36	34	49
21	0.12	0.38	0.70	39	37	38	37	52
20	0.11	0.36	0.68	41	39	41	39	55
20	0.10	0.34	0.66	44	42	43	41	57
19	0.09	0.32	0.65	48	45	46	45	60
19	0.08	0.30	0.63	51	48	50	49	63
18	0.07	0.28	0.61	53	51	54	52	67
18	0.06	0.26	0.59	56	55	57	56	70
17	0.06	0.24	0.57	61	59	60	60	73
17	0.05	0.22	0.54	66	65	63	65	76
16	0.04	0.20	0.52	72	70	69	71	80

**Probabilities of Success and Percentage of Students At or Above Each ACT Score**  
**ACT Subject: ELA (English + Reading)**  
**College Course: English Composition I and Social Sciences**

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
72	0.62	0.90	0.95	0	0	0	0	0
71	0.57	0.88	0.94	0	0	0	0	1
69	0.52	0.86	0.93	1	1	1	1	3
66	0.48	0.84	0.92	1	2	2	2	6
64	0.44	0.82	0.91	2	3	3	3	8
62	0.41	0.80	0.90	3	4	5	4	10
60	0.38	0.78	0.90	4	5	6	5	12
58	0.35	0.76	0.89	5	6	7	6	14
57	0.32	0.74	0.88	6	8	8	7	16
55	0.30	0.72	0.87	7	9	10	8	18
54	0.28	0.70	0.86	9	10	11	10	20
52	0.26	0.68	0.85	10	12	13	11	23
51	0.24	0.66	0.84	12	14	14	13	25
50	0.22	0.64	0.83	14	15	16	14	28
48	0.21	0.62	0.83	17	17	18	16	30
47	0.19	0.60	0.82	19	20	21	19	33
46	0.18	0.58	0.81	21	22	23	21	36
45	0.17	0.56	0.80	24	25	26	24	40
43	0.16	0.54	0.79	27	27	28	27	43
42	0.14	0.52	0.77	31	30	31	30	46
<b>41</b>	<b>0.13</b>	<b>0.50</b>	<b>0.76</b>	<b>34</b>	<b>33</b>	<b>34</b>	<b>33</b>	<b>50</b>
40	0.13	0.48	0.75	38	36	37	36	53
38	0.12	0.46	0.74	41	40	40	40	56
37	0.11	0.44	0.73	45	43	43	43	59
36	0.10	0.42	0.72	49	46	47	47	63
35	0.09	0.40	0.70	53	50	50	51	66
33	0.08	0.38	0.69	57	54	54	55	69
32	0.08	0.36	0.67	62	59	59	60	73
31	0.07	0.34	0.66	67	63	63	65	77
29	0.07	0.32	0.64	72	68	68	70	80
28	0.06	0.30	0.63	77	74	73	75	84
27	0.05	0.28	0.61	82	79	78	81	87
25	0.05	0.26	0.59	87	85	84	86	91
23	0.04	0.24	0.57	92	90	89	92	94
22	0.04	0.22	0.55	96	95	94	96	97
20	0.03	0.20	0.53	98	97	97	98	99

**AzMERIT High School Math, All Students**

Performance Level	Algebra I		Geometry		Algebra II	
	2017	2018	2017	2018	2017	2018
4 Highly Proficient	11%	12%	7%	10%	8%	9%
3 Proficient	39%	39%	33%	37%	35%	34%
2 Partially Proficient	60%	57%	59%	61%	56%	55%
1 Minimally Proficient	40%	42%	40%	39%	45%	45%
Passing	39%	39%	34%	36%	34%	34%
N	87,133	92,474	76,560	76,797	69,013	70,143

**AZMerit 8th grade all math, all students**

Performance Level	2017	2018
4 Highly Proficient	15%	17%
3 Proficient	38%	41%
2 Partially Proficient	59%	60%
1 Minimally Proficient	41%	41%
Passing	38%	41%
N	87,248	92,222

**AzMERIT Grade 11 ELA, All Students**

Performance Level	2017	2018
4 Highly Proficient	9%	9%
3 Proficient	26%	29%
2 Partially Proficient	49%	47%
1 Minimally Proficient	52%	53%
Passing	25%	28%
N	74,372	75,742

**AZMERIT Grade 8 ELA, All Students**

Performance Level	2017	2018
4 Highly Proficient	9%	10%
3 Proficient	34%	40%
2 Partially Proficient	55%	62%
1 Minimally Proficient	45%	39%
Passing	34%	39%
N	84,335	85,345

**AIMS High School Science, All Students**

Performance Level	2019 Cohort	2020 Cohort		2021 Cohort
	2017 Testing	2017 Testing	2018 Testing	2018 Testing
4 Exceeds	14%	22%	12%	22%
3 Meets	33%	45%	29%	45%
2 Approaches	51%	64%	47%	65%
1 Falls Far Below	49%	36%	52%	35%
Passing	32%	45%	30%	45%
N	44,223	34,038	46,424	38,336

**AIMS science, 8th grade, all students**

Performance Level	2017	2018
4 Exceeds	34%	33%
3 Meets	59%	57%
2 Approaches	78%	77%
1 Falls Far Below	22%	24%
Passing	59%	56%
N	81,955	85,426

**NAEP Mathematics**

Achievement Level	2017 Grade 8		2015 Grade 12
	Arizona	Nation	Nation
		(Public)	(Public)
4 Advanced	9%	10%	3%
3 Proficient	33%	34%	25%
2 Basic	70%	70%	62%
1 Below Basic	29%	31%	38%

\* Significantly different (p < .05) from state's results in 2017.

<https://nces.ed.gov/nationsreportcard/subject/publications/stt2017/pdf/2018038AZ8.pdf>

[https://www.nationsreportcard.gov/reading\\_math\\_g12\\_2015/#mathematics/ac](https://www.nationsreportcard.gov/reading_math_g12_2015/#mathematics/ac)

**NAEP Science**

Achievement Level	2017 Grade 8		2015 Grade 12
	Arizona	Nation	Nation
		(Public)	(Public)
4 Advanced	1%	2%*	2%
3 Proficient	25%	33%*	22%
2 Basic	61%	77%	60%
1 Below Basic	39%	33%*	40%

\* Significantly different (p < .05) from state's results in 2017.

<https://nces.ed.gov/nationsreportcard/subject/publications/stt2015/pdf/2016157AZ8.pdf>

[https://nces.ed.gov/programs/coe/pdf/coe\\_cne.pdf](https://nces.ed.gov/programs/coe/pdf/coe_cne.pdf)

**NAEP Reading**

Achievement Level	2017 Grade 8		2015 Grade 12
	Arizona	Nation	Nation
		(Public)	(Public)
4 Advanced	2%	4%*	6%
3 Proficient	30%	35%*	37%
2 Basic	74%	76%*	72%
1 Below Basic	25%	25%	28%

\* Significantly different (p < .05) from state's results in 2017.

<https://nces.ed.gov/nationsreportcard/subject/publications/stt2017/pdf/2018039AZ8.pdf>

[https://www.nationsreportcard.gov/reading\\_math\\_g12\\_2015/#reading/ac](https://www.nationsreportcard.gov/reading_math_g12_2015/#reading/ac)

**Probabilities of Success and Percentage of Students At or Above Each ACT Score**  
**ACT Subject: Mathematics**  
**College Course: Algebra**

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
36	0.89	0.94	0.96	0	0	0	0	0
35	0.86	0.93	0.95	0	1	1	0	1
34	0.83	0.92	0.95	1	1	1	1	2
33	0.78	0.90	0.94	1	1	1	1	3
32	0.74	0.88	0.92	1	2	2	1	4
31	0.70	0.86	0.91	2	3	3	2	5
30	0.64	0.83	0.90	3	3	4	2	7
29	0.58	0.80	0.89	4	5	5	3	9
28	0.51	0.77	0.87	6	7	7	5	12
27	0.45	0.73	0.85	9	10	10	7	17
26	0.39	0.69	0.83	12	13	14	10	21
25	0.34	0.64	0.80	18	18	17	14	26
24	0.29	0.59	0.78	23	22	22	18	31
23	0.23	0.55	0.75	25	25	26	20	35
<b>22</b>	<b>0.20</b>	<b>0.51</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>24</b>	<b>40</b>
21	0.16	0.46	0.70	33	32	33	27	43
20	0.13	0.40	0.66	36	35	36	30	48
19	0.11	0.35	0.63	42	41	42	35	52
18	0.09	0.30	0.60	48	47	48	41	60
17	0.07	0.26	0.56	62	58	58	53	69
16	0.05	0.22	0.51	76	73	73	69	80
15	0.04	0.19	0.46	88	85	87	83	90
14	0.03	0.16	0.43	96	95	96	95	97
13	0.02	0.13	0.39	98	98	98	98	99
12	0.02	0.11	0.35	99	99	99	99	100
N-count	70,461			13,136	47,150	40,514	305,299	1,914,460

## Probabilities of Success and Percentage of Students At or Above Each ACT Score

ACT Subject: Science

College Course: Biology

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
36	0.83	0.93	0.97	0	0	0	0	1
35	0.79	0.92	0.97	0	1	1	0	2
34	0.75	0.90	0.96	1	1	1	1	3
33	0.70	0.88	0.95	1	2	2	1	4
32	0.65	0.86	0.95	2	2	2	2	5
31	0.59	0.83	0.93	3	3	3	2	6
30	0.53	0.80	0.92	3	3	4	3	8
29	0.47	0.77	0.91	4	5	5	4	10
28	0.41	0.73	0.89	5	6	7	5	12
27	0.36	0.69	0.88	6	7	8	6	14
26	0.30	0.64	0.86	10	10	10	9	18
25	0.25	0.60	0.84	12	13	14	11	23
24	0.21	0.55	0.81	19	19	19	17	29
<b>23</b>	<b>0.18</b>	<b>0.51</b>	<b>0.79</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>23</b>	<b>36</b>
22	0.14	0.46	0.75	31	29	30	28	43
21	0.12	0.41	0.71	38	36	36	35	50
20	0.10	0.36	0.68	42	41	42	40	56
19	0.08	0.31	0.65	51	48	49	48	63
18	0.06	0.27	0.61	55	54	57	55	70
17	0.05	0.23	0.57	65	63	62	63	75
16	0.04	0.19	0.52	75	72	71	73	82
15	0.03	0.16	0.47	80	78	78	80	86
14	0.03	0.14	0.42	84	83	85	85	90
13	0.02	0.11	0.38	92	90	89	91	94
12	0.02	0.09	0.34	95	94	92	94	96
N-count	41,651			13,136	47,150	40,514	305,299	1,914,460

**Probabilities of Success and Percentage of Students At or Above Each ACT Score**  
**ACT Subject: ELA (English + Reading)**  
**College Course: English Composition I and Social Sciences**

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
72	0.68	0.89	0.94	0	0	0	0	0
71	0.66	0.89	0.94	0	0	0	0	1
70	0.65	0.88	0.94	0	1	1	1	2
69	0.63	0.87	0.93	0	1	1	1	3
68	0.62	0.87	0.93	1	1	2	1	4
67	0.60	0.86	0.92	1	2	2	1	5
66	0.58	0.85	0.92	1	2	2	2	6
65	0.57	0.84	0.92	2	3	3	2	7
64	0.55	0.83	0.91	2	3	3	3	8
63	0.53	0.82	0.91	2	4	4	3	9
62	0.51	0.82	0.90	3	4	4	4	10
61	0.50	0.80	0.90	3	5	5	4	11
60	0.48	0.79	0.89	4	5	6	5	12
59	0.47	0.78	0.89	4	6	7	5	13
58	0.45	0.77	0.88	5	7	7	6	14
57	0.43	0.75	0.88	6	8	8	7	16
56	0.42	0.74	0.87	7	8	9	8	17
55	0.40	0.73	0.87	8	9	10	8	19
54	0.38	0.72	0.86	9	10	11	9	20
53	0.37	0.70	0.85	10	11	12	10	22
52	0.35	0.68	0.85	11	12	13	11	23
51	0.33	0.67	0.84	12	14	14	13	25
50	0.32	0.66	0.83	14	15	16	14	27
49	0.30	0.64	0.82	15	16	17	15	29
48	0.29	0.62	0.81	17	18	19	17	31
47	0.27	0.61	0.81	19	20	21	19	33
46	0.26	0.59	0.80	21	22	23	21	36
45	0.24	0.57	0.79	23	24	25	23	39
44	0.23	0.56	0.78	26	26	27	25	41
43	0.22	0.54	0.77	28	28	29	28	44
42	0.21	0.52	0.76	31	31	32	30	47
41	0.20	0.51	0.75	34	33	34	33	49
<b>40</b>	<b>0.18</b>	<b>0.49</b>	<b>0.74</b>	<b>37</b>	<b>36</b>	<b>36</b>	<b>35</b>	<b>52</b>
39	0.17	0.47	0.73	40	38	39	38	55
38	0.16	0.46	0.72	43	41	41	41	57
37	0.15	0.44	0.71	46	43	44	44	60
36	0.14	0.43	0.70	49	46	47	47	63
35	0.13	0.41	0.69	52	49	50	50	65

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
34	0.12	0.40	0.68	56	52	53	53	68
33	0.12	0.38	0.66	59	56	56	57	71
32	0.11	0.37	0.65	63	59	59	60	73
31	0.10	0.35	0.64	66	63	63	64	76
30	0.10	0.33	0.63	70	66	66	68	79
29	0.09	0.32	0.61	73	70	70	72	81
28	0.09	0.31	0.60	77	74	73	75	84
27	0.08	0.29	0.59	81	77	77	79	86
26	0.07	0.28	0.58	84	81	80	83	89
25	0.07	0.27	0.57	88	85	84	86	91
24	0.06	0.26	0.55	91	88	88	90	93
23	0.06	0.24	0.54	93	91	91	93	95
22	0.06	0.23	0.52	95	94	93	95	97
21	0.05	0.22	0.51	97	96	95	97	98
20	0.05	0.21	0.50	98	97	97	98	99
19	0.05	0.20	0.49	99	98	98	99	99
18	0.04	0.19	0.47	99	99	99	99	99
17	0.04	0.18	0.46	99	99	99	100	100
16	0.04	0.18	0.45	100	99	99	100	100
15	0.04	0.17	0.44	100	100	100	100	100
N-count	198,275			13,136	47,150	40,514	305,299	1,914,460

## Process Evaluation Questionnaire

Question	5	4	3	2	1	Mean Score	SD	N
1. How adequate were the advance communications you received for preparing you to fulfill your role in this meeting?	Extremely adequate 2	Very adequate 1	Moderately adequate 1	Slightly adequate 0	Not at all adequate 0	4.25	0.96	4
2. How well did you understand the purpose of this meeting?	Extremely well 3	Very well 1	Moderately well 0	Slightly well 0	Not at all well 0	4.75	0.50	4
3. How clear were the instructions on what you were to do during each round?	Extremely clear 3	Very clear 0	Moderately clear 1	Slightly clear 0	Not at All clear 0	4.50	1.00	4
4. How well did you understand the tasks you were to accomplish during each round?	Extremely well 3	Very well 0	Moderately well 1	Slightly well 0	Not at all well 0	4.50	1.00	4
5. How well did you understand the difference between borderline performance and typical performance within an achievement level?	Extremely well 3	Very well 1	Moderately well 0	Slightly well 0	Not at all well 0	4.75	0.50	4
6. How comfortable were you using the concept of performance at the lower borderline of Level 2?	Extremely comfortable 3	Very comfortable 1	Moderately comfortable 0	Slightly comfortable 0	Not at all comfortable 0	4.75	0.50	4
7. How comfortable were you using the concept of performance at the lower borderline of Level 3?	Extremely comfortable 3	Very comfortable 1	Moderately comfortable 0	Slightly comfortable 0	Not at all comfortable 0	4.75	0.50	4
8. How comfortable were you using the concept of performance at the lower borderline of Level 4?	Extremely comfortable 3	Very comfortable 1	Moderately comfortable 0	Slightly comfortable 0	Not at all comfortable 0	4.75	0.50	4
9. How confident were you in the cut score recommendations you provided?	Extremely confident 3	Very confident 1	Moderately confident 0	Slightly confident 0	Not at all confident 0	4.75	0.50	4
10. How well did you understand the median cut scores?	Extremely well 4	Very well 0	Moderately well 0	Slightly well 0	Not at all well 0	5.00	0.00	4
11. How well did you understand the concept of using a first-year credit-bearing college course to help set cut scores?	Extremely well 3	Very well 1	Moderately well 0	Slightly well 0	Not at all well 0	4.75	0.50	4
12. How well did you understand probabilities of success?	Extremely well 4	Very well 0	Moderately well 0	Slightly well 0	Not at all well 0	5.00	0.00	4
13. How well did you understand the difference between probability of success and percent at or above?	Extremely well 4	Very well 0	Moderately well 0	Slightly well 0	Not at all well 0	5.00	0.00	4

<b>Question</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>Mean Score</b>	<b>SD</b>	<b>N</b>
14. How comfortable were you using the impact data provided to evaluate the reasonableness of the cut scores?	Extremely comfortable 3	Very comfortable 1	Moderately comfortable 0	Slightly comfortable 0	Not at all comfortable 0	4.75	0.50	4
15. How would you describe the effectiveness of the performance level setting method?	Extremely effective 3	Very effective 0	Moderately effective 1	Slightly effective 0	Not at all effective 0	4.50	1.00	4
16. How did you feel about the amount of time allotted for explanation and discussion during Round 1 (Level 3)?	Far Too Long 0	Somewhat long 2	About Right 2	Somewhat short 0	Far Too Short 0	3.50	0.58	4
17. How did you feel about the amount of time allotted for explanation and discussion during Round 2 (Level 2 & Level 4)?	Far Too Long 0	Somewhat long 2	About Right 2	Somewhat short 0	Far Too Short 0	3.50	0.58	4
18. How did you feel about the amount of time allotted for explanation and discussion during Round 3 (Levels 2, 3, and 4)?	Far Too Long 0	Somewhat long 2	About Right 2	Somewhat short 0	Far Too Short 0	3.50	0.58	4
19. To what extent was your input valued and considered by others in your group?	Extremely valued 2	Very valued 2	Moderately valued 0	Slightly valued 0	Not at all valued 0	4.50	0.58	4
20. Did you feel pressured by others in your group to make your cut score recommendations agree with theirs?	Extremely pressured 0	Very pressured 0	Moderately pressured 0	Slightly pressured 0	Not at all pressured 4	1.00	0.00	4
21. Did you feel pressured by staff to make cut score recommendations higher or lower?	Extremely pressured 0	Very pressured 0	Moderately pressured 0	Slightly pressured 0	Not at all pressured 4	1.00	0.00	4
22. Did you feel pressured by staff to keep your cut score recommendations the same?	Extremely pressured 0	Very pressured 0	Moderately pressured 0	Slightly pressured 0	Not at all pressured 4	1.00	0.00	4
23. How well did this standard setting process provide you an opportunity to use your best judgment to recommend cut scores?	Extremely well 1	Very well 3	Moderately well 0	Slightly well 0	Not at all well 0	4.25	0.50	4
24. How defensible do you feel are the cut scores produced by this standard setting process?	Extremely defensible 2	Very defensible 1	Moderately defensible 1	Slightly defensible 0	Not at all defensible 0	4.25	0.96	4
25. How reasonable do you feel will the cut scores produced by this standard setting be considered?	Extremely reasonable 2	Very reasonable 1	Moderately reasonable 1	Slightly reasonable 0	Not at all reasonable 0	4.25	0.96	4

Item	Time*	Est. Length	Presenter	Notes (slide numbers)
Registration Panelists complete demographics questionnaire and NDA	8:30 AM	0:30		Collect NDAs and demographics questionnaires.
Welcome and Introductions ACT, ADE, Panelists Purpose of the meeting General guidelines	9:00 AM	0:20	ACT/ADE	Wayne (1-8), Audra (9-10)
Introduction and Background Purpose and Achievement levels - where we are now, where we were	9:20 AM	0:10	Audra	Wayne (1-8), Audra (9-10)
Empirical standard setting methodology and why this approach is appropriate for the ACT	9:30 AM	0:10	ACT	Wayne (11-14)
Focus on college readiness	9:40 AM	0:10	ACT	Joann (15-28)
ACT for College Course Placement	9:50 AM	0:05	ACT	Joann (15-28)
ACT Benchmarks	9:55 AM	0:15	ACT	Joann (15-28)
Options for cut scores	10:10 AM	0:10	ACT	Wayne (29-47)
Probabilities of success	10:20 AM	0:10	ACT	Wayne (29-47)
<b>BREAK</b>	<b>10:30 AM</b>	<b>0:15</b>		Wayne (29-47)
Minimally Proficient (Level 3) student/Identifying Borderline Achievement	10:45 AM	0:10	ACT	Wayne (29-47), Audra (48-49)
Discussion	10:55 AM	0:20	Panel	Wayne (50-51)
Round 1 Ratings for Level 3 cut scores Math Science English + Reading	11:15 AM	0:30	Panel	Joann (52-62)
<b>LUNCH</b>	<b>11:45 AM</b>	<b>1:00</b>		
Review Round 1 overall results and impact	12:45 PM	0:10	ACT	Joann (1-13)
Prior impact data and discussion ACT in AZ and Nation AZ-Merit and AIMS NAEP	12:55 PM	0:20	ACT	Joann (1-13)
Definition/meaning of Basic and Advanced	1:15 PM	0:10	ACT	Wayne (14-31)
Discussion	1:25 PM	0:30	Panel	Wayne (14-31)
Round 2 Ratings of Basic and Advanced cut scores Math Science English + Reading	1:55 PM	0:20	Panel	Wayne (14-31)
<b>Break</b>	<b>2:15 PM</b>	<b>0:15</b>		
Review Round 2 results, Additional discussion and review of data, Coherence of cut scores across 3 levels.	2:30 PM	0:30	Panel	Joann (1-14)
Final determination of all 3 cut scores. Math Science English + Reading	3:00 PM	0:30	Panel	Joann (1-14)
<b>Break &amp; Evaluation Form</b>	<b>3:30 PM</b>	<b>0:15</b>		Collect evaluation forms
Report final results	3:45 PM	0:30	ACT	Wayne (1-6)
<b>Adjourn</b>	4:15 PM			
ACT & ADE staff debrief; summarize process and results	4:15 PM	1:00	ACT/ADE	

# ARIZONA STANDARD SETTING

JUNE 6, 2019 • PHOENIX, AZ

# WELCOME & INTRODUCTIONS

AUDRA AHUMADA, ADE

WAYNE CAMARA, ACT

## KEY ORGANIZATIONS



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## KEY STAFF

- ACT
  - Wayne Camara
  - Joann Moore
- State Department of Education
  - Audra Ahumada
  - Callie Kozlak
- State Board of Education
  - Alicia Williams
  - Catcher Baden
- Observers
  - Lisa Oliver
  - Niharika Yennum
  - Xiaoyuan Tan

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## PANELISTS

- Panelists include district/LEA representatives and TAC members.
- Brief panelist introductions
- Modified and abbreviated empirical standard setting approach

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## PURPOSE OF THE MEETING

- To recommend 3 cut scores defining four performance levels on the ACT Math, Science, and English+Reading assessments
  - Level 4 (Advanced) ← Level 4 Cut Score
  - Level 3 (Proficient) ← Level 3 Cut Score
  - Level 2 (Basic) ← Level 2 Cut Score
  - Level 1 (Below Basic)

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## SCHEDULE FOR THIS MEETING

- Review
  - ACT College Readiness Benchmarks
  - Probability of Success
- Identify Borderline Achievement
- Training for Setting Recommended Cut Scores
- Round 1 Cut Scores for College Readiness (Level 3)
- Review Impact and Additional Evidence
- Round 2 Upper (Level 4) and Lower (Level 2) Cut Scores
- Discussion
- Final cut score recommendations for Levels 2, 3, and 4

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## GENERAL GUIDELINES

1. Secure materials should *never* leave the room. (WebEx participants to securely destroy)
2. Please hold questions until the end of each section, unless they are critical to the presentation or the associated activity.
3. Return all materials at the end of the day for staff to collect.
4. If you finish a task before others, sit quietly until everyone has completed the task.

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# INTRODUCTION & BACKGROUND

ARIZONA DEPARTMENT OF EDUCATION

## MENU OF ASSESSMENTS (MOA)

- Arizona legislature passed a law that would provide LEAs flexibility in testing. 2018-2019 is the first year for MOA and is allowed at the high school level only.
- Arizona Academic Standards were most recently adopted in 2016 for ELA and Mathematics.
- Cut Scores are needed for the MOA (ACT and SAT) for State Accountability.
- About 16 LEAs (Districts and Charter)/56 Schools and about 13,500 students participated in the MOA for the 2018-2019 school year. These students were not administered AzMERIT.

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## TYPES OF STANDARDS

**Content Standards:** Content standards define the knowledge, concepts, and skills that students should acquire at each grade level.

**Performance Standards:** Performance standards specify how much understanding of content students need at each performance level (e.g., basic, proficient, advanced), relative to the content standards.

In an empirical standard-setting process, we use data to describe outcomes for students in various score ranges.

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## ACT BENCHMARKS

Primary

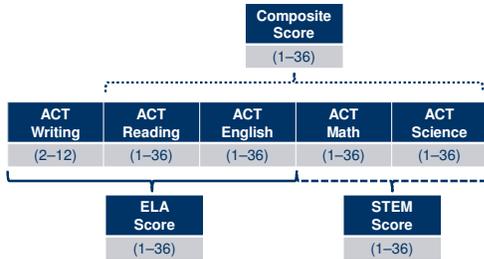
The ACT College Readiness Benchmarks are the ACT College Readiness Assessment scores associated with a **50% chance of earning a B or higher** grade in typical, first-year, credit-bearing college courses.

Secondary

The Benchmarks also correspond to an approximate **75% chance of earning a C or higher** grade in these courses.

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## THE ACT



Note: Behind the scenes, the ACT Writing score is transformed to a 1-36 scale before being averaged with Reading and English. That score is never reported.

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## GOALS OF STANDARD SETTING

The goal of this meeting is to recommend three sets of performance standards:

### 1. English Language Arts

ACT English

ACT Reading

### 2. Mathematics

ACT Math

### 3. Science

ACT Science

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## WHY COLLEGE READINESS?

- 69% of recent high school graduates enrolled in college
- Median earnings of 25–34 year olds who
  - Completed HS: \$30,500
  - Attained an associate's degree: \$36,900
  - Attained bachelor's degree: \$50,000
  - Attained a master's or higher: \$60,000

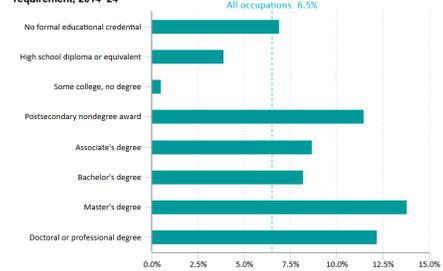
NCES Condition of Education 2017: <https://nces.ed.gov/pubs2017/2017144.pdf>

ACT

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## WHY COLLEGE READINESS?

Projected percentage change in employment by typical entry-level educational requirement, 2014–24



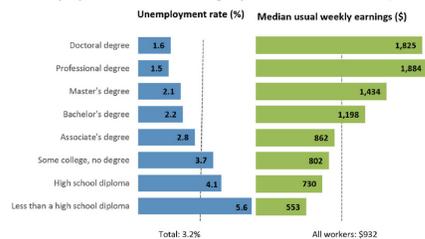
<https://www.bls.gov/opub/ted/2017/37-percent-of-may-2016-employment-in-occupations-typically-requiring-postsecondary-education.htm>

ACT

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## WHY COLLEGE READINESS?

Unemployment rates and earnings by educational attainment, 2018



Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers. Source: U.S. Bureau of Labor Statistics, Current Population Survey.

<https://www.bls.gov/emp/chart-unemployment-earnings-education.htm>

ACT

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## WHY COLLEGE READINESS?

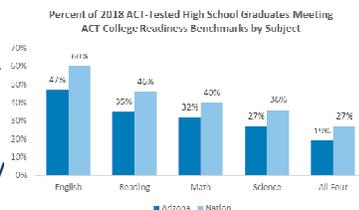
- Nationally, 65% of ACT-tested 2018 high school graduates enrolled in college.
- In Arizona, 53% of ACT-tested 2018 high school graduates enrolled in college.
- In Arizona, 73% of ACT-tested 2018 high school graduates aspired to postsecondary education.

ACT

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## WHY COLLEGE READINESS?

- Nationally, only about 1 in 4 first-year college students are college ready



<sup>1</sup>[www.act.org/content/act/en/research/pdfs/cccr-2018-briefing-Arizona.html](http://www.act.org/content/act/en/research/pdfs/cccr-2018-briefing-Arizona.html)

<sup>2</sup>The National Center for Public Policy and Higher Education and the Southern Regional Education Board. Beyond the Rhetoric: Improving College Readiness Through Coherent State Policy. (2010).

ACT

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## WHY COLLEGE READINESS?

- Remedial Coursework in College:
  - Debt without college credit.
  - 25% of students at 4-year colleges and 61% of students at 2-year colleges take remedial coursework.
  - Students who take remedial coursework are less likely to complete a degree.
    - Remedial Coursework: 30–57%
    - No Remedial Coursework: 69%

<https://nces.ed.gov/pubsub2004/20040777.pdf>

ACT

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## ACT COURSE PLACEMENT SCORES

- Some postsecondary institutions in Arizona use ACT scores for course placement.
- In Math, College Algebra placement scores were generally near the ACT College Readiness Benchmark (22), and lower scores (18-21) could place a student into lower-level credit-bearing courses (e.g., Intermediate Algebra).
- In English, placement scores for first-year Composition were close to or higher than the ACT College Readiness Benchmark (18-20).
- Lower scores require students to take a placement test.

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## ACT COURSE PLACEMENT SCORES IN ARIZONA

Type	Name	ACT Math	ACT English and Reading
2-year	Pima Community College	22 for Intermed. Algebra 22 for College Algebra	20 for English Comp. 22 for Critical Reading
2-year	Mesa Community College	Placement test required for ACT scores < 18 22 for College Algebra	Placement test required for ACT scores < 18
4-year	Arizona State University	24 Math competency	19-25 for English Comp. 21 English competency
4-year	University of Arizona	21 for Intermed. Algebra 22 for College Algebra	21 English proficiency for most majors
4-year	Northern Arizona University	24 for Algebra for Precalculus, Quant. Reasoning < 24 Intermed. Algebra	17-29 Critical reading < 17 Intensive Writing Lab

Note: This is a sample of Arizona's CCs and 4-year institutions.

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## ACT-AZMERIT LINKING STUDY

- Spring 2015
- 58,888 AzMERIT Grade 11 ELA, 32,945 Algebra II
- Also took ACT before HS graduation in 2016
- Equipercetile equating
- Close correspondence found between AzMERIT Level 3 cut scores and ACT College Readiness Benchmarks

<https://cms.azed.gov/home/GetDocumentFile?id=57f689b5aadebf0a04b267c9>  
<https://cms.azed.gov/home/GetDocumentFile?id=5b9bda051dcb260b5c235ee8>

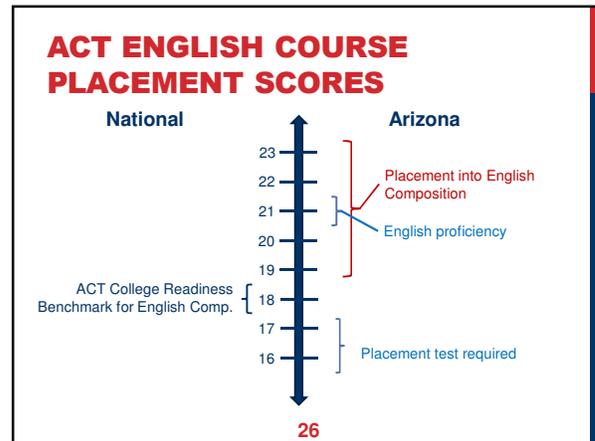
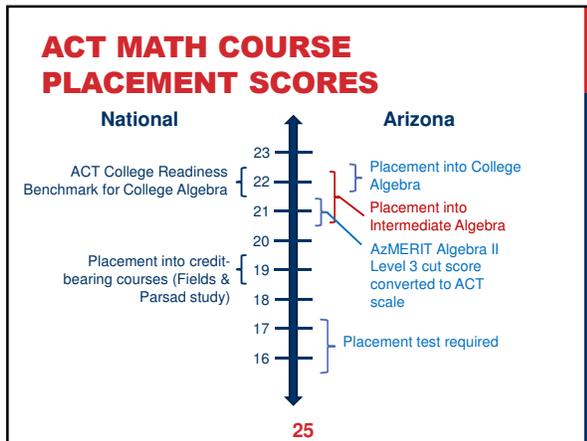
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## ACT-AZMERIT LINKING STUDY

Performance Level	AzMerit 11th Grade ELA	ACT Reading
Level 4	2608–2675	29–36
Level 3	2585–2607	22–28
Level 2	2569–2584	19–21
Level 1	2465–2568	1–18

Performance Level	AzMerit 11th Grade Algebra II	ACT Math
Level 4	3751–3839	26–36
Level 3	3711–3750	21–25
Level 2	3690–3710	18–20
Level 1	3629–3689	5–17

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# ACT COLLEGE READINESS BENCHMARKS

### ACT BENCHMARKS

**Primary** → The ACT College Readiness Benchmarks are the ACT College Readiness Assessment scores associated with a **50% chance of earning a B or higher grade** in typical, first-year, credit-bearing college courses.

**Secondary** → The Benchmarks also correspond to an **approximate 75% chance of earning a C or higher grade** in these courses.

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### BENCHMARKS LINK ACT SUBJECT AREA TEST SCORES TO COMMON FIRST-YEAR COURSES

ACT Subject -Area Test	College Course	Benchmark
English	English Composition	18
Mathematics	College Algebra	22
Reading	Social Science	22
Science	Biology	23
ELA	English Composition & Social Science	20

**Social Science courses:** Courses available to a first-year student that typically require a significant amount of reading (American History, Other History, Psychology, Sociology, Political Science, Economics).

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### INSTITUTIONS IN BENCHMARK DEVELOPMENT SAMPLES

Characteristic	ELA	Math	Science
N (Institutions)	233	125	90
N (Students)	198,275	70,461	41,651
Type			
2-year	40%	42%	44%
Less selective 4-year	53%	48%	46%
More selective 4-year	7%	10%	10%
Control			
Public	88%	92%	87%
Private	12%	8%	13%

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## BENCHMARK DEVELOPMENT SUCCESS RATES BY COURSE

College Course Type	Percentage of Course Grades					Success Criteria	
	A	B	C	D	F	≥B	≥C
English Comp / Social Science	20%	32%	25%	9%	14%	52%	77%
College Algebra	24%	25%	23%	11%	18%	49%	72%
Biology	20%	27%	26%	12%	16%	47%	73%

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## OPTIONS FOR CUT SCORES BASED ON ACT DATA

### (1) GRADE WHY B OR HIGHER? (WHAT'S WRONG WITH A GRADE OF C?)

- This criterion seems to reproduce the current grading distribution fairly well.
- Policy implications of putting a student with a 50% chance of earning less than a C grade into a class.
- Stability of models is affected by courses/institutions where grades below C are uncommon.

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### ACT COLLEGE READINESS BENCHMARKS

College Course	ACT Subject-Area Test	The ACT Benchmark
English Composition & Social Science	ELA (English, Reading, & Writing)	20
College Algebra	Mathematics	22
Biology	Science	23

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### (2) DISTRIBUTION ACROSS COLLEGES: TYPICAL STUDENT, TYPICAL COLLEGE

The score value for a 50% chance of a B grade varies from college to college, depending on course rigor and grading standards. In general, the values do not vary considerably.

Subject	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile
ELA	18	20	22
Mathematics	21	22	24
Science	22	23	25

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### TYPICAL STUDENT, TYPICAL COLLEGE

There is little variability in the ACT score associated with a 50% chance of earning a B or higher across institution types.

Subject	2 Year	4 Year, Less Selective	4 Year, More Selective
English	18	17	17
Mathematics	23	22	22
Reading	22	23	21
Science	23	23	24

ACT

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### (3) SCORE PRECISION

Often the standard error of measurement is used to capture a score's imprecision. Sometimes cut scores may be lowered by .5, 1, 1.5 or even 2 SEMS

Subject	SEM	-1 SEM	Benchmark	+1 SEM
English	1.71	16	18	20
Reading	2.16	20	22	24
E & R	2.76	37	40	43
Mathematics	1.55	20	22	22
Science	2.01	21	23	25

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### ACT BENCHMARKS FOR MEETS/COLLEGE READY?

#### Advantages

- ACT score reports show College Readiness levels, and scores will be reported in terms of ACT's benchmarks.
- Continuity across AZ and ACT reports, across states, and trend data.
- Facilitates comparisons across state lines.

#### Disadvantages

- Panelists are given no input in cut score.
- Cut score impact may be significantly different than in the past or in gr. 3–8.
- Reduces the opportunity to smooth or reconcile impact across grades.
- ACT resets benchmarks every 5–7 years.
- Reflects national impact, not just AZ.

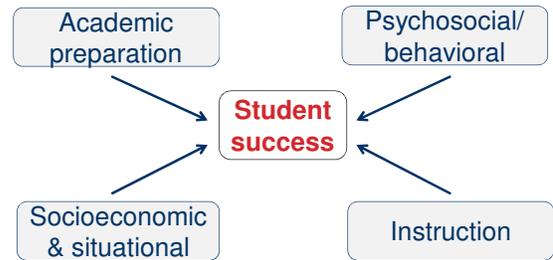
ACT

38

## PROBABILITY OF SUCCESS

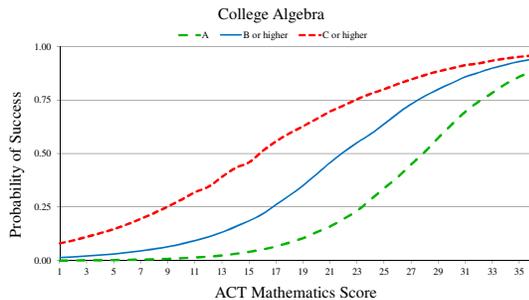
### WHY USE PROBABILITIES?

Components of College Student Success



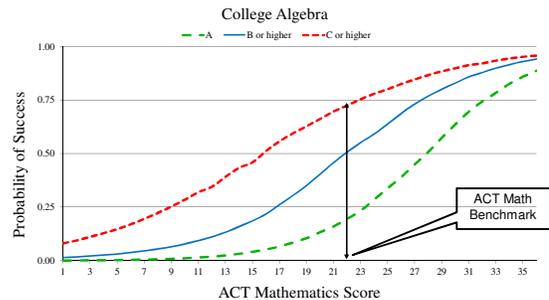
40

### SUCCESS PROBABILITIES



41

### SUCCESS PROBABILITIES



42

## SUCCESS PROBABILITIES

Probability of First-Year Course Grade		
A	B or higher	C or higher
<b>Mathematics</b>		
0.22	0.52	0.74
0.20	0.50	0.73
0.19	0.48	0.72
<b>Science</b>		
0.20	0.52	0.79
0.19	0.50	0.78
0.17	0.48	0.76
<b>English + Reading</b>		
0.14	0.52	0.77
0.13	0.50	0.76
0.13	0.48	0.75

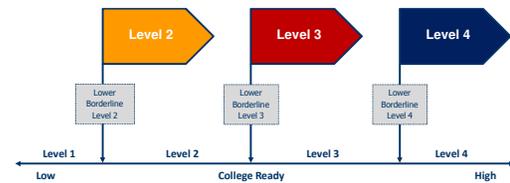
43

## 15 MINUTE BREAK

## IDENTIFYING BORDERLINE ACHIEVEMENT

### ESTABLISHING CUT SCORES FOR FOUR LEVELS OF ACHIEVEMENT

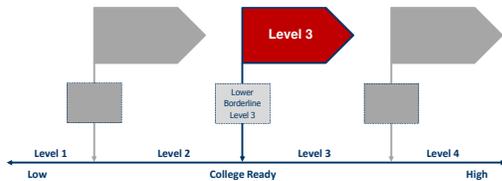
To divide the achievement scale into Level 1, Level 2, Level 3, and Level 4, we will focus on the **lower borderline** of each achievement level.



46

### LEVEL 3 ACHIEVEMENT LEVEL

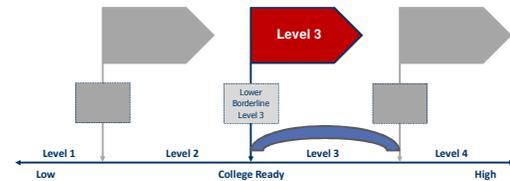
First, we will focus on the **lower borderline** of the Level 3 achievement level.



47

### LEVEL 3 ACHIEVEMENT LEVEL

First, we will focus on the **lower borderline** of the Level 3 achievement level.



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## EMPIRICALLY-BASED PERFORMANCE LEVEL DESCRIPTORS

- Set cut scores corresponding to relevant empirical data or outcomes.
- ACT Benchmarks are based on established relationships between test scores and actual first-year college course outcomes.
- Probabilities of succeeding in first-year college courses.
- Does not necessarily reflect specific knowledge and skills in a particular subject area.

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## EMPIRICALLY-BASED PERFORMANCE LEVEL DESCRIPTORS

Other relevant data may be considered in setting the college-ready level, such as

- Percentage of students college ready on ACT
- Percentage of students proficient on NAEP
- Percentage of students enrolling in 2-year or 4-year colleges
- Other

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## EMPIRICALLY-BASED PERFORMANCE LEVEL DESCRIPTORS

Example of an empirically-based PLD for college readiness:

Students performing at this level **meet academic expectations** for the knowledge, skills, and practices assessed at grade 11. They are very likely to engage successfully (**0.75 probability of earning a grade of C or higher**) in entry-level, credit-bearing courses in the corresponding content area or in technical courses requiring college-level skills. Students performing at this level are exempt from having to take and pass placement tests in two- and four-year public institutions of higher education designed to determine whether they are academically prepared for such courses without need for remediation.

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## EMPIRICALLY-BASED PERFORMANCE LEVEL DESCRIPTORS

AZ college ready Performance Level Descriptor:  
Students performing at Level 3 are

???

ADE currently uses this language on student reports:

For each content area, student performance is also reported as one of four performance levels: Level 1, Level 2, Level 3, and Level 4. Students who score at Level 1 or Level 2 are likely to need support to be ready for the next grade or course. Students who score at Level 3 or Level 4 are proficient and likely to be ready for the next grade or course.

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## ADE POLICY PLDs FOR STATEWIDE ASSESSMENTS FOR ELA AND MATHEMATICS

Policy PLDs

Policy PLDs			
Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
Minimally Proficient students demonstrate a modest understanding of and ability to apply the content knowledge and skills needed to be on track toward college and career readiness as specified in Arizona's Mathematics and English Language Arts Standards.	Partially Proficient students demonstrate a partial understanding of and ability to apply the content knowledge and skills needed to be on track toward college and career readiness as specified in Arizona's Mathematics and English Language Arts Standards.	Proficient students demonstrate a fundamental understanding of and ability to apply the content knowledge and skills needed to be on track toward college and career readiness as specified in Arizona's Mathematics and English Language Arts Standards.	Highly Proficient students demonstrate an advanced understanding of and ability to apply the content knowledge and skills needed to be on track toward college and career readiness as specified in Arizona's Mathematics and English Language Arts Standards.

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## WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 3 (PROFICIENT)?

- What should the *minimally qualified* student know and be able to do at the Level 3 achievement level?
  - What's the chance that student will get a B?
  - What's the chance that student will get a C?
- Important to keep *minimally qualified* in mind:
  - Not the same as the average or typical student.
  - Of students who get a B grade in a first-year college course, what is their probability of success?
  - Of students who get a C grade in a first-year college course, what their probability of success?

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# DISCUSSION

# INSTRUCTIONS FOR SETTING ROUND 1 CUT SCORES

## ROUND 1 LEVEL 3 RATING FORM FOR MATH

Probability of Success		
A prob	B or higher prob	C or higher prob
0.36	0.66	0.82
0.34	0.64	0.81
0.32	0.62	0.80
0.29	0.60	0.79
0.27	0.58	0.78
0.25	0.56	0.77
0.24	0.54	0.76
0.22	0.52	0.74
<b>0.20</b>	<b>0.50</b>	<b>0.73</b>
0.19	0.48	0.72
0.17	0.46	0.71
0.16	0.44	0.69
0.15	0.42	0.68
0.13	0.40	0.67
0.12	0.38	0.65
0.11	0.36	0.64

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## SETTING A LEVEL 3 ACHIEVEMENT LEVEL IN MATH

### Task:

- Think about minimally **Level 3** students in math.
- Think about their likelihood of success in first-year, entry-level, college course in math (e.g., College Algebra).
- Highlight the **one** row on the rating sheet that best reflects what you see as their probability of achieving an A, B, or C grade.
- Ratings should reflect your individual judgment.

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## ROUND 1 LEVEL 3 RATING FORM FOR MATH

Probability of Success		
A prob	B or higher prob	C or higher prob
0.36	0.66	0.82
0.34	0.64	0.81
0.32	0.62	0.80
0.29	0.60	0.79
0.27	0.58	0.78
0.25	0.56	0.77
0.24	0.54	0.76
0.22	0.52	0.74
<b>0.20</b>	<b>0.50</b>	<b>0.73</b>
0.19	0.48	0.72
0.17	0.46	0.71
0.16	0.44	0.69
0.15	0.42	0.68
0.13	0.40	0.67
0.12	0.38	0.65
0.11	0.36	0.64

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## ROUND 1 LEVEL 3 RATING FORM FOR SCIENCE

Probability of Success		
A prob	B or higher prob	C or higher prob
0.33	0.66	0.86
0.31	0.64	0.85
0.29	0.62	0.84
0.27	0.60	0.83
0.25	0.58	0.82
0.23	0.56	0.81
0.22	0.54	0.80
0.20	0.52	0.79
<b>0.19</b>	<b>0.50</b>	<b>0.78</b>
0.17	0.48	0.76
0.16	0.46	0.75
0.15	0.44	0.74
0.14	0.42	0.73
0.13	0.40	0.71
0.12	0.38	0.70
0.11	0.36	0.68

60

## SETTING A LEVEL 3 ACHIEVEMENT LEVEL IN SCIENCE

### Task:

- Think about minimally **Level 3** students in science.
- Think about their likelihood of success in first-year, entry-level, college course in science (e.g., College Biology).
- Highlight the **one** row on the rating sheet that best reflects what you see as their probability of achieving an A, B, or C grade.
- Ratings should reflect your individual judgment.

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## ROUND 1 LEVEL 3 RATING FORM FOR SCIENCE

Probability of Success		
A prob	B or higher prob	C or higher prob
0.33	0.66	0.86
0.31	0.64	0.85
0.29	0.62	0.84
0.27	0.60	0.83
0.25	0.58	0.82
0.23	0.56	0.81
0.22	0.54	0.80
0.20	0.52	0.79
<b>0.19</b>	<b>0.50</b>	<b>0.78</b>
0.17	0.48	0.76
0.16	0.46	0.75
0.15	0.44	0.74
0.14	0.42	0.73
0.13	0.40	0.71
0.12	0.38	0.70
0.11	0.36	0.68

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## ROUND 1 LEVEL 3 RATING FORM FOR ENGLISH+READING

Probability of Success		
A prob	B or higher prob	C or higher prob
0.24	0.66	0.84
0.22	0.64	0.83
0.21	0.62	0.83
0.19	0.60	0.82
0.18	0.58	0.81
0.17	0.56	0.80
0.16	0.54	0.79
0.14	0.52	0.77
<b>0.13</b>	<b>0.50</b>	<b>0.76</b>
0.13	0.48	0.75
0.12	0.46	0.74
0.11	0.44	0.73
0.10	0.42	0.72
0.09	0.40	0.70
0.08	0.38	0.69
0.08	0.36	0.67

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## SETTING A LEVEL 3 ACHIEVEMENT LEVEL IN ENGLISH+READING

### Task:

- Think about minimally **Level 3** students in English and reading.
- Think about their likelihood of success in first-year, entry-level, college course in English and reading (e.g., English Composition or Social Science course).
- Highlight the **one** row on the rating sheet that best reflects what you see as their probability of achieving an A, B, or C grade.
- Ratings should reflect your individual judgment.

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## ROUND 1 LEVEL 3 RATING FORM FOR ENGLISH+READING

Probability of Success		
A prob	B or higher prob	C or higher prob
0.24	0.66	0.84
0.22	0.64	0.83
0.21	0.62	0.83
0.19	0.60	0.82
0.18	0.58	0.81
0.17	0.56	0.80
0.16	0.54	0.79
0.14	0.52	0.77
<b>0.13</b>	<b>0.50</b>	<b>0.76</b>
0.13	0.48	0.75
0.12	0.46	0.74
0.11	0.44	0.73
0.10	0.42	0.72
0.09	0.40	0.70
0.08	0.38	0.69
0.08	0.36	0.67

65

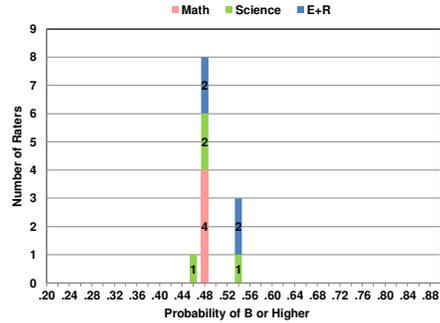
## ROUND 1 RATING AND LUNCH BREAK

- Highlight the **one** row on the rating sheet for each subject area that best reflects what you see as their probability of achieving an A, B, or C grade.
- Ratings should reflect your individual judgment.
- When finished, hand in the rating sheet to your facilitator and break for lunch.
- Return to this room for the afternoon session in one hour.

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# ROUND 1 RESULTS AND ADDITIONAL EVIDENCE

## ROUND 1 SUCCESS PROBABILITIES



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## DATA SOURCES

AZ Juniors Statewide, 2018

- In-school ACT testing in 11<sup>th</sup> grade
- 16% of total statewide juniors

All ACT-tested AZ Juniors, 2017 and 2018

- Includes state testing, district testing, and national testing
- 57% of total statewide juniors in 2018, 49% in 2017

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## DATA SOURCES

Census-tested states, 2018

- In-school census testing in 11<sup>th</sup> grade
- 9 states (13 total; 5 have student data privacy use restrictions)

ACT-Tested Graduating Class of 2018 (Grad. Cohort)

- All U.S. ACT-Tested high school graduates
- Each student's most recent scores
- 53% most recently tested as juniors

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## ROUND 1 SUCCESS PROBABILITIES

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State 2018	All AZ Juniors 2018	All AZ Juniors 2017	Census States Juniors 2018	National Grad Class 2018
					<b>Mathematics</b>				
Round 1	22	0.19	0.48	0.72	31	30	30	25	40
					<b>Science</b>				
Round 1	23	0.17	0.48	0.76	27	25	26	24	38
					<b>English + Reading</b>				
Round 1	43	0.16	0.54	0.79	27	27	28	27	43

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## ACT-AZMERIT LINKING STUDY

Performance Level	AzMerit 11th Grade ELA	ACT Reading
Level 4	2608--2675	29--36
Level 3	2585--2607	22--28
Level 2	2569--2584	19--21
Level 1	2465--2568	1--18

Performance Level	AzMerit 11th Grade Algebra II	ACT Math
Level 4	3751--3839	26--36
Level 3	3711--3750	21--25
Level 2	3690--3710	18--20
Level 1	3629--3689	5--17

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### AZMERIT GRADES 8 AND HS MATH ACHIEVEMENT:

Math Achievement Level	Percentage At or Above				
	Grade 8		High School (2018)		
	2017	2018	Alg. I	Geom.	Alg. II
Highly Proficient	15%	17%	12%	10%	9%
Proficient	38%	41%	39%	37%	34%
Partially Proficient	59%	60%	57%	61%	55%

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### AZMERIT GRADE HS MATH ACHIEVEMENT:

Math Achievement Level	Percentage At or Above					
	Algebra I		Geometry		Algebra II	
	2017	2018	2017	2018	2017	2018
Highly Proficient	11%	12%	7%	10%	8%	9%
Proficient	39%	39%	33%	37%	35%	34%
Partially Proficient	60%	57%	59%	61%	56%	55%

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### AZMERIT GRADES 8 AND 11 ELA ACHIEVEMENT:

ELA Achievement Level	Percentage At or Above			
	Grade 8		Grade 11	
	2017	2018	2017	2018
Highly Proficient	9%	10%	9%	9%
Proficient	34%	40%	26%	29%
Partially Proficient	55%	62%	49%	47%

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### AIMS GRADES 8 AND HS SCIENCE ACHIEVEMENT:

Science Achievement Level	Percent At or Above					
	Grade 8		2019 Cohort	2020 Cohort		2021 Cohort
	2017	2018	2017	2017	2018	2018
Highly Proficient	34%	33%	14%	22%	12%	22%
Proficient	59%	57%	33%	45%	29%	45%
Partially Proficient	78%	77%	51%	64%	47%	65%

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### GRADES 8 AND 12 NAEP MATH ACHIEVEMENT LEVELS:

Math Achievement Level	2017 Grade 8		2015 Grade 12
	AZ	National public	National public
Advanced	9%	10%	3%
Proficient	33%	34%	25%
Basic	70%	70%	62%

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### GRADES 8 AND 12 NAEP SCIENCE ACHIEVEMENT LEVELS:

Science Achievement Level	2017 Grade 8		2015 Grade 12
	AZ	National public	National public
Advanced	1%	2%	2%
Proficient	25%	33%	22%
Basic	61%	77%	60%

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## GRADES 8 AND 12 NAEP READING ACHIEVEMENT LEVELS:

Reading Achievement Level	2017 Grade 8		2015 Grade 12
	AZ	National public	National public
Advanced	2%	4%	6%
Proficient	30%	35%	37%
Basic	74%	76%	72%

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## DISCUSSION

- How did your initial ratings compare with those of others?
- How did ratings in each subject area compare with those in the other subject areas?
- How does the additional impact information provided influence your initial ratings of the Level 3 cut score?
- Which information is the most important in making your choice of Level 3 cut scores?
  - Math
  - Science
  - English + Reading

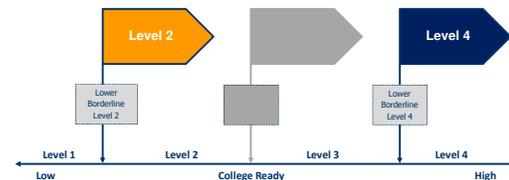
There will be an opportunity to make a final Level 3 rating

80

## WHAT DOES IT MEAN TO BE LEVEL 2 OR LEVEL 4?

## ESTABLISHING CUT SCORES FOR FOUR LEVELS OF ACHIEVEMENT

To divide the achievement scale into Level 1, Level 2, Level 3, and Level 4, we will focus on the **lower borderline** of each achievement level.



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## BASIC AND ADVANCED DESCRIPTORS - NAEP

NAEP *Basic* Achievement Level:

This level denotes **partial mastery** of prerequisite knowledge and skills that are fundamental for proficient work at each grade.

NAEP *Advanced* Achievement Level:

This level signifies **superior performance** beyond proficient.

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## LEVEL 2 AND LEVEL 4 DESCRIPTORS - AZ

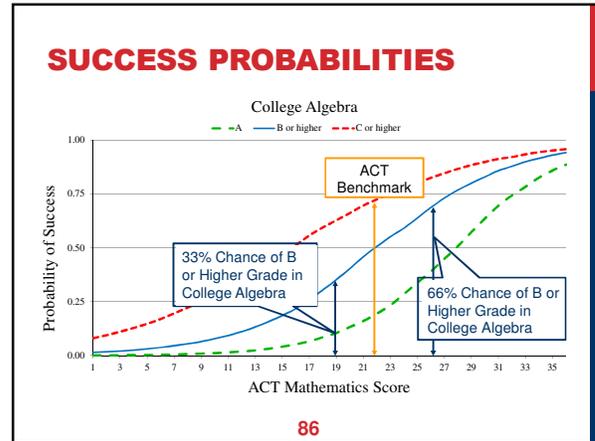
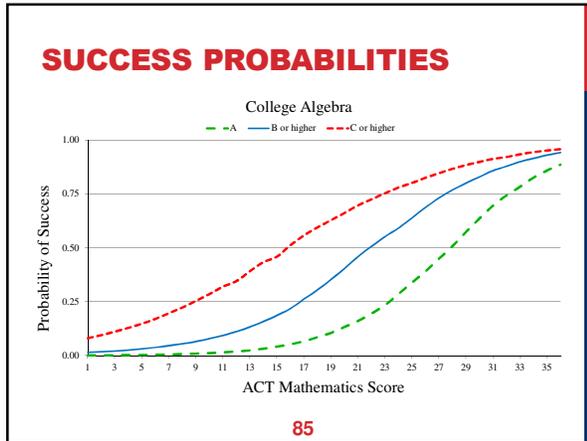
AZ college ready Level 2 Descriptor:

Students performing at Level 2 are  
???

AZ college ready Level 4 Descriptor:

Students performing at Level 4 are  
???

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- ### WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 2 IN MATH?
- What should a student who is minimally at Level 2 know and be able to do?
    - What's the chance that student will get a B?
    - What's the chance that student will get a C?
    - Of students who get a B grade in a first-year college course,
      - Would you find a **Level 2** student among them?
    - Of students who get a C grade in a first-year college course,
      - What would a minimally **Level 2** student know? Where would that minimally **Level 2** student rank among them?
    - What differentiates a minimally **Level 2** student from a Level 1 student? At which score?
- 87

- ### WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 2 IN SCIENCE?
- What should a student who is minimally at Level 2 know and be able to do?
    - What's the chance that student will get a B?
    - What's the chance that student will get a C?
    - Of students who get a B grade in a first-year college course,
      - Would you find a **Level 2** student among them?
    - Of students who get a C grade in a first-year college course,
      - What would a minimally **Level 2** student know? Where would that minimally **Level 2** student rank among them?
    - What differentiates a minimally **Level 2** student from a Level 1 student? At which score?
- 88

- ### WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 2 IN ENGLISH AND READING?
- What should a student who is minimally at Level 2 know and be able to do?
    - What's the chance that student will get a B?
    - What's the chance that student will get a C?
    - Of students who get a B grade in a first-year college course,
      - Would you find a **Level 2** student among them?
    - Of students who get a C grade in a first-year college course,
      - What would a minimally **Level 2** student know? Where would that minimally **Level 2** student rank among them?
    - What differentiates a minimally **Level 2** student from a Level 1 student? At which score?
- 89

- ### WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 4 IN MATH?
- What should a student who is minimally at Level 4 know and be able to do?
    - What's the chance that student will get a B?
    - What's the chance that student will get a C?
    - Of students who get a B grade in a first-year college course,
      - Would you find a **Level 4** student among them?
    - Of students who get a C grade in a first-year college course,
      - What would a minimally **Level 4** student know? Where would that minimally **Level 4** student rank among them?
    - What differentiates a minimally **Level 4** student from a Level 3 student? At which score?
- 90

## WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 4 IN SCIENCE?

- What should a student who is minimally at Level 4 know and be able to do?
  - What's the chance that student will get a B?
  - What's the chance that student will get a C?
  - Of students who get a B grade in a first-year college course,
    - Would you find a **Level 4** student among them?
  - Of students who get a C grade in a first-year college course,
    - What would a minimally **Level 4** student know? Where would that minimally **Level 4** student rank among them?
- What differentiates a minimally **Level 4** student from a Level 3 student? At which score?

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## WHAT DOES IT MEAN TO BE MINIMALLY LEVEL 4 IN ENGLISH AND READING?

- What should a student who is minimally at Level 4 know and be able to do?
  - What's the chance that student will get a B?
  - What's the chance that student will get a C?
  - Of students who get a B grade in a first-year college course,
    - Would you find a **Level 4** student among them?
  - Of students who get a C grade in a first-year college course,
    - What would a minimally **Level 4** student know? Where would that minimally **Level 4** student rank among them?
- What differentiates a minimally **Level 4** student from a Level 3 student? At which score?

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# INSTRUCTIONS FOR SETTING ROUND 2 CUT SCORES

## SETTING LEVEL 2 AND LEVEL 4 ACHIEVEMENT LEVELS

### Task:

- Think about minimally *Level 2* and a minimally *Level 4* students in each subject area.
- Think about their likely success in their first-year, entry-level college course in that subject area (College Algebra, Social Science course, or College Biology).
- Highlight the **one** row for *Level 2* and the **one** row for *Level 4* on the rating sheet that best reflect what you see as their probabilities of achieving an A, B, or C grade.
- Ratings should reflect your individual judgment.

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## ROUND 2 LEVEL 2 AND LEVEL 4 RATING FORM IN MATH

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
28	0.51	0.77	0.87	6	7	7	5	12
27	0.45	0.73	0.85	9	10	10	7	17
26	0.39	0.69	0.83	12	13	14	10	21
25	0.34	0.64	0.80	18	18	17	14	26
24	0.29	0.59	0.78	23	22	22	18	31
23	0.23	0.55	0.75	25	25	26	20	35
<b>22</b>	<b>0.20</b>	<b>0.51</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>24</b>	<b>40</b>
21	0.16	0.46	0.70	33	32	33	27	43
20	0.13	0.40	0.66	36	35	36	30	48
19	0.11	0.35	0.63	42	41	42	35	52
18	0.09	0.30	0.60	48	47	48	41	60
17	0.07	0.26	0.56	62	58	58	53	69
16	0.05	0.22	0.51	76	73	73	69	80
15	0.04	0.19	0.46	88	85	87	83	90

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## ROUND 2 LEVEL 2 AND LEVEL 4 RATING FORM IN SCIENCE

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
28	0.41	0.73	0.89	5	6	7	5	12
27	0.36	0.69	0.88	6	7	8	6	14
26	0.30	0.64	0.86	10	10	10	9	18
25	0.25	0.60	0.84	12	13	14	11	23
24	0.21	0.55	0.81	19	19	19	17	29
<b>23</b>	<b>0.18</b>	<b>0.51</b>	<b>0.79</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>23</b>	<b>36</b>
22	0.14	0.46	0.75	31	29	30	28	43
21	0.12	0.41	0.71	38	36	36	35	50
20	0.10	0.36	0.68	42	41	42	40	56
19	0.08	0.31	0.65	51	48	49	48	63
18	0.06	0.27	0.61	55	54	57	55	70
17	0.05	0.23	0.57	65	63	62	63	75
16	0.04	0.19	0.52	75	72	71	73	82
15	0.03	0.16	0.47	80	78	78	80	86

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## ROUND 2 LEVEL 2 AND LEVEL 4 RATING FORM IN ENGLISH+READING

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
46	0.26	0.59	0.80	21	22	23	21	36
45	0.24	0.57	0.79	23	24	25	23	39
44	0.23	0.56	0.78	26	26	27	25	41
43	0.22	0.54	0.77	28	28	29	28	44
42	0.21	0.52	0.76	31	31	32	30	47
41	0.20	0.51	0.75	34	33	34	33	49
40	0.18	0.49	0.74	37	36	36	35	52
39	0.17	0.47	0.73	40	38	39	38	55
38	0.16	0.46	0.72	43	41	41	41	57
37	0.15	0.44	0.71	46	43	44	44	60
36	0.14	0.43	0.70	49	46	47	47	63
35	0.13	0.41	0.69	52	49	50	50	65
34	0.12	0.40	0.68	56	52	53	53	68
33	0.12	0.38	0.66	59	56	56	57	71

97

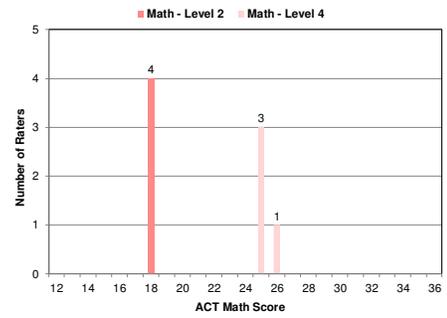
**BREAK**

Standard Setting will recommence in 15 Minutes

98

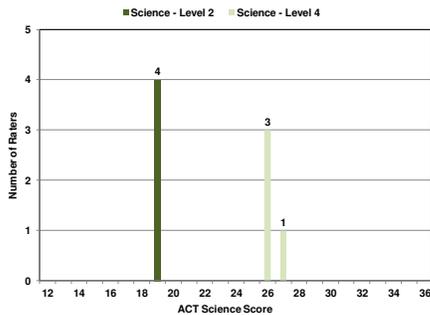
## ROUND 2 RESULTS

### MATH RATINGS FOR LEVELS 2 AND 4



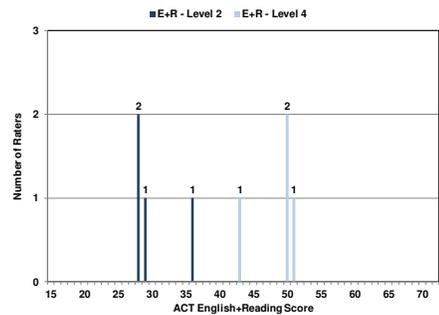
100

### SCIENCE RATINGS FOR LEVELS 2 AND 4



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### ENGLISH+READING RATINGS FOR LEVELS 2 AND 4



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## ACHIEVEMENT LEVEL IMPACT

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State 2018	All AZ Juniors 2018	All AZ Juniors 2017	Census States Juniors 2018	National Grad Class 2018
<b>Mathematics</b>									
Level 4	25	0.34	0.64	0.80	18	18	17	14	26
Level 3 (R1)	22	0.19	0.48	0.72	31	30	30	25	40
Level 2	18	0.09	0.30	0.60	48	47	48	41	60
<b>Science</b>									
Level 4	26	0.30	0.64	0.86	10	10	10	9	18
Level 3 (R1)	23	0.17	0.48	0.76	27	25	26	24	38
Level 2	19	0.08	0.31	0.65	51	48	49	48	63
<b>ELA</b>									
Level 4	50	0.32	0.66	0.83	14	15	16	14	27
Level 3 (R1)	43	0.16	0.54	0.79	27	27	28	27	43
Level 2	28	0.09	0.31	0.60	77	74	73	75	84

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## DISCUSSION

- How did your ratings compare with those of others?
- How did ratings in each subject area compare with ratings of the other subject areas?
- How does the additional impact information provided influence your ratings of the three cut scores?
- Which information is the most important in making your choice of cut scores?
  - Math
  - Science
  - English & Reading

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## COHERENCE OF CUT SCORES ACROSS 3 LEVELS

- How did your ratings in each subject area compare with ratings in other subject areas?
- Is it important to have similar probabilities of success for each cut score in each subject area? Why or why not?
- Do you have any additional questions or concerns before making your final cut score recommendations?

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## NEXT STEPS

- We will shortly complete the final round of ratings, followed by an evaluation, during which time we will tally the final recommended cut scores.
- After briefly reporting the final recommendations we will conclude the standard setting.
- After this meeting, ACT will deliver a report and recommendations to ADE.
- The Arizona Board of Education will determine the final cut scores.
- THANK YOU for participating!

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## INSTRUCTIONS FOR SETTING FINAL CUT SCORES

## SETTING LEVEL 2, 3, AND 4 ACHIEVEMENT LEVELS

### Task:

- Think about students *minimally* at Level 2, 3, and 4 in each subject area.
- Think about their likelihood of success in their first-year, entry-level college course in each subject area (College Algebra, English and Social Science courses, or College Biology).
- Highlight the **one** row for Level 2, **one** row for Level 3, and **one** row for Level 4 on the rating sheet that best reflect what you see as their probabilities of achieving an A, B, or C grade.
- When finished, hand the rating sheets to the facilitators and complete the evaluation form.

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## FINAL RATING FORM IN MATH

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
28	0.51	0.77	0.87	6	7	7	5	12
27	0.45	0.73	0.85	9	10	10	7	17
26	0.39	0.69	0.83	12	13	14	10	21
25	0.34	0.64	0.80	18	18	17	14	26
24	0.29	0.59	0.78	23	22	22	18	31
23	0.23	0.55	0.75	25	25	26	20	35
<b>22</b>	<b>0.20</b>	<b>0.51</b>	<b>0.73</b>	<b>30</b>	<b>29</b>	<b>29</b>	<b>24</b>	<b>40</b>
21	0.16	0.46	0.70	33	32	33	27	43
20	0.13	0.40	0.66	36	35	36	30	48
19	0.11	0.35	0.63	42	41	42	35	52
18	0.09	0.30	0.60	48	47	48	41	60
17	0.07	0.26	0.56	62	58	58	53	69
16	0.05	0.22	0.51	76	73	73	69	80
15	0.04	0.19	0.46	88	85	87	83	90

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## FINAL RATING FORM IN SCIENCE

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
28	0.41	0.73	0.89	5	6	7	5	12
27	0.36	0.69	0.88	6	7	8	6	14
26	0.30	0.64	0.86	10	10	10	9	18
25	0.25	0.60	0.84	12	13	14	11	23
24	0.21	0.55	0.81	19	19	19	17	29
<b>23</b>	<b>0.18</b>	<b>0.51</b>	<b>0.79</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>23</b>	<b>36</b>
22	0.14	0.46	0.75	31	29	30	28	43
21	0.12	0.41	0.71	38	36	36	35	50
20	0.10	0.36	0.68	42	41	42	40	56
19	0.08	0.31	0.65	51	48	49	48	63
18	0.06	0.27	0.61	55	54	57	55	70
17	0.05	0.23	0.57	65	63	62	63	75
16	0.04	0.19	0.52	75	72	71	73	82
15	0.03	0.16	0.47	80	78	78	80	86

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## FINAL RATING FORM IN ENGLISH+READING

ACT Score	Probability of Success			Percentage At/Above				
	A prob	B or higher prob	C or higher prob	AZ Juniors State	All AZ Juniors	All AZ Juniors	Census State Juniors	National Grad Class
				2018	2018	2017	2018	2018
46	0.25	0.59	0.80	21	22	23	21	36
45	0.24	0.57	0.79	23	24	25	23	39
44	0.23	0.56	0.78	26	26	27	25	41
43	0.22	0.54	0.77	28	28	29	28	44
42	0.21	0.52	0.76	31	31	32	30	47
41	0.20	0.51	0.75	34	33	34	33	49
<b>40</b>	<b>0.18</b>	<b>0.49</b>	<b>0.74</b>	<b>37</b>	<b>36</b>	<b>36</b>	<b>35</b>	<b>52</b>
39	0.17	0.47	0.73	40	38	39	38	55
38	0.16	0.46	0.72	43	41	41	41	57
37	0.15	0.44	0.71	46	43	44	44	60
36	0.14	0.43	0.70	49	46	47	47	63
35	0.13	0.41	0.69	52	49	50	50	65
34	0.12	0.40	0.68	56	52	53	53	68
33	0.12	0.38	0.66	59	56	56	57	71

111

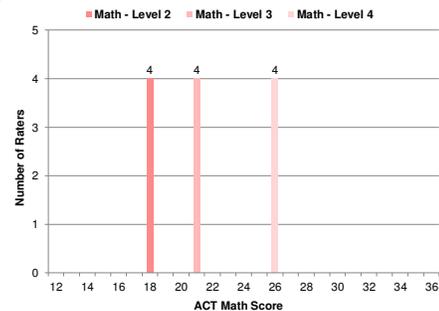
## NEXT STEPS

- 15 minute break
- Please complete the final round of ratings and hand in the rating sheets to the facilitators.
- Please complete the evaluation form.
- After briefly reporting the final recommendations we will conclude the standard setting.
- THANK YOU for participating!

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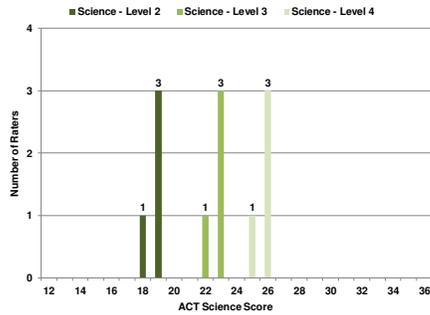
# ARIZONA STANDARD SETTING RESULTS

## MATH RATINGS FOR LEVELS 2, 3, AND 4



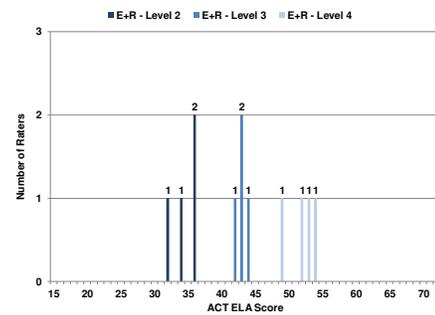
114

## SCIENCE RATINGS FOR LEVELS 2, 3, AND 4



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## ENGLISH+READING RATINGS FOR LEVELS 2, 3, AND 4



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## FINAL ROUND OF RESULTS

	ACT Score	Probability			Percentage At or Above				
		A	B or higher	C or higher	AZ Juniors State 2018	All AZ Juniors 2018	All AZ Juniors 2017	Census States Juniors 2018	National Grad Class 2018
<b>Mathematics</b>									
Level 4	26	0.39	0.69	0.83	12	13	14	10	21
Level 3	21	0.16	0.46	0.70	33	32	33	27	43
Level 2	18	0.09	0.30	0.60	48	47	48	41	60
<b>Science</b>									
Level 4	26	0.30	0.64	0.86	10	10	10	9	18
Level 3	23	0.18	0.51	0.79	25	23	25	23	36
Level 2	19	0.08	0.31	0.65	51	48	49	48	63
<b>ELA</b>									
Level 4	53	0.37	0.70	0.85	10	11	12	10	22
Level 3	43	0.22	0.54	0.77	28	28	29	28	44
Level 2	35	0.13	0.41	0.69	52	49	50	50	65

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## NEXT STEPS

- After this meeting, ACT will deliver a report and your recommendations to the Arizona Department of Education.
- The Arizona Department of Education will determine the final cut scores.
- THANK YOU for participating!

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