AzSCI

ARIZONA SCIENCE TEST

AzSCI Item Specifications Grade Band 6–8

Created October 2021; updated November 2022
Prepared by the Arizona Department of Education

Table of Contents

Introduction 3
Standards Description 4
Purpose of the Arizona Science Standards 4
Core Ideas 4
Scientific and Engineering Practices (SEPs) 4
Crosscutting Concepts (CCCs) 5
Coding and Navigating the Standards 6
Item Development Process 7
Test Design and Blueprint Tables 7
Cognitive Complexity 9
Item Sets and Item Types 11
Universal Tools 12
Development 13
Examples of Phenomena Development 14
AZ Grades 6-8 Item/Standard Specifications 18

Introduction

The Arizona Statewide Achievement Assessment for Science (AzSCI) is Arizona's statewide science achievement test. AzSCI assesses the Arizona Science Standards (AzSS) adopted by the Arizona State Board of Education in 2018. AzSCI is a computer-based assessment that allows for the use of a variety of innovative item types where students can apply critical thinking skills to demonstrate a deeper understanding of the three dimensions of the Arizona Science Standards.

During the item-development process, all AzSCI items are written in accordance with the Item Specifications and are reviewed and approved by a committee of Arizona educators to confirm alignment and appropriateness for inclusion in the test. AzSCI item review committee members are generally representative of Arizona's geographic regions and culturally diverse population. Items are reviewed for the following kinds of bias: gender, racial, ethnic, linguistic, religious, geographic, and socioeconomic. Item reviews also include consideration of issues related to individuals with disabilities. Arizona community members also have an opportunity to review items for issues of potential concern to members of the community at large. Reviewers are asked to consider the variety of cultural, regional, philosophical, political, and religious backgrounds throughout Arizona, and then to determine whether the subject matter will be acceptable to Arizona students, families, and other members of Arizona communities.

The AzSCI Item Specifications provide resource documents that define the content and format of the test and test items for item writers and reviewers. Each Item Specifications document indicates the alignment of items with the Arizona Science Standards. It also serves to provide all stakeholders with information about the scope and function of assessment items. This document can also serve to assist educators in understanding how assessment items are developed in alignment with the standards for science.

AzSCI has a test blueprint that was developed by Arizona and is different from any other state or consortium test blueprint. These item specifications for AzSCI are intended to provide information regarding standards, item formats, and response types. The descriptions of blueprints and cognitive complexity in this document are meant to provide an overview of the test. Item specifications are meant for the purposes of assessment, not instruction. They are not intended to be tools for instruction or the basis for curricula. AzSCI has a test blueprint that was developed by Arizona and is different from any other state or consortium test blueprint.

Standards Description

Purpose of the Arizona Science Standards

The Arizona Science Standards present a vision of what it means to be scientifically literate as well as college and career ready. These standards outline what all students need to know, understand, and be able to do by the end of high school, and reflect the following shifts for science education:

- Organize standards around thirteen core ideas and develop learning progressions to coherently and logically build scientific literacy from kindergarten through high school.
- Connect core ideas, crosscutting concepts, and science and engineering practices to make sense of the natural world and understand how science and engineering are practiced and experienced.
- Focus on fewer, broader standards that allow for greater depth, more connections, deeper understanding, and more applications of content.

Core Ideas

AzSCI examines students' performance of scientific and engineering practices in the context of core ideas and crosscutting concepts. Although described separately, they generally function in concert. The ten core ideas for Knowing Science center on understanding the causes of phenomena in physical, Earth and space, and life science. The three core ideas for Using Science connect scientific principles, theories, and models; engineering and technological applications; and societal implications to the content knowledge in order to support that understanding.

Core Ideas for Knowing Science		Core Ideas for Using Science
Physical Science P1: All matter in the Universe is made of very small particles. P2: Objects can affect other objects at a distance. P3: Changing the movement of an object requires a net force to be acting on it. P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event. **Earth and Space Science** E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate. E2: The Earth and our solar system are a very small part of one of many galaxies within the Universe. **Life Science** L1: Organisms are organized on a cellular basis and have a finite life span. L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms. L3: Genetic information is passed down from one generation of organisms to another. L4: The unity and diversity of organisms, living and extinct, is the result of evolution. *Adapted from ***Working with Big Ideas in Science Education***[2]		U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products. U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

Scientific and Engineering Practices (SEPs)

The science and engineering practices (SEPs) describe a robust process for how scientists investigate and build models and theories of the natural world or how engineers design and build. These practices reflect science and engineering as they are practiced and experienced.

The SEPs are grouped into eight categories, each describing how students should engage in the practices used by scientists and engineers. Each SEP is grouped into a practice type subcategory: sensemaking, investigating, or critiquing. Students engage in all eight of the SEPs throughout each grade band. As students progress from the lower to the upper grades, the complexity and sophistication of the SEPs increase in order to reflect the progression in students' abilities to use each practice and in their increased understanding of the core ideas.

SEP	Science and Engineering Practice	SEP Reporting Category
INV	Planning and Carrying Out Investigations	Investigating
Q/P	Asking Questions and Defining Problems	Investigating
MCT	Using Mathematical and Computational Thinking	Investigating
DATA	Analyzing and Interpreting Data	Investigating**
MOD	Developing and Using Models	Sensemaking
E/S	Constructing Explanations and Designing Solutions	Sensemaking
ARG	Engaging in Argument from Evidence	Critiquing
INFO	Obtaining, Evaluating, and Communicating Information	Critiquing

**Assessment purpose only.

Crosscutting Concepts (CCCs)

Crosscutting concepts (CCCs) cross boundaries between science disciplines and provide an organizational framework to connect knowledge from various disciplines into a coherent and scientifically based view of the world. They build bridges between science and other disciplines and connect core ideas and practices throughout the fields of science and engineering. Their purpose is to provide a lens to help students deepen their understanding of the core ideas as they make sense of phenomena in the natural and designed worlds. The CCCs are applied across all domains of science and act as a mechanism for linking the different domains. Throughout each grade band, students will engage in all seven CCCs. As with the SEPs, the complexity and sophistication of the CCCs will increase as students increase their understanding of the core ideas while moving from the lower to the upper grades.

CCC	Crosscutting Concept	CCC	Crosscutting Concept
PAT	Patterns	E/M	Energy and Matter
C/E	Cause and Effect	S/F	Structure and Function
SPQ	Scale, Proportion, and Quantity	S/C	Stability and Change
SYS	System and System Models		

Coding and Navigating the Standards

Standard: Grade 3, Core Ideas L2 and U1, standard number 8.

CCC: Bold CCCs indicate the CCCs that may be most appropriate for use with the standard.

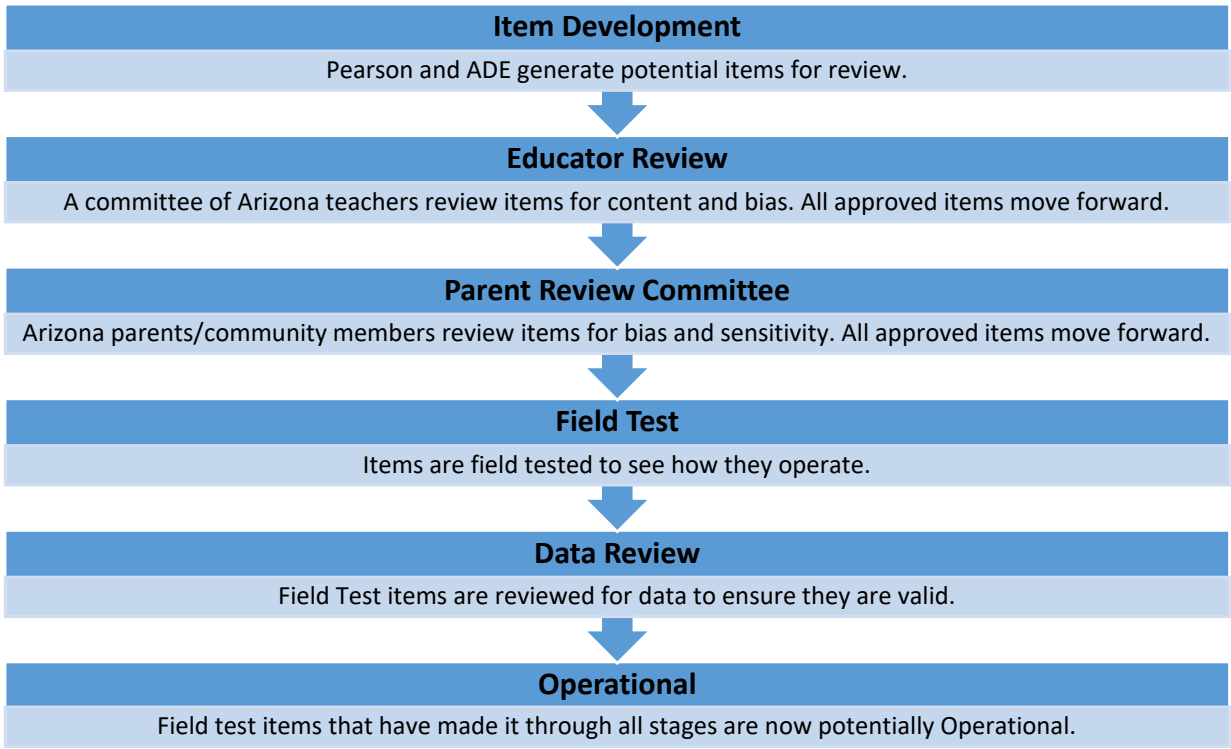
3.L2U1.8	Crosscutting Concepts & Background Information for Educators
Construct an argument from evidence that organisms are interdependent.	**Crosscutting Concepts:** Patterns, Cause and Effect, Scale, Proportion and Quantity; **Systems and System Models**; Energy and Matter; **Structure and Function**; Stability and Change[4] **Background Information:** **Animals** and **plants** alike generally need to take in air and water, animals must take in food, and plants need light and **minerals**; **anaerobic** life, such as **bacteria** in the gut, functions without air. Food provides animals with the materials they need for **body repair** and **growth** and is **digested** to release the **energy** they need to maintain body warmth and for motion. Plants acquire their material for growth chiefly from air and water and process matter they have formed to maintain their **internal conditions** (e.g., at night).[1 (p. 148)] Animals need food that they can break down, which comes either directly by eating plants (**herbivores**) or by eating animals (**carnivores**) which have eaten plants or other animals. Animals are ultimately dependent on plants for their survival. The relationships among organisms can be represented as food chains and food webs. Some animals are dependent on plants in other ways as well as for food, for example for shelter and, in the case of human beings, for clothing and fuel. Plants also depend on animals in various ways. For example, many flowering plants depend on insects for pollination and on other animals for dispersing their seeds.[2 (p. 27)]

SEP: Engaging in Argument from Evidence

Background Information: A guidance resource embedded into the standards document. This is the first step to deepen content knowledge and to make apparent the research behind the standard. The learning progression is supporting material and not the basis for assessment.

Item Development Process

AzSCI items go through a rigorous review before they are operational. When an item is "operational" it means it is used to determine a student's score on the assessment. This is a description of the process every item must go through before it is operational on AzSCI.



Sample tests are available online for the science portion of AzSCI. To access the AzSCI Sample Tests, go to: https://home.testnav.com/, select "Arizona," and then select "Mic Check and Sample Tests."

Test Design and Blueprint Tables

AzSCI is a grade-band assessment where each of the Core Ideas is assessed in each grade band, 3–5, 6–8, and high school. The new assessment consists of a combination of independent and cluster items. AzSCI will ask students to do more than answer recall questions about science; they will apply the practices, or behaviors, of scientists and engineers to investigate each real-world phenomenon and design solutions to problems.

Each assessment form is composed of 60 items. There are three test units with 20 items in each unit. The approximate time for each test unit is 60 minutes.

The 2018 Arizona Science Standards were developed using a three-dimensional approach to K–12 science education that captures students' interests and provides them with the necessary foundational knowledge for basic proficiency and continuing study in science.

AzSCI Blueprint

AzSCI identifies what it means to be proficient in science; it rests on a view of science as both a body of knowledge and an evidence-based, model- and theory-building enterprise that continually extends, refines, and revises knowledge. AzSCI reflects the three dimensions that are combined to form each standard and item. The construction of the AzSCI assessment is guided by the depth and rigor of the Arizona Science Standards. Items are created to address key components of the standards and assess a range of important skills. The AzSCI Blueprint provides an overview of the distribution of items on the AzSCI according to the standards. The standards for SEPs and CCCs are embedded within all AzSCI items. Further, the AzSCI blueprint outlines the Depth of Knowledge (replaced with the Task Analysis Guide in Science [TAGS]), SEP and CCC coverage, and distribution of items.

AzSCI Assessment Grade Band 6–8 Blueprint

Domain	Percent Range
Science and Engineering Practices and Crosscutting Concepts in Physical Sciences	36%–44%
Science and Engineering Practices and Crosscutting Concepts in Life Sciences	30%–38%
Science and Engineering Practices and Crosscutting Concepts in Earth and Space Sciences	22%–30%

Every standard in each grade band will be assessed over a three-year period.

AzSCI TAGS

Task	Percent Range
Doing tasks	0%–5%
Guided tasks	66%–84%
Scripted tasks	16%–28%

SEP Coverage

Practice	Percent Range
Investigating	14%–26%
Sensemaking	40%–60%
Critiquing	18%–30%

Investigating Practices	Sensemaking Practices	Critiquing Practices
Asking Questions and Defining Problems	Developing and Using Models	Engaging in Argument from Evidence
Planning and Carrying Out Investigations	Constructing Explanations and Designing Solutions	Obtaining, Evaluating, and Communicating Information
Using Mathematical and Computational Thinking		
Analyzing and Interpreting Data***		

***Assessment Reporting Categories for Science Engineering Practices (SEP) may vary.

Cognitive Complexity

Conventional cognitive complexity models, such as Depth of Knowledge (DOK), evaluate based on individual cognitive actions (memorization, application, evaluation, and analysis). This works well with one-dimensional standards. This does not work as well with multidimensional standards, such as the Arizona Science Standards, because each dimension being assessed could have its own cognitive level. To sufficiently evaluate a student's range of proficiency, Arizona needed a scale that goes beyond a singular focus and takes into account three-dimensionality.

The Task Analysis Guide in Science (TAGS) was developed for classroom use to evaluate cognitive demand with integration of practices and content (see Tekkumsu-Kisa, Stein, & Schunn, *A Framework for Analyzing Cognitive Demand and Content-Practices Integration: Task Analysis Guide in Science [TAGS]*, 2015). The classroom model is now being adapted for use on assessments (see Center on Standards and Assessment Implementation, *Cognitive Loading in Three-Dimensional NGSS Assessment: Knowledge, Skills, and Know-How)*, 2019.

Arizona modified these models for the AzSCI assessment in order to more accurately recognize that cognitive demand increases as the number of integrated dimensions increases.

AZ Task Analysis Guide in Science

TAGS	Az TAGS Example	TAGS Coding	
		Students must use 2 Dimensions	Students must use 3 Dimensions
Doing Science Tasks: Students are required to DO science by using practices to DEVELOP an understanding of a scientific or engineering phenomenon. Students must develop a model, explanation or argument from raw data or information. Students must be able to determine which data or information is appropriate and how to use it.	Doing Science items will typically not direct the students to specific information to use. *Use the information to explain the patterns observed.* OR *Which graph best represents the changes in X?* (Students then must look through all information/tabs to determine what information is relevant.)	D2	D3
Guided Science Tasks: Students use higher-level thinking to work through guided or scaffolded tasks. Students are told what information (model, data etc.) to use or are provided with information and then required to develop the actual answer.	Guided items will typically direct the students to the information to use (Tab 2, Graph 1, etc.), but the method for completing the task is left for the student to develop/ determine with minimal if any further instruction. *Based on Graph 1, which statement explains when X event will happen?*	G2	G3
Scripted Science Tasks: Students follow a script (defined actions or procedure) to complete a task.	Scripted items will typically direct the student to the information to use (Tab 1, Table 1, etc.) AND provide a set of well-defined actions or procedures to perform in order to complete a given task. Drag and drop (*Drag the arrows to complete the food chain*), hot spots, etc.	S2	S3

These models are intended to enable a user to navigate AzSCI items and focus on how to use the principle of developing AzSCI Item Sets and Item Types.

Item Sets and Item Types

An item set is a group of items that share the same stimulus centered on a specific science and/or engineering phenomenon. The AzSCI assessment uses two different types of item sets: independent and clusters. Sets of questions assess student application of knowledge across the domains of science for a comprehensive picture of student readiness for their next grade or course in science.

Independent Item Set	Cluster Item Set
Aligns to at least one standard	Aligns to at least one standard
Three or more associated items	Five associated items
Items must function independently and do not need to be related.	All five items will be placed on the same form and should work together to show understanding of the phenomena.
Items can target various difficulty levels.	Avoid large differences in difficulty levels of items within a cluster set of five items.
Stimulus has a maximum of two tabs.	Stimulus has a maximum of four tabs.

Item Types

AzSCI assessments are composed of item formats that include traditional multiple-choice response items (MC) and technology-enhanced response items (TEI).

For paper-based assessments (including those for students with an IEP or 504 plan that specifies a paper-based accommodation), TEIs will be modified so that they can be key-entered and scored electronically.

Item Type	Specifications
Multiple Choice (MC)	Four image, math, or text-based choices with a single correct choice
Multiple Response (MR)	Five to six image, math, or text-based choices with two or three correct choices
Inline Choice	Multiple drop-down menus are used within a range of text to provide several options consisting of words or phrases.
Bar Graph	Vertical bar graph
Point Graph	Points are plotted on a graph.
Hot Spot	Object Selection, Graphic Change. One or more images or portions of an image are selected.
Match	Responses are dragged into text gaps.
Gap Match	Drag and Drop. Responses are dragged into categories.
Graphic Gap Match	Graphic Gap Match interactions are drag and drop that include responses that are images.
Gap Match - Table	Responses are dragged into a table grid.

Item Type	Specifications
Match - Table Grid	Responses are indicated by selecting radio buttons or checkboxes within a table grid.
Two-Part Independent (TPI)	Any combination of item types. Two-part independent (TPI) items will be weighted as two points, one point awarded for each part. TPI items ask the student to demonstrate a deeper understanding of the standard by completing two separate thought processes.
Two-Part Dependent (TPD)	Any combination of item types. Two-part dependent (TPD) items will be weighted as one point (no partial credit). TPD items ask students to demonstrate their understanding of the standard by selecting a claim in Part A and identifying supporting evidence in Part B. Correctly answering Part B is dependent on correctly answering Part A and is part of the same thought process.

Universal Tools

The following tools will be available in the online test administration platform to assist each student while taking the AzSCI.

Text to Speech: Text to speech is available to all students who take the AzSCI assessment in the online platform.

Answer Eliminator: Students can use this tool to cross out answers they believe are incorrect.

Notepad: Allows students to take notes on each item screen.

Ruler: Students measure objects on the screen using either a standard or metric ruler.

Highlighter: Students select words on the screen to highlight.

Zoom: If pictures and words on the screen are too small, students can make them larger using buttons on the keyboard.

Protractor: Students measure angles on the screen using the protractor tool.

Calculator:

Grade 5: A four-function calculator is permitted on AzSCI. The Desmos four-function calculator is embedded in the online AzSCI test.

Grades 8 and 11: A scientific calculator is permitted on AzSCI. The scientific calculator should include these functions: standard four functions (addition, subtraction, multiplication, and division), decimal, change sign (+/-), parentheses, square root, and π. They may NOT include: any problem-solving or

programming capabilities, place values, or inequalities. Sample acceptable calculator: TI-30X IIS or similar. The Desmos Scientific calculator is embedded in the online AzSCI test.

Exhibits: Exhibits are information sheets available to help students answer some questions. The AzSCI assessment will provide the AzSCI Periodic Table of the Elements (https://www.azed.gov/assessments/sci) on both the Grade 8 and Grade 11 assessments. The Grade 11 assessment will also have the AzSCI Formula Reference Guide (https://www.azed.gov/assessments/sci) available to assist students on questions that require the use of a specific formula. This document is NOT intended to dictate information that should be taught as part of Arizona Science Standards or curriculum. This reference sheet is intended to cover a list of all potential HS symbols, equations, terminology, and formulas that students may encounter on the AzSCI assessment.

Development

The AzSCI stimuli and items go through rigorous development and review processes before being used on an assessment. All stimuli and items are approved by Arizona educators and community members as part of the processes.

The development process begins with developing a phenomenon. Once it is determined that the phenomenon is a good fit to assess the intended standards and dimensions, the stimuli and then items are developed using the phenomenon document as the focus and starting point.

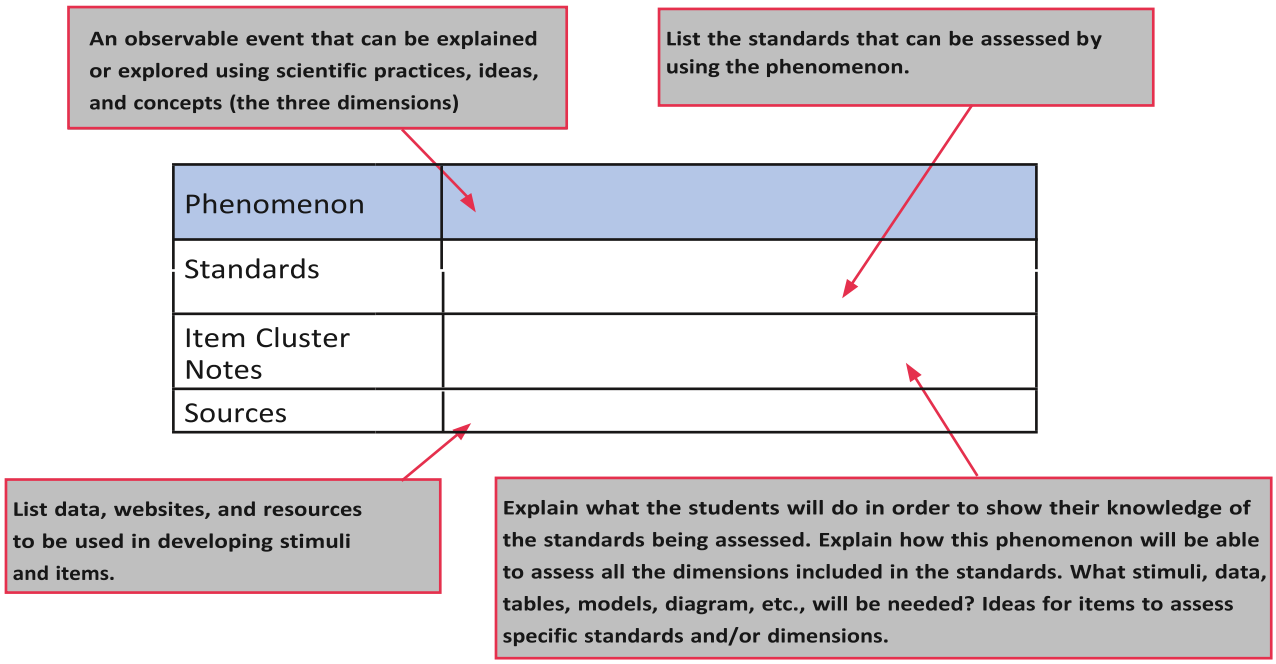
Phenomena Outline

The Arizona Science Standards are not intended to be taught or assessed one at a time or in isolation. Therefore, cluster item sets can be a useful step in organizing phenomena. Item developers group standards together in manageable arrangements to help students and teachers look for the connections between ideas that naturally exist in the sciences.

AzSCI stimuli and items are designed by first developing phenomena documents such as the ones shown here. These documents help focus the topic and guide the development of stimuli and items.

Stimuli Development Criteria

- Have a phenomenon statement that incorporates the standards and three dimensions to explain
- Based on real verifiable data
- Creative and interesting to students
- Free of bias and sensitivity concerns
- Concise and with only necessary information



Examples of Phenomena Development

An example and template of Phenomena Development is provided to demonstrate some of the many ways Arizona Science Standards can be grouped together to support the development of a cohesive assessment cluster.

This is an example of Phenomena Development for an item set. Actual items can be viewed for practice on the AzSCI Sample Test at https://www.azed.gov/assessment/resources.

Grade 8 Cluster Item Set

Phenomenon	Plants inside a closed glass terrarium can remain alive for a long period of time using only the resources within the terrarium.
Standards	**7.E1U1.5: Construct a model** that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere. **6.L2U1.14: Construct a model** that shows the cycling of matter and flow of energy in ecosystems.

Item Cluster Notes	Item cluster will open with observations of a closed glass jar terrarium, most likely a diagram showing components sealed inside. Aside from substrate materials, air, and a small amount of moisture, the only obvious feature inside the terrarium will be a small plant seedling. Students are tasked with analyzing the components of the jar terrarium and linking them to atmospheric, hydrospheric, and geospheric equivalents. In doing so, students demonstrate understanding that the jar terrarium is a model (7.E1U1.5) of larger and more complex Earth systems. Items may probe into how the approximations of natural systems within the jar allow easier monitoring and quantification of matter and energy cycling than would attempting to monitor the whole of Earth's atmosphere or geosphere. Items may point out that models like the jar terrarium demonstrate only the near-surface interactions between Earth systems—some cyclical processes, such as the exchange of thermal energy with the deep geosphere—are beyond the scope of the model. Affordances of various substrate materials may allow a deeper dive on geosphere-hydrosphere interactions in a near-surface setting. Students are tasked with completing a graphical model (flowchart, graphic organizer, etc.) to describe the needs of the seedling (6.L2.U1.14) and evaluate whether the seedling is likely to survive inside the jar if left in a warm, sunny room. Emphasis may be on energy flow. A key observation will be the production of condensation on the walls of the terrarium, and how that provides evidence of matter cycling. It could include the observation that moving the terrarium away from sunlight reduces the condensation rate and impacts plant health once the energy flow becomes disrupted.
Sources	Inspiration for picture/models: https://player.slideplayer.com/85/13710706/slides/slide_7.jpg https://www.physicsclassroom.com/class/refln/Lesson-1/The-Role-of-Light-to-Sight

Phenomena Template

Phenomenon	
Standards	
Item Cluster Notes	
Sources	

Key Terms

- ***Cluster.*** A group of stimuli and 5 items assessed together on the assessment.
- ***Crosscutting Concept*** *(CCC).* There are seven crosscutting concepts in the Arizona Science Standards.
- ***Grade Band.*** A grade band is a set of grades for elementary grades (K–2 and 3–5), middle school (6–8), or high school (9–12).
- ***Independent Item Set.*** A group of stimuli with associated items designed to be assessed independently from each other.
- ***Phenomenon.*** Something observable that happens in the real world, whether natural or man-made. Student inquiry about phenomena—together with student-driven designing of solutions to problems—should drive instruction.
- ***Science and Engineering Practice*** *(SEP).* There are eight practices described by the Arizona Science Standards.
- ***Standard Core Idea*** *(CI).* The CIs are defined by the Arizona Science Standards, with the associated elements identified as the foundation of each standard.
- ***Task Analysis Guide in Science*** *(TAGS).* TAGS was developed for classroom use to evaluate cognitive demand with integration of practices and content.

AZ Grades 6-8 Item/Standard Specifications

Standard	**6.P1U1.1** **Analyze and interpret data** to show that changes in states of matter are caused by different rates of movement of atoms in solids, liquids, and gases (Kinetic Theory).
SEPs	**Analyzing and Interpreting Data**
CCCs	**Patterns,** Cause and Effect, **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter;** Structure and Function; Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.P1U1.2** **Plan and carry out an investigation** to demonstrate that variations in temperature and/or pressure affect changes in state of matter
SEPs	**Planning and Carrying Out Investigations**
CCCs	**Patterns,** Cause and Effect, **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter;** Structure and Function; Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.P1U1.3** **Develop and use models** Develop and use models to represent that matter is made up of smaller particles called atoms.
SEPs	**Developing and Using Models**
CCCs	**Patterns,** Cause and Effect, **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter;** Structure and Function; Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.P2U1.4** **Develop and use a model** to predict how forces act on objects at a distance.
SEPs	**Developing and Using Models**
CCCs	**Patterns,** Cause and Effect, **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter;** Structure and Function; Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.P4U2.5** **Analyze** how humans use technology to store (potential) and/or use (kinetic) energy.
SEPs	**Analyzing and Interpreting Data**
CCCs	**Patterns,** Cause and Effect, **Scale, Proportion and Quantity; Systems and System Models; Energy and Matter;** Structure and Function; Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.E1U1.6** **Investigate and construct an explanation** demonstrating that radiation from the Sun provides energy and is absorbed to warm the Earth's surface and atmosphere.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	**Patterns,** Cause and Effect, **Systems and System Models; Energy and Matter;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.E2U1.7** Use ratios and proportions to **analyze and interpret data** related to scale, properties, and relationships among objects in our solar system.
SEPs	**Analyzing and Interpreting Data**
CCCs	**Patterns;** Cause and Effect; **Systems and System Models; Energy and Matter;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.E2U1.8** **Develop and use models** to explain how constellations and other night sky patterns appear to move due to Earth's rotation and revolution.
SEPs	**Developing and Using Models**
CCCs	**Patterns;** Cause and Effect; **Scale, Proportion and Quantity; Systems and System Models;** Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.E2U1.9** **Develop and use models to construct an explanation** of how eclipses, moon phases, and tides occur within the Sun-Earth-Moon system.
SEPs	**Developing and Using Models**
CCCs	**Patterns;** Cause and Effect; **Scale, Proportion and Quantity; Systems and System Models;** Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.E2U1.10** **Use a model** to show how the tilt of Earth's axis causes variations in the length of the day and gives rise to seasons.
SEPs	**Developing and Using Models**
CCCs	**Patterns;** Cause and Effect; **Scale, Proportion and Quantity; Systems and System Models;** Stability and Change
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.L2U3.11** **Use evidence to construct an argument** regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems.
SEPs	**Engaging in Argument from Evidence**
CCCs	**Patterns; Cause and effect; Systems and System Models; Energy and Matter; Stability and Change**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.L2U3.12** **Engage in argument from evidence** to support a claim about the factors that cause species to change and how humans can impact those factors.
SEPs	**Engaging in Argument from Evidence**
CCCs	**Patterns; Cause and effect; Systems and System Models; Energy and Matter; Stability and change**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**6.L2U1.13** **Develop and use models** to demonstrate the interdependence of organisms and their environment including biotic and abiotic factors.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect; Systems and System Models; Energy and Matter; Stability and Change**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**6.L2U1.14** **Construct a model** that shows the cycling of matter and flow of energy in ecosystems.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect; Systems and System Models; Energy and Matter; Stability and Change**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC, Gap Match

Standard	**7.P2U1.1** **Collect and analyze data** demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength.
SEPs	**Analyzing and Interpreting Data**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion, and Quantity; Systems and System Models; Stability and change; **Structure and function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables, Inline Choice, Point Graph
Item Types	MC

Standard	**7.P2U1.2** **Develop and use a model** to predict how forces act on objects at a distance.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion, and Quantity; Systems and System Models; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC, Hot Spot

Standard	**7.P3U1 .3** **Plan and carry out an investigation** that can support an evidence based explanation of how objects on Earth are affected by gravitational force.
SEPs	**Planning and Carrying Out Investigations**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion, and Quantity; Systems and System Models; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC, Text Entry

Standard	**7.P3U1 .4** **Use** non-algebraic **mathematics and computational thinking** to explain Newton's laws of motion.
SEPs	**Using Mathematics and Computational Thinking**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**7.E1U1 .5** **Construct a model** that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect; Systems and System Models;** Energy and Matter; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC, Match - Table Grid, Multiple Select, Inline Choice

Standard	**7.E1U1 .6** **Construct a model** to explain how the distribution of fossils and rocks, continental shapes, and seafloor structures provides evidence of the past plate motions.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**7.E1U2.7** **Analyze and interpret data to construct an explanation** for how advances in technology has improved weather prediction.
SEPs	**Analyzing and Interpreting Data**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC, Hot Spot

Standard	**7.L1U1.8** **Obtain, evaluate, and communicate information** to provide evidence that all living things are made of cells, cells come from existing cells, and cells are the basic structural and functional unit of all living things.
SEPs	**Obtaining, Evaluating, and Communicating Information**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**7.L1U1.9** **Construct an explanation** to demonstrate the relationship between major cell structures and cell functions (plant and animal).
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**7.L1U1.10** **Develop and use a model** to explain how cells, tissues, and organ systems maintain life (animals).
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**7.L1U1.11** **Explain** how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**7.L2U1.12** **Construct an explanation** for how some plant cells convert light energy into food energy.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Stability and Change; **Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.P1U1.1** **Develop and use a model** to demonstrate that atoms and molecules can be combined or rearranged in chemical reactions to form new compounds with the total number of each type of atom conserved.
SEPs	**Developing and Using Models**
CCCs	**Patterns; Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change; Structure and Function**
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC, Match - Table Grid, Multiple Select

Standard	**8.P1U1.2** **Obtain and evaluate information** regarding how scientists identify substances based on unique physical and chemical properties.
SEPs	**Obtaining, Evaluating, and Communicating Information**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.P4U1.3** **Construct an explanation** on how energy can be transferred from one energy store to another.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC, Slider, Inline Choice

Standard	**8.P4U1.4** **Develop and use mathematical models to explain** wave characteristics and interactions.
SEPs	**Developing and Using Models**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**8.P4U2.5** **Develop a solution** to increase efficiency when transferring energy from one source to another.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.E1U1 .6** **Analyze and interpret data** about the Earth's geological column to communicate relative ages of rock layers and fossils.
SEPs	**Analyzing and Interpreting Data**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.E1U3.7** **Obtain, evaluate, and communicate** information about data and historical patterns to predict natural hazards and other geological events.
SEPs	**Obtaining, Evaluating, and Communicating Information**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC, Multiple Select, Match - Table Grid, Bar Graph

Standard	**8.E1U3.8** **Construct and support an argument** about how human consumption of limited resources impacts the biosphere.
SEPs	**Engaging in Argument from Evidence**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.L3U1.9** **Construct an explanation** of how genetic variations occur in offspring through the inheritance of traits or through mutations.
SEPs	**Constructing Explanations and Designing Solutions**
CCCs	**Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Standard	**8.L4U1.11** **Develop and use a model** to explain how natural selection may lead to increases and decreases of specific traits in populations over time.
SEPs	**Developing and Using Models**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; **Energy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Models, Figures, Diagrams
Item Types	MC

Standard	**8.L4U1.12** **Gather and communicate evidence** on how the process of natural selection provides an explanation of how new species can evolve.
SEPs	**Obtaining, Evaluating, and Communicating Information**
CCCs	Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; E**nergy and Matter; Stability and Change;** Structure and Function
Assessment Boundaries	Not applicable
Stimulus Materials	Figures, Diagrams, Graphs, Tables
Item Types	MC

Pearson

19500 Bulverde Road

San Antonio, Texas 78259-3701

888-705-9421 | www.pearson.com

1128521 1 2 3 4 5 A B C D E Printed in the USA ISD34489