

Arizona Science Standards - 7th Grade

Three Dimensions of Science

Sensemaking in science occurs with the integration of three essential dimensions.

Science and Engineering Practices

- ask questions and define problems
- develop and use models
- plan and carry out investigations
- analyze and interpret data
- use mathematics and computational thinking
- construct explanations and design solutions
- engage in argument from evidence
- obtain, evaluate, and communicate information

Crosscutting Concepts

- patterns
- cause and effect
- structure and function
- systems and system models
- stability and change
- scale, proportion, and quantity
- energy and matter

Core Ideas

Core Ideas for Knowing 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.

Core Ideas for Using Science

- 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.

Physical Science Standards

Students will explore how cause and effect take place within and between a wide variety of force and motion systems from forces on individual objects to the forces that shape our Earth.

7.P2U1.1	Collect and analyze data demonstrating how electromagnetic forces can be attractive or repulsive and can vary in strength.
7.P2U1.2	Develop and use a model to predict how forces act on objects at a distance.
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.
7.P3U1.4	Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion.

Earth and Space Science Standards

Students develop an understanding of the patterns of energy flow along with matter cycling within and among Earth's systems.

7.E1U1.5	Construct a model that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere.
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.
7.E1U2.7	Analyze and interpret data to construct an explanation for how advances in technology has improved weather prediction.

Phenomena are observable events that can be explained or explored. Science aims to explain the causes of these events, or phenomena, using scientific ideas, concepts, and practices (3-dimensions).

Life Science Standards

Students develop an understanding of the structure and function of cells.

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.
7.L1U1.9	Construct an explanation to demonstrate the relationship between major cell structures and cell functions (plant and animal).
7.L1U1.10	Develop and use a model to explain how cells, tissues, and organ systems maintain life (animals).
7.L1U1.11	Construct an explanation for how organisms maintain internal stability and evaluate the effect of the external factors on organisms' internal stability.
7.L2U1.12	Construct an explanation for how some plant cells convert light energy into food energy.

Key Crosscutting Concepts in 7th Grade
Patterns; Cause and Effect; Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Structure and Function; Stability and Change

Arizona Science Standards - 8th Grade

Three Dimensions of Science

Sensemaking in science occurs with the integration of three essential dimensions.

Science and Engineering Practices

- ask questions and define problems
- develop and use models
- plan and carry out investigations
- analyze and interpret data
- use mathematics and computational thinking
- construct explanations and design solutions
- engage in argument from evidence
- obtain, evaluate, and communicate information

Crosscutting Concepts

- patterns
- cause and effect
- structure and function
- systems and system models
- stability and change
- scale, proportion, and quantity
- energy and matter

Core Ideas

Core Ideas for Knowing 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.

Core Ideas for Using Science

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.

Physical Science Standards

Students apply stability and change to explore chemical properties of matter and chemical reactions to further understand energy and matter.

8.P1U.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.
8.P1U.2	Obtain and evaluate information regarding how scientists identify substances based on unique physical and chemical properties.
8.P4U.3	Construct an explanation on how energy can be transferred from one energy store to another.
8.P4U.4	Develop and use mathematical models to explain wave characteristics and interactions.
8.P4U.5	Develop a solution to increase efficiency when transferring energy from one source to another.

Earth and Space Science Standards

Students explore natural and human-induced cause-and-effect changes in Earth systems over time.

8.E1U.6	Analyze and interpret data about the Earth's geological column to communicate relative ages of rock layers and fossils.
8.E1U.7	Obtain, evaluate, and communicate information about data and historical patterns to predict natural hazards and other geological events.
8.E1U.8	Construct and support an argument about how human consumption of limited resources impacts the biosphere.

Life Science Standards

Students develop an understanding of patterns and how genetic information is passed from generation to generation. They also develop the understanding of how traits within populations change over time.

8.L3U.9	Construct an explanation of how genetic variations occur in offspring through the inheritance of traits or through mutations.
8.L3U.10	Communicate how advancements in technology have furthered the field of genetic research and use evidence to support an argument about the positive and negative effects of genetic research on human lives.
8.L4U.11	Develop and use a model to explain how natural selection may lead to increases and decreases of specific traits in populations over time.
8.L4U.12	Gather and communicate evidence on how the process of natural selection provides an explanation of how new species can evolve.

Key Crosscutting Concepts in 8th Grade
Patterns; Cause and Effect; Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Structure and Function; Stability and Change

Phenomena are observable events that can be explained or explored. Science aims to explain the causes of these events, or phenomena, using scientific ideas, concepts, and practices (3-dimensions).

*Optimized for 11x17 printing

Released 11/03/2022

7th Grade Essential Standards

7.P3U1.4	Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion.
7.E1U1.5	Construct a model that shows the cycling of matter and flow of energy in the atmosphere, hydrosphere, and geosphere.
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.

8th Grade Essential Standards

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.

8.P1U1.2

Obtain and evaluate information regarding how scientists identify substances based on unique physical and chemical properties.

8.L3U1.9

Construct an explanation of how genetic variations occur in offspring through the inheritance of traits or through mutations.

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.

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.