Arizona Science Standards - 1st 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 develop an understanding of the effects of forces and waves, and how they can impact or be impacted by objects near and far away. They explore the relationships between sound and vibrating materials, as well as light and materials including the ability of sound and light to travel from place to place.

1.P2U1.1	Plan and carry out investigations demonstrating the effect of placing objects made with different materials in the path of a beam of light and predict how objects with similar properties will affect the beam of light.
1.P2U1.2	Use models to provide evidence that vibrating matter creates sound and sound can make matter vibrate.
1.P3U1.3	Plan and carry out investigations which demonstrate how equal forces can balance objects and how unequal forces can push, pull, or twist objects, making them change their speed, direction, or shape.
1.P4U2.4	Design and evaluate ways to increase or reduce heat from friction between two objects.

Earth and Space Science Standards

Students develop an understanding that earth materials are essential for organism's survival.

1.E1U1.5	Obtain, evaluate, and communicate information about the properties of Earth materials and investigate how humans use natural resources in everyday life.

Life Science Standards

Students develop an understanding that Earth has supported, and continues to support, a large variety of organisms. These organisms can be distinguished by their physical characteristics, life cycles, and their different resource needs for survival. Different types of organisms live where there are different earth resources such as food, air, and water.

1.L1U1.6	Observe, describe, and predict life cycles of animals and plants.
1.L2U2.7	Develop and use models about how living things use resources to grow and survive; design and evaluate habitats for organisms using earth materials.
1.L2U1.8	Construct an explanation describing how organisms obtain resources from the environment including materials that are used again by other organisms.
1.L3U1.9	Obtain, evaluate, and communicate information to support an evidence-based explanation that plants and animals produce offspring of the same kind, but offspring are generally not identical to each other or their parents.
1.L4.U1.10	Develop a model to describe how animals and plants are classified into groups and subgroups according to their similarities.
1.L4.U3.11	Ask questions and explain how factors can cause species to go extinct.

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).

Key Crosscutting Concepts in 1st Grade

*Patterns; **Cause and Effect;** Scale, Proportion and Quantity; Systems and System Models; Energy and Matter; Structure and Function; **Stability and Change***

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Arizona Science Standards - 1st Grade

Core Ideas for Knowing Science: Elements for Physical, Earth & Space, and Life Science Standards

Elements of Physical Science Standards

1.P2U1.1 Plan and carry out investigations demonstrating the effect of placing objects made with different materials in the path of a beam of light and predict how objects with similar properties will affect the beam of light.
- Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them where the light cannot reach. Mirrors can be used to redirect a light beam.

Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.

1.P2U1.2 Use models to provide evidence that vibrating matter creates sound and sound can make matter vibrate.
- Sound can make matter vibrate, and vibrating matter can make sound.
- Sound comes from things that vibrate and can be detected at a distance from the source because the air or other material around is made to vibrate. Sounds are heard when the vibrations in the air enter our ears.

1.P3U1.3 Plan and carry out investigations which demonstrate how equal forces can balance objects and how unequal forces can push, pull, or twist objects, making them change their speed, direction, or shape.
- Forces can push, pull or twist objects, making them change their motion or shape.
- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.
- The movement of objects is changed if the forces acting on them are not in balance.

1.P4U2.4 Design and evaluate ways to increase or reduce heat from friction between two objects.
- When two objects rub against each other, this is called friction.
- Friction between two surfaces can warm both of them (e.g., rubbing hands together).
- There are ways to reduce the friction between two objects.

Elements of Earth and Space Science Standards

1.E1U1.5 Obtain, evaluate, and communicate information about the properties of Earth materials and investigate how humans use natural resources in everyday life.
- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

The elements are not to be used as a check-off list, but rather a useful tool to help educators identify the specific pieces of knowledge and skill that make up the practice, crosscutting concept, or core idea at that grade-band.

Elements of Life Science Standards

1.L1U1.6 Observe, describe, and predict life cycles of animals and plants.
- Adult plants and animals can have young.
- Plants and animals grow and change. Plants and animals have predictable characteristics at different stages of development.

1.L2U2.7 Develop and use models about how living things use resources to grow and survive; design and evaluate habitats for organisms using earth materials.
- All animals need food in order to live and grow. They obtain their food from plants or from other animals. (1.L2U1.8)
- Plants depend on air, water, minerals (in the soil), and light to grow. (1.L2U1.8)
- Animals can move around, but plants cannot, and they often depend on animals for pollination or to move their seeds around. (1.L2U1.8)
- Animals depend on their surroundings to get what they need, including food, water, shelter, and a favorable temperature.
- Organisms obtain the materials they need to grow and survive from the environment. Many of these materials come from organisms and are used again by other organisms. (1.L2U1.8)

1.L2U1.8 Construct an explanation describing how organisms obtain resources from the environment including materials that are used again by other organisms.
- All animals need food in order to live and grow. They obtain their food from plants or from other animals. (1.L2U2.7)
- Plants depend on air, water, minerals (in the soil), and light to grow. (1.L2U2.7)
- Animals can move around, but plants cannot, and they often depend on animals for pollination or to move their seeds around. (1.L2U2.7)
- Different plants survive better in different settings because they have varied needs for water, minerals, and sunlight.
- Organisms obtain the materials they need to grow and survive from the environment. Many of these materials come from organisms and are used again by other organisms. (1.L2U1.7)

1.L3U1.9 Obtain, evaluate, and communicate information to support an evidence-based explanation that plants and animals produce offspring of the same kind, but offspring are generally not identical to each other or their parents.
- Living things produce offspring of the same kind, but offspring are not identical with each other or with their parents.
- Plants and animals, including humans, resemble their parents in many features because information is passed from one generation to the next.
- Organisms have characteristics that can be similar or different.

1.L4.U1.10 Develop a model to describe how animals and plants are classified into groups and subgroups according to their similarities.
- Animals and plants are classified into groups and subgroups according to their similarities.

1.L4.U3.11 Ask questions and explain how factors can cause species to go extinct.
- There are many different kinds of plants and animals in the world today and many kinds that once lived but are now extinct.
- Living things can survive only where their needs are met. If some places are too hot or too cold or have too little water or food, plants and animals may not be able to live there.