

# Curriculum Tools



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## Academic Frameworks

Discipline:

Science and Technology/Engineering – May 2001

Grades:

<input type="checkbox"/>	<input type="checkbox"/> Pre-K	<input type="checkbox"/> K	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input checked="" type="checkbox"/> 4	<input type="checkbox"/> 5
<input type="checkbox"/> ALL	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9	<input type="checkbox"/> 10	<input type="checkbox"/> 11	<input type="checkbox"/> 12

Strand:

(ALL)

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## Science and Technology/Engineering Curriculum Framework (May 2001)

### Earth and Space Science (preK-8) Strand

#### Topic : Rocks and Their Properties

Grades 3-5:

1. Give a simple explanation of what a mineral is and some examples, e.g., quartz, mica.
3. Identify the three categories of rocks (metamorphic, igneous, and sedimentary) based on how they are formed, and explain the natural and physical processes that create these rocks.

#### Topic : Soil

Grades 3-5:

4. Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains).
5. Recognize and discuss the different properties of soil, including color, texture (size of particles), the ability to retain water, and the ability to support the growth of plants.

#### Topic : Weather

**Grades 3-5:**

6. Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.
7. Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.
8. Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.
9. Differentiate between weather and climate.

**Topic : The Water Cycle****Grades 3-5:**

10. Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.
11. Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.

**Topic : Earth's History****Grades 3-5:**

12. Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes

**Topic : The Earth in the Solar System****Grades 3-5:**

13. Recognize that the earth is part of a system called the "solar system" that includes the sun (a star), planets, and many moons. The earth is the third planet from the sun in our solar system.
14. Recognize that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.

**Life Science (Biology) (preK-8) Strand****Topic : Characteristics of Plants and Animals****Grades 3-5:**

1. Classify plants and animals according to the physical characteristics that they share

## Topic : Plant Structures and Functions

### Grades 3-5:

2. Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection.
3. Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death.
4. Describe the major stages that characterize the life cycle of the frog and butterfly as they go through metamorphosis.
5. Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves, color of eyes, number of appendages) and characteristics that are affected by the climate or environment (e.g., browning of leaves due to too much sun, language spoken).

## Topic : Adaptations of Living Things

### Grades 3-5:

6. Give examples of how inherited characteristics may change over time as adaptations to changes in the environment that enable organisms to survive, e.g., shape of beak or feet, placement of eyes on head, length of neck, shape of teeth, color.
7. Give examples of how changes in the environment (drought, cold) have caused some plants and animals to die or move to new locations (migration).
8. Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. Recognize that some animal behaviors are instinctive (e.g., turtles burying their eggs), and others are learned (e.g., humans building fires for warmth, chimpanzees learning how to use tools).
9. Recognize plant behaviors, such as the way seedlings' stems grow toward light and their roots grow downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors, e.g., in winter, some trees shed leaves, some animals hibernate, and other animals migrate.
10. Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.

## Topic : Energy and Living Things

### Grades 3-5:

11. Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.

## Physical Sciences (Chemistry and Physics) (preK-8) Strand

## Topic : Properties of Objects and Materials

Grades 3-5:

### Topic : States of Matter

Grades 3-5:

2. Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.
3. Describe how water can be changed from one state to another by adding or taking away heat.

### Topic : Forms of Energy

Grades 3-5:

4. Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change.
5. Give examples of how energy can be transferred from one form to another.

### Topic : Electrical Energy

Grades 3-5:

6. Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound.
7. Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of electricity.

### Topic : Magnetic Energy

Grades 3-5:

10. Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.

### Topic : Sound Energy

Grades 3-5:

11. Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relate the rate of vibration to the pitch of the sound.

## Topic : Light Energy

### Grades 3-5:

12. Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.

## Technology/Engineering (preK-8) Strand

### Topic : Materials and Tools

Broad Concept: Appropriate materials, tools, and machines extend our ability to solve problems and invent.

#### Grades 3-5:

- 1.1. Identify materials used to accomplish a design task based on a specific property, i.e., weight, strength, hardness, and flexibility.
- 1.2. Identify and explain the appropriate materials and tools (e.g., hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) to construct a given prototype safely.
- 1.3. Identify and explain the difference between simple and complex machines, e.g., hand can opener that includes multiple gears, wheel, wedge gear, and lever.

### Topic : Engineering Design

Broad Concept: Engineering design requires creative thinking and strategies to solve practical problems generated by needs and wants.

#### Grades 3-5:

- 2.1. Identify a problem that reflects the need for shelter, storage, or convenience.
- 2.2. Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.
- 2.3. Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem.
- 2.4. Compare natural systems with mechanical systems that are designed to serve similar purposes, e.g., a bird's wings as compared to an airplane's wings.