

Plymouth Public Schools' Science and Technology/Engineering Program Grade 1 Integrated Science Learning Standards

An Introduction to the Massachusetts Department of Elementary and Secondary Education Science and Technology/Engineering Curriculum Framework

Effective teaching and learning in science fosters engagement and has rigor, relevance, and coherence embedded within. It couples practice with content to give the context for performance. A program with these components encourages students to analyze and explain phenomena and experience; engages with practices to build, use, and apply knowledge; and builds a storyline over time and among disciplines. The state standards that form this program are outcomes that reflect what a student should know and be able to do as a result of instruction. Science and engineering practices, which are included in these standards, are not teaching strategies; they are important learning goals and skills to be learned, also as a result of instruction. The standards listed below are not intended to represent an exhaustive list of all that could be included in our district's science program, nor should this list prevent students from going beyond the standards where appropriate. (Excerpts from Curriculum Framework)

Overarching Theme – Describing Patterns

In grade 1, students have more fluency with language, number sense and inquiry skills. This allows students to describe various patterns: motion between the sun, moon, and stars in relation to the Earth; seasonal patterns from sunrise and sunset data; and temperature and rainfall trends. Students also describe patterns in how light passes through various materials and how sounds differ from different types of materials. Additionally, students compare the ways different animals and plants use their body parts and senses to do the things they need to do to grow and survive including typical ways parents keep the young safe so they will survive to adulthood. They notice that though there are differences between plants or animals of the same type, the similarities of behavior and appearance are what allow us to identify them as belonging to a group. Grade 1 students begin to understand the power of patterns to predict future events in the natural and designed world. (Excerpts from Curriculum Framework)

ESS1. Earth's Place in the Universe

- 1-ESS1-1. Use observations of the sun, moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
- 1-ESS1-2. Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature and rainfall or snowfall patterns, and seasonal changes to the environment.

Clarification Statement:

Examples of seasonal changes to the environment can include foliage changes, bird migration, and differences in amount of insect activity.

LS1. From Molecules to Organisms: Structures and Processes

1-LS1-1. Use evidence to explain that:

- a. different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air; and
- b. plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant.

Clarification Statement:

Descriptions are not expected to include mechanisms such as the process of photosynthesis.

1-LS1-2. Obtain information to compare ways in which the behavior of different animal parents and their offspring help the offspring to survive.

Clarification Statement:

Examples of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).

LS3. Heredity: Inheritance and Variation of Traits

1-LS3-1. Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.

Clarification Statements:

1. Examples of observations could include leaves from the same kind of plant are the same shape, but can differ in size.
2. Inheritance, animals that undergo metamorphosis, or hybrids are not expected.

PS4. Waves and Their Applications in Technologies for Information Transfer

1-PS4-1. Demonstrate that vibrating materials can make sound and that sound can make materials vibrate.

Clarification Statements:

1. Examples of vibrating materials that make sound could include tuning forks, a stretched string or rubber band, and a drum head.
2. Examples of how sound can make materials vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.

1-PS4-3. Conduct an investigation to determine the effect of placing materials that allow light to pass through them, allow only some light through them, block all the light, or redirect light when put in the path of a beam of light.

Clarification Statements:

1. Effects can include some or all light passing through, creation of a shadow, and redirecting light.
2. Quantitative measures are not expected.

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to send a signal over a distance.

Clarification Statements:

1. Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.
2. Technological details for how communication devices work are not expected.

ETS1. Engineering Design

1.K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change that can be solved by developing or improving an object or tool.

1.K-2-ETS1-2. Generate multiple solutions to a design problem and make a drawing (plan) to represent one or more of the solutions.