

Plymouth Public Schools' Science and Technology/Engineering Program Kindergarten 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 – Reasons for Change

In kindergarten, students build on early experiences observing the world around them as they continue to make observations that are more quantitative in nature and help them identify why some changes occur. Students begin to learn to use these observations as evidence to support a claim through growing language skills. They learn that all animals and plants need food, water, and air to grow and thrive and that the fundamental difference between plants and animals is a plant's ability to make its own food. Students build their quantitative knowledge of temperature in relationship to the weather and its effect on different kinds of materials. They observe that the amount of sunlight shining on a surface causes a temperature change and they design a structure to reduce the warming effects of sunlight. They investigate motions of objects by changing the strength and direction of pushes and pulls. They provide examples of plants and animals that can change their environment through their interactions with it. In kindergarten science students begin to identify reasons for changes in some common phenomena. (Excerpts from Curriculum Framework)

ESS2. Earth's Systems

K-ESS2-1. Use and share quantitative observations of local weather conditions to describe patterns over time.

Clarification Statements:

1. Examples of quantitative observations could include numbers of sunny, windy and rainy days in a month, and relative temperature.
2. Quantitative observations should be limited to whole numbers.

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.

Clarification Statement:

Examples of plants and animals changing their environment could include a squirrel digging holes in the ground and tree roots that break concrete.

ESS3. Earth and Human Activity

K-ESS3-2. Obtain and use information about weather forecasting to prepare for, and respond to, different types of local weather.

K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses.

Clarification Statement:

Examples of solutions could include reusing paper to reduce the number of trees cut down and recycling cans and bottles to reduce the amount of plastic or metal used.

LS1. From Molecules to Organisms: Structures and Processes

K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.

K-LS1-2(MA). Recognize that all plants and animals grow and change over time.

PS1. Matter and Its Interactions

K-PS1-1(MA). Investigate and communicate the idea that different kinds of materials can be a solid or liquid depending on temperature.

Clarification Statements:

1. Materials chosen must exhibit solid and liquid states in a reasonable temperature range for Kindergarten students (e.g., 0-80°F), such as water, crayons or glue sticks.

2. Only a qualitative description of temperature, such as hot, warm, and cool, is expected.

PS2. Motion and Stability: Forces and Interactions

K-PS2-1. Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Clarification Statements:

1. Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.
2. Comparisons should be on different relative strengths or different directions, not both at the same time.
3. Non-contact pushes or pulls such as those produced by magnets are not expected.

PS3. Energy

K-PS3-1. Make observations to determine that sunlight warms materials on Earth's surface.

Clarification Statements:

1. Examples of materials on Earth's surface could include sand, soil, rocks, and water.
2. Measures of temperature should be limited to relative measures such as warmer/cooler.

K-PS3-2. Use tools and materials to design and build a model of a structure that will reduce the warming effect of sunlight on an area.