Plymouth Public Schools' Science and Technology/Engineering Program Grade 3 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 – Human Interactions

In grade 3, students develop and sharpen their skills at obtaining, recording and charting, and analyzing data in order to study their environment. They use these practices to study the interactions between humans and Earth systems, humans and the environment, and humans and the designed world. They learn that these entities not only interact, but influence behaviors, reactions, and traits of organisms. Grade 3 students analyze weather patterns and consider humans' influence and opportunity to impact weather-related events. In life science, they study the interactions between and influence of the environment and human traits and characteristics. They use the engineering design process to identify a problem and design solutions that enhance humans' interactions with their surroundings and to meet their needs. Students consider the interactions and consequent reactions between objects and forces, including forces that are balanced or not. Students reason and provide evidence to support arguments for the influence of humans on nature and nature on human experience. (Excerpts from Curriculum Framework)

ESS2. Earth's Systems

3-ESS2-1. Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.

Clarification Statements:

1. Examples of weather data could include temperature, amount and type of

precipitation (e.g., rain, snow), wind direction, and wind speed.
2. Graphical displays should focus on pictographs and bar graphs.

3-ESS2-2. Obtain and summarize information about the climate of different regions of the world to illustrate that typical weather conditions over a year vary by region.

Clarification Statement:
Examples of information can include climate data (average temperature, average precipitation, average wind speed) or comparative descriptions of seasonal weather for different regions.

State Assessment Boundary:
An understanding of climate change is not expected in state assessment.

ESS3. Earth and Human Activity

3-ESS3-1. Evaluate the merit of a design solution that reduces the damage caused by weather.

Clarification Statement:
Examples of design solutions to reduce weather-related damage could include a barrier to prevent flooding, a wind-resistant roof, and a lightning rod.

LS1. From Molecules to Organisms: Structures and Processes

3-LS1-1. Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common, but there are a variety of ways in which these happen.

Clarification Statements:
1. Examples can include different ways plants and animals begin (e.g., sprout from a seed, born from an egg), grow (e.g., increase in size and weight, produce new part), reproduce (e.g., develop seeds, root runners, mate and lay eggs that hatch), and die (e.g., length of life).
2. Plant life cycles should focus on those of flowering plants.
3. Describing variation in organism life cycles should focus on comparisons of the general stages of each, not specifics.

State Assessment Boundary:
Detailed descriptions of any one organism's cycle, the differences of "complete metamorphosis" and "incomplete metamorphosis", or details of human reproduction are not expected in state assessment.

LS3. Heredity: Inheritance and Variation of Traits

3-LS3-1. Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.

Clarification Statements:

1. Examples of inherited traits that vary can include the color of fur, shape of leaves, length of legs, and size of flowers.
2. Focus should be on non-human examples.

State Assessment Boundary:
Genetic mechanisms of inheritance or prediction of traits are not expected in state assessment.

3-LS3-2. Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

Clarification Statements:

1. Examples of the environment affecting a characteristic could include normally tall plants grown with insufficient water or light are stunted; a lizard missing a tail due to a predator; and, a pet dog that is given too much food and little exercise may become overweight.
2. Focus should be on non-human examples.

LS4. Biological Evolution: Unity and Diversity

3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.

Clarification Statement:
Comparisons should focus on physical or observable features.

State Assessment Boundary:
Identification of specific fossils or specific present-day plants and animals, dynamic processes, or genetics are not expected in state assessment.

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.

Clarification Statements:

1. Examples can include rose bushes of the same species, one with slightly longer thorns than the other which may prevent its predation by deer; and, color variation within a species that may provide advantages so one organism may be more likely to survive and therefore more likely to produce offspring.
2. Examples of evidence could include needs and characteristics of the organisms and habitats involved.

3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.

Clarification Statement:
Examples of evidence could include needs and characteristics of the different organisms (species) and habitats involved.

3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.

Clarification Statements:

1. Changes should include changes to landforms, distribution of water, climate, and availability of resources.
2. Changes in the habitat could range in time from a season to a decade.
3. While it is understood that ecological changes are complex the focus should be on a single change to the habitat.

3-LS4-5(MA). Provide evidence to support a claim that the survival of a population is dependent upon reproduction.

State Assessment Boundary:
Details of reproduction are not expected in state assessment.

PS2. Motion and Stability: Forces and Interactions

3-PS2-1. Provide evidence to explain the effect of multiple forces, including friction, on an object. Include balanced forces that do not change the motion of the object and unbalanced forces that do change the motion of the object.

Clarification Statements:

1. Descriptions of force magnitude should be qualitative and relative.
2. Force due to gravity is appropriate, but only as a force that pulls objects down.

State Assessment Boundaries:

1. Quantitative force magnitude is not expected in state assessment.
2. State assessment will be limited to one variable at a time: number, size, or direction of forces.

3-PS2-3. Conduct an investigation to determine the nature of the forces between two magnets based on their orientations and distance relative to each other.

Clarification Statement:
Focus should be on forces produced by magnetic objects that are easily manipulated.

3-PS2-4. Define a simple design problem that can be solved by applying the use of the interactions between magnets.

Clarification Statement:
Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.

ETS1. Engineering Design

3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.

3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.

Clarification Statement:
Examples of design problems can include adapting a switch on a toy for children that have a motor coordination disability, designing a way to clear or collect debris or trash from a storm drain, or creating safe moveable playground equipment for a new recess game.

3.3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.

Clarification Statements:

1. Examples of informational resources can include books, videos, and websites.
2. Examples of representations can include graphic organizers, sketches, models, and prototypes.