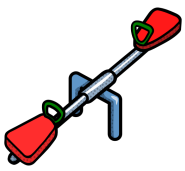
3rd Grade Science Map

The **Science and Engineering Practices (SEPs)** are the major practices that **scientist**s apply as they investigate and build models and theories about the world, and that **engineers** use as they design and build systems. This is vital, as the fields of science and engineering are related and mutually supportive through the eight SEPs that students DO. The **Crosscutting Concepts (CCCs)** represent seven themes that span across science domains (Physical, Life, Earth and Space, and Engineering, Technology, and Applications of Science) and have value to both scientists and engineers as they identify and connect universal properties and processes found in all domains. The CCCs give students an organizational framework for connecting knowledge from the various disciplines into a coherent and scientific based view of the world. Disciplinary Core Ideas (DCIs) are a set of four science and engineering domains for K–12 science that have broad importance across multiple science and engineering disciplines. The DCIs provide a tool for understanding or investigating more complex ideas and solving problems, relate to the interests and life experiences of students, and are learnable over multiple grades at increasing levels of depth and sophistication. Students should not memorize or learn isolated facts about the DCIs secondhand or apart from the other two dimensions.

Unit 1 - Introduction to Science & Engineering Practices and Crosscutting Concepts

Students will begin exploring how scientists and engineers use the Science and Engineering Practices (skills scientists and engineers use) including asking questions, defining problems, developing and using models, planning and carrying out scientific investigations, analyzing and interpreting data, using mathematical and computational thinking, constructing explanations, designing solutions, engaging in argument from evidence, and obtaining/evaluating/communicating information. Students will also be introduced to the Crosscutting Concepts (ways scientists and engineers think about phenomena) including patterns, cause and effect relationships, scale/proportion/quantity, systems and system models, energy and matter, structure and function, and stability/change. Finally, students will be introduced to the engineering design process where students will define problems before developing and optimizing solutions to local, national, and global issues.



Unit 2 - Playground Forces

3-PS2-1, 3-PS2-2, 3-PS2-3, 3-PS2-4

Students will be planning and conducting investigations, to explore the effects of balanced and unbalanced forces on the motion of an object. Examples could include an unbalanced force on one side of a ball, which causes motion; and balanced forces pushing on a box from opposite sides, which does not cause motion. Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. There are different types of interactions. Objects in contact exert forces on each other. Students will describe the causes and effects of balanced and unbalanced forces.

Students will make observations and measurements of an object's motion in order to provide evidence that observed patterns of objects can predict future motion. Examples of motion with a predictable pattern could include a pendulum swinging, a ball rolling back and forth in a bowl, and two children on a seesaw. Students will describe the patterns of an object's motion in various situations since they can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. Patterns of change can be used to make predictions. Students will ask questions to determine cause and effect relationships of electric interactions and magnetic interactions between objects not in contact with each other. Examples could include the interactive force on hair from an electrically charged balloon or other instances of static electricity. Examples could include either the magnetic force between two permanent magnets or an electromagnet and steel paper clips. Students will describe the cause and effect relationships such as how the distance between objects affects strength of the force, how combining magnets affects the strength of the force, and how the orientation of magnets affects the direction of the force. Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. Students will also use scientific ideas about magnets to develop solutions to simple design problems. Testing a solution involves investigating how well it performs under a range of likely conditions. Students will describe how their system works. The system can be described in terms of its components and their interactions.

Unit 3 - Weather Impacts

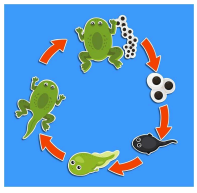
3-ESS2-2, 3-ESS2-1, 3-ESS3-1

Students will represent data in tables and graphical displays (bar graphs or pictographs) of typical weather conditions during a particular season to identify patterns and make predictions. Examples could include making predictions about weather conditions based on average temperature, precipitation, and wind direction. Weather, which varies from day to day and seasonally throughout the year, is the condition of the atmosphere at a given place and time. Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. Students will describe how the patterns of change can be used to make predictions. Students will make a claim about the effectiveness of a design solution that reduces the impacts of a weather related hazard. Examples of design solutions could include barriers to prevent flooding, wind resistant roofs, and lighting rods. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. Students will obtain and combine information to describe climate patterns in different regions of the world. Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. Students will describe the patterns of different regions because similarities and differences in patterns can be used to sort and classify natural phenomena such as climate.

Unit 4 - Surviving in Changing Environments

3-LS4-1, 3-LS3-2, 3-LS4-3, 3-LS4-4

Students will be analyzing and interpreting data from fossils to provide evidence of organisms and the environment in which they lived long ago. Examples could include marine fossils found on dry land and tropical plant fossils found in cold regions. Some kinds of plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. Students will describe the scale, proportion and quantity of fossil evidence such as observable phenomena that exist from very short to very long time periods. Students will use evidence to support explanations that traits can be influenced by the environment. Examples could include stunted growth in plants due to insufficient resources or obesity in animals that eat too much and get little exercise. Some characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. The environment affects the traits that an organism develops. They will use these scientific skills to explain the cause and effect relationship between traits and the environment. Students will construct an argument with evidence that in a particular habitat some organisms can thrive, struggle to survive, or fail to survive. Examples could include needs and characteristics of the organisms and habitats involved. Changes in a habitat are sometimes beneficial, sometimes neutral, or sometimes harmful to an organism. Adaptation can lead to organisms that are better suited for their environment. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. They will use these scientific skills to explain the cause and effect relationship around the survival of organisms in a particular habitat.



Unit 5 - Life Cycles for Survival

3-LS1-1, 3-LS3-1, 3-LS4-2, 3-LS2-1

Students develop and use models to describe how organisms change in predictable patterns during their unique and diverse life cycles. Changes organisms go through during their life cycles could include birth/sprouting, growth, reproduction, and death. Reproduction is essential to the continued existence of every kind of organism. Students will analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms. Similarities and differences in shared traits form patterns among parents, siblings, and offspring. Many characteristics of organisms are inherited from their parents. Different organisms vary in how they look and function because they have different inherited information. Students will use evidence to construct an explanation for how the variations in traits among individuals of the same species may provide advantages in surviving and producing

	offspring. Examples could include plants that have larger thorns than other plants may be less likely to be eaten, or animals that have better camouflage may be more likely to survive and produce offspring. Students will describe the cause and effect relationships used to explain change. For example, sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. Students will construct an argument that some animals form groups that help members survive. Students will describe the cause and effect relationship of these social interactions and group behaviors. Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Groups can be collections of equal individuals, hierarchies with dominant members, small families, groups of single or mixed gender, or groups composed of individuals similar in age. Some groups are stable over long periods of time; others are fluid, with members moving in and out. Some groups assign specialized tasks to each member; in others, all members perform the same or a similar range of functions.