Greenwich Public Schools Curriculum Overview

Grade 4: Science

Families as Partners in Learning

In Grade 4, instructional time should focus on exploration of forces and how they affect the motion of an object, relating the speed of an object to its energy, energy transfer and conversion, and energy transfer in ecosystems. **All grade 4 units of study are directly aligned with the approved Next Generation Science Standards** **The GPS Science Program uses the practice of inquiry-based science instruction, applying science concepts to real-world scenarios. Students are required to communicate results and their process to teachers and peers, using a variety of methods to demonstrate their learning and construct viable arguments and critique the reasoning of others, engaging in evidence-based arguments.**	
Unit	**Student Learning Expectations**
Unit 1: Science Notebook Launch ***Enduring Understandings:*** ● Students learn about the world around them through asking questions and making observations. ● Data analysis, interpretation and evaluation help students to apply science concepts in multiple contexts.	**Students will Do:** Students will make observations and ask questions about the world around them. Students will learn how to design and conduct simple investigations. Students will learn how to organize, analyze, interpret, and present their data. Students will model a natural phenomena. Students will draw a conclusion and support their claims with evidence. Click Next Generation Science Standards to learn more.

Force and Motion **ENDURING UNDERSTANDING:** ● There are a variety of forces acting on objects at all times that affect motion.	**Students will Do:** ● Students will plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Students will make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. ● Students will use evidence to construct an explanation relating the speed of an object to the energy of that object. ● Students will ask questions and predict outcomes about the changes in energy that occur when objects collide. ● Students will support an argument that the gravitational force exerted by Earth on objects is directed down. ● Students will develop and revise a model of the forces acting on a rocket when it is launched. ● Students will plan and conduct an investigation to provide evidence of (balanced and unbalanced) forces on the motion of an object (rocket). ● Students will make observations and ask questions about the changes in energy that occur when objects collide. ● Students will predict outcomes about the changes in energy that occur when objects collide. ● Students will apply their understanding of scientific concepts to a novel scenario. ● Students will develop an evidence based explanation of the forces acting on the ball. **Science and Engineering Practices** ● Planning and carrying out investigations ● Engaging in argument from evidence
Unit 3 Magnetism and Electricity ***Enduring Understandings:*** ● Electrical energy can be transferred from place to place, converted from one form to another.	**Students will Do:** ● Students will ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. ● Students will define a simple design problem that can be solved by applying scientific ideas about magnets. ● Students will make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. ● Students will apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Magnetic forces can be converted from one form to another (motion).	• Students will define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. • Students will generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. • Students will plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. • Students will explore and ask questions about the properties of magnets. • Students will design procedures for moving magnetic objects without touching them. • Students will conduct investigations into the force of a magnet and its ability to move objects. • Students will build a complete circuit. • Students will identify insulators and conductors. • Students will model how energy flows in a circuit. • Students will develop questions about the cause and effect relationships of electromagnets between two objects not in contact. • Students will identify a problem that can be solved by converting energy from one form to another. • Students will design a device that converts energy from one form to another to solve that problem. • Students will test and refine their design. • Students will go public with (share) their findings. **Science and Engineering Practices:** • Developing and using models • Planning and carrying out investigations
Unit 4 Energy Transfer in Ecosystems ***Enduring Understanding*:** Healthy oceans are necessary for a healthy planet including all of its populations.	**Students will Do:** • Students will support an argument that plants get the materials they need for growth chiefly from air and water. • Students will use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. • Students will develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. • Students will develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

	● Students will generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ● Students will collect and organize observed data on organisms in the Long Island Sound ecosystem. ● Students will develop questions about the Greenwich beach ecosystem. ● Students will analyze data by posing questions and drawing conclusions. ● Students will analyze the role plants and algae have in sustaining food webs. ● Students will support an argument using scientific evidence that the energy needed to sustain an ecosystem ultimately comes from the sun. ● Students will create the first iteration of the model in their science notebook. ● Students will revise their model to include the sun as the energy source, and the plants get what they need from air, water and sun. ● Students will revise their model to include labels of producers, consumers, and decomposers. ● Students will revise their model to include labels of 2 systems (atmosphere, hydrosphere, biosphere, or geosphere). ● Students will share models with peers. ● Students will give one another feedback on their models. ● Students will identify one problem facing Long Island Sound. ● Students will explain how the problem they chose can lead to the ecosystem becoming unstable. ● Students will generate multiple solutions to the problem. ● Students will compare the solutions and determine the best solution. **Science and Engineering Practices:** ● Asking questions (for science) and defining problems (for engineering) ● Developing and using models ● Analyzing and interpreting data