



Bedford Public Schools

Grade 4 – Science

As outlined in the 2016 Massachusetts Science and Technology/Engineering Frameworks: “In grade 4, students observe and interpret patterns related to the transfer of matter and energy on Earth, in physical interactions, and in organisms. Students learn about energy—its motion, transfer, and conversion—in different physical contexts. Grade 4 students interpret patterns of change over time as related to the deposition and erosion in landscape formation. They study today’s landscapes to provide evidence for past processes. Students learn that animals’ internal and external structures support life, growth, behavior, and reproduction. They work through the engineering design process, focusing on developing solutions by building, testing, and re-designing prototypes to fit a specific purpose. Each domain relates to the use of matter and energy over time and for specific purposes.”

Click on the link below to access a copy of the 2016 Massachusetts Elementary and Secondary Science and Technology/Engineering Frameworks.

<http://www.doe.mass.edu/frameworks/scitech/2016-04.pdf>



Learning Expectations

[Life Science](#)

[Physical Science](#)

[Earth Science](#)

[Engineering Design Challenge](#)

Life Science: Internal and External Structures

Enduring Understandings In order to meet the expectations, students will need to understand that...	Essential Questions In order to understand, students will need to consider questions such as...	Knowledge and Skills Learning this material will require students to ...
<ul style="list-style-type: none">• Plants and animals have internal and external structures that support survival, growth, behavior, and reproduction.• Animals receive different types of information through their senses.• Animals process information in their brains and respond in different ways.	<ul style="list-style-type: none">• How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?	<ul style="list-style-type: none">• Construct an argument that plants and animals have internal and external structures that support the survival, growth, and reproduction of plants and animals.• Use a model to describe the ways animals receive information through their senses.• Follow the scientific method.

Physical Science: Energy and Waves

Enduring Understandings In order to meet the expectations, students will need to understand that...	Essential Questions In order to understand, students will need to consider questions such as...	Knowledge and Skills Learning this material will require students to ...
<ul style="list-style-type: none">• The energy and speed of an object are related to one another.• Energy can be transferred from place to place by sound, light, heat, and electric currents.• Energy can be transferred from object to object through collisions.• Waves have patterns in terms of amplitude and wavelength.• Waves cause objects to move.• Visible light comes from light reflecting off of objects.	<ul style="list-style-type: none">• How is energy related to motion?• What are waves and what are some things they can do?	<ul style="list-style-type: none">• Model conversions of energy from one form to another.• Create a model of waves.• Follow the scientific method.

Earth Science: Slow and Rapid Changes to the Earth

Enduring Understandings In order to meet the expectations, students will need to understand that...	Essential Questions In order to understand, students will need to consider questions such as...	Knowledge and Skills Learning this material will require students to ...
<ul style="list-style-type: none"> • Changes in the landscape occur over time as evidenced from patterns in rock formations and fossils in rock layers. • Observations and measurements are used to provide evidence of the effects of weathering or the rate of erosion caused by water, ice, wind, or vegetation. • Energy and fuels come from natural resources and their uses affect the environment. • Maps can be analyzed and interpreted to describe patterns of Earth's features. • We need to apply knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impact of such processes on humans. 	<ul style="list-style-type: none"> • How is the Earth changing? • What factors change the earth? • How can maps be used to determine Earth's features? • How do Earth's rapid processes continue to impact us and our planet? • How can people reduce the impact of natural Earth processes on humans and other living things? 	<ul style="list-style-type: none"> • Conduct experiments that model physical and chemical weathering, erosion, earthquakes, volcanoes, and tsunamis. • Analyze maps and images to make predictions about the history of a landscape. • Recommend a solution to reduce the impacts of Earth processes using the Engineering and Design process. • Follow the scientific method.

Engineering Design Challenge

The concepts of engineering are applied throughout our science units. However, the criteria below is more specific to the behaviors of what engineers do.

Enduring Understandings In order to meet the expectations, students will need to understand that...	Essential Questions In order to understand, students will need to consider questions such as...	Knowledge and Skills Learning this material will require students to ...
<ul style="list-style-type: none"> • Engineering is a scientific study that combines science, math and problem-solving skills. • The engineering design process is an agreed upon process for designing, building, testing and improving solutions to problems. • Engineers use technology in designing solutions to problems. • Different material have different properties. • Different materials are suitable for different purposes. 	<ul style="list-style-type: none"> • What is an engineer? • What is technology? • How can following the Engineering Design Process assist engineers in solving problems? 	<ul style="list-style-type: none"> • Define what an engineer is and does. • Identify the steps of the Engineering Design Process. • Create a design that addresses a specific problem people face. • Work in a team to design, build, test, and improve solutions to a problem. • Analyze their models for strengths and weaknesses based on observations made during testing. • Imagine ways to improve their designs and implement some of their improvement ideas.