Middle School Grade 8 Science Tutorials offer targeted instruction, practice, and review designed to help students develop scientific literacy, deepen conceptual understanding, and apply scientific practices. Students explore concepts such as waves, the relationship between force and motion, Earth's place in the universe, Earth's systems and resources, Earth's history, and the diversity of life.

Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By continually honing their ability to apply knowledge in real-world scenarios, students build the depth of knowledge and higher-order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students as they explore the nature of science through focused content, interactive mini investigations, multi-modal representations, and personalized feedback. The Review It offers a high-impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

These Tutorials are built to the Next Generation Science Standards for middle school science.

Unit 1: Nature of Science

- **WHAT IS SCIENCE?**
  - 8.E.4B.5: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Obtain and communicate information to describe how data from technologies (including telescopes, spectroscopes, satellites, space probes) provide information about objects in the solar system and the universe.
  - 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
  - 8.S.1A.1.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to generate hypotheses for scientific investigations,

- 8.S.1A.3.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: formulate scientific questions and testable hypotheses,
- 8.S.1A.1.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to refine models, explanations, or designs, or

- **TYPES OF INVESTIGATIONS**
  - 8.S.1A.3.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: select and use appropriate tools or instruments to collect qualitative and quantitative data, and
  - 8.S.1A.1.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to generate hypotheses for scientific investigations,
  - 8.S.1A.3.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: formulate scientific questions and testable hypotheses,

- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or
- 8.S.1A.6.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using predictions based on observations and measurements, or
- 8.S.1A.1.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to extend the results of investigations or challenge claims.
- 8.S.1A.3.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: identify materials, procedures, and variables,
- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.

- **USING MODELS**
  - 8.S.1A.2.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Develop, use, and refine models to understand or represent phenomena, processes, and relationships,

- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,
- 8.S.1A.6.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using predictions based on observations and measurements, or
- 8.S.1A.1.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to refine models, explanations, or designs, or

Unit 2: Measurement and Data

- **TOOLS AND MEASUREMENT**
  - 8.S.1A.3.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: select and use appropriate tools or instruments to collect qualitative and quantitative data, and
  - 8.S.1A.3.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer

questions, test hypotheses, and develop explanations: record and represent data in an appropriate form. Use appropriate safety procedures.

- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.5.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use and manipulate appropriate metric units,

- **DISPLAYING AND INTERPRETING DATA**
  - 8.S.1A.3.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: record and represent data in an appropriate form. Use appropriate safety procedures.
  - 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
  - 8.S.1A.2.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Develop, use, and refine models to understand or represent phenomena, processes, and relationships,
  - 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or

- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or
- 8.S.1A.5.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use grade-level appropriate statistics to analyze data.
- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,

Unit 3: Waves

- **MECHANICAL WAVES AND SOUND**
  - 8.P.3A.1: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Construct explanations of the relationship between matter and energy based on the characteristics of mechanical and light waves.
  - 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific

thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or

- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,
- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.
- 8.P.3A.2: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Develop and use models to exemplify the basic properties of waves (including frequency, amplitude, wavelength, and speed).
- 8.P.3A.4: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Analyze and interpret data to describe the behavior of mechanical waves as they intersect.

- **ELECTROMAGNETIC WAVES**

- 8.P.3A.1: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Construct explanations of the relationship between matter and energy based on the characteristics of mechanical and light waves.
- 8.P.3A.2: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Develop and use models to exemplify the basic properties of waves (including frequency, amplitude, wavelength, and speed).
- 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or

- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,
- 8.P.3A.5: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Construct explanations for how humans see color as a result of the transmission, absorption, and reflection of light waves by various materials.
- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.

Unit 4: Applications of Waves

- **WAVES AND MATTER**
  - 8.P.3A.1: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Construct explanations of the relationship between matter and energy based on the characteristics of mechanical and light waves.
  - 8.P.3A.3: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter.

Analyze and interpret data to describe the behavior of waves (including refraction, reflection, transmission, and absorption) as they interact with various materials.

- 8.P.3A.5: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Construct explanations for how humans see color as a result of the transmission, absorption, and reflection of light waves by various materials.
- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,

- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,

- **WAVES AND TECHNOLOGY**
  - 8.S.1B.1.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. Technology is any modification to the natural world created to fulfill the wants and needs of humans. The engineering design process involves a series of iterative steps used to solve a problem and often leads to the development of a new or improved technology. Construct devices or design solutions using scientific knowledge to solve specific problems or needs: ask questions to identify problems or needs,
  - 8.P.3A.6: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Obtain and communicate information about how various instruments are used to extend human senses by transmitting and detecting waves (such as radio, television, cell phones, and wireless computer networks) to exemplify how technological advancements and designs meet human needs.
  - 8.S.1A.8.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to develop models,
  - 8.S.1B.1.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. Technology is any modification to the natural world created to fulfill the wants and needs of humans. The engineering design process involves a series of iterative steps used to solve a problem and often leads to the development of a new or improved technology. Construct devices or design solutions using scientific knowledge to solve specific problems or needs: generate and communicate ideas for possible devices or solutions,

- 8.E.4B.5: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Obtain and communicate information to describe how data from technologies (including telescopes, spectroscopes, satellites, space probes) provide information about objects in the solar system and the universe.
- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,

Unit 5: Force and Motion

- **DESCRIBING FORCES**
  - 8.P.2A.4: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret data to support claims that for every force exerted on an object there is an equal force exerted in the opposite direction (Newtons Third Law of Motion).
  - 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the

development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,

- 8.S.1A.5.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use and manipulate appropriate metric units,
- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or
- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,
- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.
- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.

- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
- 8.S.1A.8.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to develop models,
- 8.P.2A.1: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Plan and conduct controlled scientific investigations to test how varying the amount of force or mass of an object affects the motion (speed and direction), shape, or orientation of an object.
- 8.P.2A.2: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Develop and use models to compare and predict the resulting effect of balanced and unbalanced forces on an objects motion in terms of magnitude and direction.
- 8.P.2A.5: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.

- **DESCRIBING MOTION**

- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.
- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 8.P.2A.6: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Use mathematical and computational thinking to generate graphs that represent the motion of an objects position and speed as a function of time.
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.5.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use and manipulate appropriate metric units,
- 8.P.2A.7: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a

change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Use mathematical and computational thinking to describe the relationship between the speed and velocity (including positive and negative expression of direction) of an object in determining average speed (v=d/t).

Unit 6: Forces in Action

- **EFFECTS OF FORCES**
  - 8.P.2A.2: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Develop and use models to compare and predict the resulting effect of balanced and unbalanced forces on an objects motion in terms of magnitude and direction.
  - 8.P.2A.3: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Construct explanations for the relationship between the mass of an object and the concept of inertia (Newtons First Law of Motion).
  - 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
  - 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,

- 8.S.1A.6.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using predictions based on observations and measurements, or
- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
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- 8.P.2A.2: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can

be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Develop and use models to compare and predict the resulting effect of balanced and unbalanced forces on an objects motion in terms of magnitude and direction.

- 8.P.2A.5: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.5.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use and manipulate appropriate metric units,
- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or
- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by

scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.

GRAVITATIONAL FORCE

- 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.S.1A.5.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to use and manipulate appropriate metric units,
- 8.S.1A.4.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to reveal patterns and construct meaning or
- 8.S.1A.6.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using primary or secondary scientific evidence and models,
- 8.S.1A.6.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using predictions based on observations and measurements, or

- 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.
- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
- 8.P.2A.5: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.

Unit 7: Forces in the Solar System

- **SUN-EARTH-MOON SYSTEM**
  - 8.E.4B.2: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system

have effects that can be observed on Earth. Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth.

- 8.E.4B.4: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Develop and use models to explain how motions within the Sun-Earth-Moon system cause Earth phenomena (including day and year, moon phases, solar and lunar eclipses, and tides).
- 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,
- 8.E.4B.3: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Develop and use models to explain how seasons, caused by the tilt of Earths axis as it orbits the Sun, affects the length of the day and the amount of heating on Earths surface.
- 8.E.4B.2: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth.
- 8.E.4B.4: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Develop and use models to explain how motions within the Sun-Earth-Moon system cause Earth phenomena (including day and year, moon phases, solar and lunar eclipses, and tides).

- **OUR SOLAR SYSTEM**
  - 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific

thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or

- 8.S.1A.8.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to evaluate hypotheses, explanations, claims, or designs or
- 8.P.2A.5: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.
- 8.E.4B.2: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth.
- 8.E.4B.1: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Obtain and communicate information to model and compare the characteristics and movements of objects in the solar system (including planets, moons, asteroids, comets, and meteors).

Unit 8: Exploring the Universe

- **THE UNIVERSE**
  - 8.E.4A.1: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system is part of the Milky Way Galaxy, which is one of many galaxies in the universe. The planet Earth is a tiny part of a vast universe that has developed over a span of time beginning with a period of extreme and rapid expansion. Obtain and communicate information to model the position of the Sun in the universe, the shapes and

composition of galaxies, and the measurement unit needed to identify star and galaxy locations.

- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.E.4A.2: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system is part of the Milky Way Galaxy, which is one of many galaxies in the universe. The planet Earth is a tiny part of a vast universe that has developed over a span of time beginning with a period of extreme and rapid expansion. Construct and analyze scientific arguments to support claims that the universe began with a period of extreme and rapid expansion using evidence from the composition of stars and gases and the motion of galaxies in the universe.

- **THE SUN AND OTHER STARS**
  - 8.E.4B.6: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Analyze and interpret data from the surface features of the Sun (including photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth.
  - 8.S.1A.5.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to express relationships between variables for models and investigations, or
  - 8.P.2A.5: Physical Science: Forces and Motion The student will demonstrate an understanding of the effects of forces on the motion and stability of an object. Motion occurs when there is a change in position of an object with respect to a reference point. The final position of an object is determined by measuring the change in position and direction of the segments along a trip. While the speed of the object may vary during the total time it is moving, the average speed is the result of the total distance divided by the total time taken. Forces acting on an object can be balanced or unbalanced. Varying the amount of force or mass will affect the motion of an object. Inertia is the tendency of objects to resist any change in motion. Analyze and interpret

data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.

SPACE EXPLORATION

- 8.P.3A.6: Physical Science: Waves The student will demonstrate an understanding of the properties and behaviors of waves. Waves (including sound and seismic waves, waves on water, and light waves) have energy and transfer energy when they interact with matter. Waves are a repeating pattern of motion that transfers energy from place to place without overall displacement of matter. All types of waves have some features in common. When waves interact, they superimpose upon or interfere with each other resulting in changes to the amplitude. Major modern technologies are based on waves and their interactions with matter. Obtain and communicate information about how various instruments are used to extend human senses by transmitting and detecting waves (such as radio, television, cell phones, and wireless computer networks) to exemplify how technological advancements and designs meet human needs.
- 8.E.4A.1: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system is part of the Milky Way Galaxy, which is one of many galaxies in the universe. The planet Earth is a tiny part of a vast universe that has developed over a span of time beginning with a period of extreme and rapid expansion. Obtain and communicate information to model the position of the Sun in the universe, the shapes and composition of galaxies, and the measurement unit needed to identify star and galaxy locations.
- 8.E.4B.5: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Obtain and communicate information to describe how data from technologies (including telescopes, spectroscopes, satellites, space probes) provide information about objects in the solar system and the universe.
- 8.S.1A.1.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Ask questions to refine models, explanations, or designs, or
- 8.S.1A.2.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Develop, use, and refine models to test devices or solutions, or

- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
- 8.S.1A.8.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to evaluate hypotheses, explanations, claims, or designs or
- 8.S.1B.1.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. Technology is any modification to the natural world created to fulfill the wants and needs of humans. The engineering design process involves a series of iterative steps used to solve a problem and often leads to the development of a new or improved technology. Construct devices or design solutions using scientific knowledge to solve specific problems or needs: ask questions to identify problems or needs,
- 8.S.1B.1.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. Technology is any modification to the natural world created to fulfill the wants and needs of humans. The engineering design process involves a series of iterative steps used to solve a problem and often leads to the development of a new or improved technology. Construct devices or design solutions using scientific knowledge to solve specific problems or needs: ask questions about the criteria and constraints of the device or solutions,

Unit 9: Exploring Planet Earth

- **MODELS OF EARTH**
  - 8.S.1A.6.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop

understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct explanations of phenomena using data communicated in graphs, tables, or diagrams.

- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
- 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,
- 8.E.4B.4: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Develop and use models to explain how motions within the Sun-Earth-Moon system cause Earth phenomena (including day and year, moon phases, solar and lunar eclipses, and tides).

- **EARTH'S STRUCTURE AND CYCLES**
  - 8.E.5A.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Obtain and communicate information about the relative position, density, and composition of Earths layers to describe the crust, mantle, and core.
- **THE ROCK CYCLE**
  - 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific

thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,

- 8.E.5A.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Use the rock cycle model to describe the relationship between the processes and forces that create igneous, sedimentary, and metamorphic rocks.
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,

Unit 10: Earth's Plates

- **PLATE TECTONICS**
  - 8.E.5A.4.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the motion of lithospheric plates,
  - 8.E.5A.4.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the motion of lithospheric plates,
  - 8.E.5A.4.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life

on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the geologic activities at plate boundaries, and

- 8.E.5A.4.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the changes in landform areas over geologic time.
- 8.E.5B.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Analyze and interpret data to describe patterns in the location of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hot spots.
- 8.E.5B.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Construct explanations of how forces inside Earth result in earthquakes and volcanoes.
- 8.E.5A.5.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for the distribution of fossils on different continents,

- 8.E.5A.5.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for the occurrence of earthquakes, and
- 8.E.5A.5.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for continental and ocean floor features (including mountains, volcanoes, faults and trenches).
- 8.E.5B.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Analyze and interpret data to describe patterns in the location of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hot spots.

- **DEFORMING EARTH'S CRUST**
  - 8.E.5A.4.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the geologic activities at plate boundaries, and
  - 8.E.5A.4.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature,

the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the geologic activities at plate boundaries, and

- 8.E.5A.4.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct explanations for how the theory of plate tectonics accounts for the changes in landform areas over geologic time.

- **EARTHQUAKES AND VOLCANOES**

- 8.E.5A.5.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for the occurrence of earthquakes, and
- 8.E.5B.2: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Construct explanations of how forces inside Earth result in earthquakes and volcanoes.
- 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
- 8.E.5A.5.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within

and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for continental and ocean floor features (including mountains, volcanoes, faults and trenches).

- 8.E.5B.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Analyze and interpret data to describe patterns in the location of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hot spots.
- 8.E.5B.3: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Natural processes can cause sudden or gradual changes to Earths systems. Some may adversely affect humans such as volcanic eruptions or earthquakes. Mapping the history of natural hazards in a region, combined with an understanding of related geological forces can help forecast the locations and likelihoods of future events. Define problems that may be caused by a catastrophic event resulting from plate movements and design possible devices or solutions to minimize the effects of that event on Earths surface and/or human structures.

Unit 11: Earth's Resources

- **NATURAL RESOURCES**
  - 8.E.5C.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Humans depend upon many Earth resourcessome renewable over human lifetimes and some nonrenewable or irreplaceable. Resources are distributed unevenly around the planet as a result of past geological processes. Obtain and communicate information regarding the physical and chemical properties of minerals, ores, and fossil fuels to describe their importance as Earth resources.
  - 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
- **MINERALS**

- 8.E.5C.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. Humans depend upon many Earth resourcessome renewable over human lifetimes and some nonrenewable or irreplaceable. Resources are distributed unevenly around the planet as a result of past geological processes. Obtain and communicate information regarding the physical and chemical properties of minerals, ores, and fossil fuels to describe their importance as Earth resources.

Unit 12: Our Changing Planet

- **CLIMATE**
  - 8.S.1A.8.3: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to develop models,
  - 8.E.4B.3: Earth Science: Earths Place in the Universe The student will demonstrate an understanding of the universe and the predictable patterns caused by Earths movement in the solar system. Earths solar system consists of the Sun and other objects that are held in orbit around the Sun by its gravitational pull on them. Motions within the Earth-Moon-Sun system have effects that can be observed on Earth. Develop and use models to explain how seasons, caused by the tilt of Earths axis as it orbits the Sun, affects the length of the day and the amount of heating on Earths surface.
  - 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
  - 8.S.1A.7: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
  - 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific

thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,

- 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,
- 8.S.1A.8.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to evaluate hypotheses, explanations, claims, or designs or
- 8.E.6A.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations from evidence for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.
- 8.E.6B.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. Adaptation by natural selection acting over generations is one important process by which species change in response to changes in environmental conditions. The resources of biological communities can be used within sustainable limits, but if the ecosystem becomes unbalanced in ways that prevent the sustainable use of resources, then ecosystem degradation and species extinction can occur. Obtain and communicate information to support claims that natural and human-made factors can contribute to the extinction of species.

- **WEATHERING AND EROSION**
  - 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,

- 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,
- 8.E.5A.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Develop and use models to explain how the processes of weathering, erosion, and deposition change surface features in the environment.

- **GEOLOGIC TIME**
  - 8.S.1A.5.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Use mathematical and computational thinking to collect and analyze data,
  - 8.E.6A.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Analyze and interpret data from index fossil records and the ordering of rock layers to infer the relative age of rocks and fossils.
  - 8.E.6A.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations from evidence for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.

- 8.E.6A.1: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Develop and use models to organize Earths history (including era, period, and epoch) according to the geologic time scale using evidence from rock layers.
- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.S.1A.8.1: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to answer questions,
- 8.E.5A.5.1: Earth Science: Earth Systems and Resources The student will demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet. All Earth processes are the result of energy flowing and matter cycling within and among Earths systems. Because Earths processes are dynamic and interactive in nature, the surface of Earth is constantly changing. Earths hot interior is a main source of energy that drives the cycling and moving of materials. Plate tectonics is the unifying theory that explains the past and current crustal movements at the Earths surface. This theory provides a framework for understanding geological history. Construct and analyze scientific arguments to support claims that plate tectonics accounts for the distribution of fossils on different continents,
- 8.E.6A.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations from evidence for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.

- 8.E.6A.4.1: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of the diversity of life that has been present on Earth,
- 8.E.6A.4.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of relationships between past and existing life forms, and
- 8.E.6A.4.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of environmental changes that have occurred during Earths history.
- 8.E.6A.5: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations for why most individual organisms, as well as some entire taxonomic groups of organisms, that lived in the past were never fossilized.
- 8.E.6B.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. Adaptation by natural selection acting over generations is one important process by which species change in response to changes in environmental conditions. The resources of biological communities can be used within sustainable limits, but if the ecosystem becomes unbalanced in ways that prevent the sustainable use of resources, then ecosystem degradation and species extinction can occur. Obtain and communicate information to support claims that natural and human-made factors can contribute to the extinction of species.

Unit 13: Our Changing Biosphere

- **THEORY OF EVOLUTION**

- 8.E.6A.4.1: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of the diversity of life that has been present on Earth,
- 8.E.6A.4.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of environmental changes that have occurred during Earths history.
- 8.E.6A.3: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations from evidence for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.
- 8.E.6A.5: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct explanations for why most individual organisms, as well as some entire taxonomic groups of organisms, that lived in the past were never fossilized.
- 8.E.6B.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. Adaptation by natural selection acting over generations is one important process by which species change in response to changes in environmental conditions. The resources of biological communities can be used within sustainable limits, but if the ecosystem becomes unbalanced in ways that prevent the sustainable use of resources, then ecosystem degradation and species extinction

can occur. Obtain and communicate information to support claims that natural and human-made factors can contribute to the extinction of species.

- 8.S.1A.4.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to support hypotheses, explanations, claims, or designs.
- 8.S.1A.8.4: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to evaluate hypotheses, explanations, claims, or designs or
- 8.E.6A.4.2: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earths history. Analysis of rock strata and the fossil record, which documents the existence, diversity, extinction, and change of many life forms throughout history, provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earths varying geological conditions. Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of relationships between past and existing life forms, and

- **NATURAL SELECTION**
  - 8.E.6B.1: Earth Science: Earths History and Diversity of Life The student will demonstrate an understanding of Earths geologic history and its diversity of life over time. Adaptation by natural selection acting over generations is one important process by which species change in response to changes in environmental conditions. The resources of biological communities can be used within sustainable limits, but if the ecosystem becomes unbalanced in ways that prevent the sustainable use of resources, then ecosystem degradation and species extinction can occur. Construct explanations for how biological adaptations and genetic variations of traits in a population enhance the probability of survival in a particular environment.
  - 8.S.1A.8.2: Science and Engineering Practices The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content. The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers Obtain and evaluate scientific information to explain or describe phenomena,

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