

Science Tutorials offer targeted instruction, practice, and review designed to help students develop scientific literacy, deepen conceptual understanding, and apply scientific practices. 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 state standards.

### Unit 1: Nature of Science

- **WHAT IS SCIENCE?**

- ESS.6.2.2: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Construct an explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions.

- **TYPES OF INVESTIGATIONS**

- PS.6.1.3: Matter and its Interactions Understand the structure, states, and physical properties of matter. Carry out investigations to compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.

- **USING MODELS**

- LS.6.2.1: Ecosystems- Interactions, Energy, and Dynamics Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers.
- PS.6.3.1: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Use models of a simple wave to explain wave properties in seismic, light, and

sound waves that include: waves having a repeating pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.

- ESS.6.2.1: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.

## Unit 2: Measurement and Data

### • TOOLS AND MEASUREMENT

- PS.6.1.3: Matter and its Interactions Understand the structure, states, and physical properties of matter. Carry out investigations to compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.

### • DISPLAYING AND INTERPRETING DATA

- ESS.6.1.4: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.

## Unit 3: Nature of Matter

### • WHAT IS MATTER?

- PS.6.1.1: Matter and its Interactions Understand the structure, states, and physical properties of matter. Use models to illustrate that matter is made of atoms and elements, and are distinguished from each other by the types of atoms that compose them.

### • PROPERTIES OF MATTER

- PS.6.1.3: Matter and its Interactions Understand the structure, states, and physical properties of matter. Carry out investigations to compare the physical properties of pure substances that are independent of the amount of matter present including density, melting point, boiling point and solubility to properties that are dependent on the amount of matter present to include volume, mass and weight.

## Unit 4: Describing Matter

### • SOLIDS, LIQUIDS, AND GASES

- PS.6.1.2: Matter and its Interactions Understand the structure, states, and physical properties of matter. Use models to explain the relationship between changes in thermal energy in a substance and the motion of its particles (including phase changes).

### • CHANGES OF STATE

- PS.6.1.2: Matter and its Interactions Understand the structure, states, and physical properties of matter. Use models to explain the relationship between changes in thermal energy in a substance and the motion of its particles (including phase changes).

## Unit 5: Thermal Energy and Heat

- **HEAT AND THERMAL ENERGY**

- PS.6.2.1: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Use models to compare the directional transfer of heat energy of matter through convection, radiation, and conduction.

- **THERMAL ENERGY AND TEMPERATURE**

- PS.6.2.2: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Use models to explain how the transfer of heat and resulting change of temperature impacts the behavior of matter to include expansion, and contraction.
- PS.6.2.3: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Carry out investigations to compare the transfer of thermal energy in insulated and non-insulated materials (examples could include insulated box, solar cooker, or styrofoam cup).

- **ENERGY TRANSFER AND TECHNOLOGY**

- PS.6.2.3: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Carry out investigations to compare the transfer of thermal energy in insulated and non-insulated materials (examples could include insulated box, solar cooker, or styrofoam cup).
- PS.6.2.5: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Carry out investigations to explain the transfer of electrical energy in electrical circuits, to include how a circuit requires a complete loop through which an electrical current can pass.
- PS.6.2.4: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Engage in argument from evidence to classify materials as conductors and insulators of energy (both thermal and electrical).

## Unit 6: Waves

- **MECHANICAL WAVES**

- PS.6.3.3: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Carry out investigations to conclude the relationship between sound waves (including rate of vibration, the medium through which vibrations travel) and hearing.
- PS.6.3.1: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Use models of a simple wave to explain wave properties in seismic, light, and sound waves that include: waves having a repeating pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.

- **ELECTROMAGNETIC WAVES**

- PS.6.3.1: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Use models of a simple wave to explain wave properties in seismic, light, and

sound waves that include: waves having a repeating pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.

- PS.6.3.2: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Carry out investigations to conclude the relationship between the electromagnetic spectrum (including visible light) and sight.
- **INTERACTIONS OF WAVES AND MATTER**
- PS.6.3.4: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Use models to explain that various waves (seismic, sound, electromagnetic, including visible light) are reflected, absorbed or transmitted through various materials.
- PS.6.3.2: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible light), and sound waves. Carry out investigations to conclude the relationship between the electromagnetic spectrum (including visible light) and sight.

## Unit 7: Nature of Life

- **CHARACTERISTICS OF LIFE**
- LS.6.2.1: Ecosystems- Interactions, Energy, and Dynamics Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers.
- **CHEMISTRY OF LIFE**
- LS.6.2.1: Ecosystems- Interactions, Energy, and Dynamics Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers.
- PS.6.2.1: Energy Understand characteristics of thermal and electrical energy transfer and interactions of matter and energy. Use models to compare the directional transfer of heat energy of matter through convection, radiation, and conduction.

## Unit 8: Multicellular Bodies

- **SPECIALIZED CELLS AND TISSUES**
- LS.6.1.2: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Construct an explanation to compare how vascular and nonvascular plants obtain, transport, and use nutrients and water necessary for survival.
- **ORGANS AND ORGAN SYSTEMS**
- LS.6.1.2: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Construct an

explanation to compare how vascular and nonvascular plants obtain, transport, and use nutrients and water necessary for survival.

- LS.6.1.3: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Use models to summarize structural adaptations, processes, and responses that flowering plants use for defense, survival and reproduction.

### Unit 9: Reproduction and Response

- **PATTERNS OF REPRODUCTION**

- LS.6.1.3: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Use models to summarize structural adaptations, processes, and responses that flowering plants use for defense, survival and reproduction.

- **PLANT RESPONSES**

- LS.6.1.3: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Use models to summarize structural adaptations, processes, and responses that flowering plants use for defense, survival and reproduction.
- LS.6.1.1: From Molecules to Organisms- Structures and Processes Understand the structures, processes, and behaviors of plants that enable them to survive and reproduce. Use models to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.

### Unit 10: Ecology

- **CHARACTERISTICS OF ECOSYSTEMS**

- LS.6.2.2: Ecosystems- Interactions, Energy, and Dynamics Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. Analyze and interpret data to predict how the abiotic factors (such as temperature, water, sunlight, and soil quality) and biotic factors affect the ability of organisms to grow and survive in different biomes (freshwater, marine, temperate forest, rainforest, grassland, desert, taiga, tundra).

- **INTERACTIONS IN ECOSYSTEMS**

- LS.6.2.1: Ecosystems- Interactions, Energy, and Dynamics Understand the flow of energy through ecosystems and the responses of populations to the biotic and abiotic factors in their environment. Use models to summarize how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred to consumers and decomposers.

### Unit 11: Planet Earth

- **EARTH'S STRUCTURE AND CYCLES**

- PS.6.3.4: Waves and Their Applications in Technologies for Information Transfer Understand the properties of waves and the wavelike property of energy in seismic, electromagnetic (including visible

light), and sound waves. Use models to explain that various waves (seismic, sound, electromagnetic, including visible light) are reflected, absorbed or transmitted through various materials.

- ESS.6.2.1: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.
- ESS.6.2.3: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks).
- **THE ROCK CYCLE**
  - ESS.6.2.3: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks).
- **SOIL**
  - ESS.6.2.3: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks).
  - ESS.6.3.1: Earth and Human Activity Understand the reciprocal relationship between the lithosphere and humans. Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the lithosphere, maintaining soil quality and stewardship.

## Unit 12: Earth's Plates

- **PLATE TECTONICS**
  - ESS.6.2.2: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Construct an explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions.
- **EARTHQUAKES AND VOLCANOES**
  - ESS.6.2.2: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Construct an explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions.

## Unit 13: Our Changing Planet

- **DEFORMING EARTH'S CRUST**
  - ESS.6.2.2: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Construct an

explanation to illustrate how the movement of lithospheric plates can create geologic landforms and cause major geologic events such as earthquakes and volcanic eruptions.

- ESS.6.2.1: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to summarize the structure of the earth, including the layers, the mantle and core based on the relative position, composition and density.
- **WEATHERING AND EROSION**
- ESS.6.2.3: Earths Systems Understand the lithosphere and how interactions of constructive and destructive forces have resulted in changes in the surface of the earth over time. Use models to explain the rock cycle and its relationship to the formation of soil (including how different types of soil come from different types of rocks).
- **IMPACTS OF HUMANS**
- ESS.6.3.2: Earth and Human Activity Understand the reciprocal relationship between the lithosphere and humans. Obtain, evaluate, and communicate information to compare the implications of sustainable and unsustainable land use practices (including agriculture and deforestation) and the importance of stewardship.
- ESS.6.3.1: Earth and Human Activity Understand the reciprocal relationship between the lithosphere and humans. Engage in argument from evidence to explain that the good health of humans and the environment requires: monitoring of the lithosphere, maintaining soil quality and stewardship.

#### Unit 14: The Solar System

- **OUR SOLAR SYSTEM**
- ESS.6.1.3: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Use models to explain how the gravitational forces of the Sun and planets impact the structure of our solar system.
- ESS.6.1.4: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.
- ESS.6.1.2: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data to compare the planets in our solar system in terms of: size and gravitational force relative to Earth, surface and atmospheric features, relative distance from the sun, and ability to support life.
- **SUN-EARTH-MOON SYSTEM**
- ESS.6.1.1: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Use models to explain how the relative motion and relative position of the Sun, Earth and moon affect the seasons, tides, phases of the moon, and eclipses.

#### Unit 15: Exploring the Universe

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- **THE UNIVERSE**

- ESS.6.1.4: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.

- **OUR SUN AND OTHER STARS**

- ESS.6.1.4: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.

- **SPACE EXPLORATION**

- ESS.6.1.4: Earths Place in the Universe Understand the earth/moon/sun system, and the properties, structures and predictable motions of celestial bodies in the Universe. Analyze and interpret data from historical and ongoing space exploration to illustrate the size and scale of the components of our solar system, galaxy, and universe.