irtual Learning Academy
Jefferson County Educational Service Center
Academic Content Standards
Science 05

Lesson 01: Rocks and the Formation of Rocks

Rocks and the Formation of Rocks

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)
S05. Scientific Inquiry
A. Use appropriate instruments safely to observe, measure and collect data when conducting a scientific investigation. (03-05)
01. Select and safely use the appropriate tools to collect data when conducting investigations and communicating findings to others (e.g., thermometers, timers, balances, spring scales, magnifiers, microscopes and other appropriate tools). (05)
B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions. (03-05)
03. Use evidence and observations to explain and communicate the results of investigations. (05)
C. Develop, design and safely conduct scientific investigations and communicate the results. (03-05)
04. Identify one or two variables in a simple experiment. (05)
05. Identify potential hazards and/or precautions involved in an investigation. (05)
06. Explain why results of an experiment are sometimes different (e.g., because of unexpected differences in what is being investigated, unrealized differences in the methods used or in the circumstances in which the investigation was carried out, and because of errors in observations). (05)
S06. Scientific Ways of Knowing
B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions. (03-05)
04. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments). (05)
C. Explain the importance of keeping records of observations and investigations that are accurate and understandable. (03-05)
05. Keep records of investigations and observations that are understandable weeks or months later. (05)

Lesson 02: Volcanoes

Volcanoes

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)
S06. Scientific Ways of Knowing
B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions. (03-05)
04. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments). (05)

Lesson 03: Weathering

Weathering

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)
S05. Scientific Inquiry
B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions. (03-05)
03. Use evidence and observations to explain and communicate the results of investigations. (05)
S06. Scientific Ways of Knowing
C. Explain the importance of keeping records of observations and investigations that are accurate and understandable. (03-05)
05. Keep records of investigations and observations that are understandable weeks or months later. (05)

Lesson 04: Stars

Stars

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)

04. Explain that stars are like the sun, some being smaller and some larger, but so far away that they look like points of light. (05)
S05. Scientific Inquiry
B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions. (03-05)
02. Evaluate observations and measurements made by other people and identify reasons for any discrepancies. (05)
03. Use evidence and observations to explain and communicate the results of investigations. (05)
S06. Scientific Ways of Knowing
B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions. (03-05)
02. Develop descriptions, explanations and models using evidence to defend/support findings. (05)

Lesson 05: Earthquakes

Earthquakes

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)
S06. Scientific Ways of Knowing
B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions. (03-05)
04. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments). (05)

Lesson 06: Erosion

Erosion

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)

Lesson 07: Deposition

Deposition

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)
S05. Scientific Inquiry
B. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions. (03-05)
03. Use evidence and observations to explain and communicate the results of investigations. (05)
S06. Scientific Ways of Knowing
C. Explain the importance of keeping records of observations and investigations that are accurate and understandable. (03-05)
05. Keep records of investigations and observations that are understandable weeks or months later. (05)

Lesson 08: Mountain Building

Mountain Building

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)

Lesson 09: Galaxies

Galaxies

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
04. Explain that stars are like the sun, some being smaller and some larger, but so far away that they look like points of light. (05)

Lesson 10: The Solar System

The Solar System

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
01. Describe how night and day are caused by Earth's rotation. (05)
02. Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth. (05)

Lesson 11: The Moon and the Earth

The Moon and the Earth

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
01. Describe how night and day are caused by Earth's rotation. (05)
02. Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth. (05)

Lesson 12: The Earth's Movement

The Earth's Movements

Standard Benchmark and Indicator
S01. Earth and Space Sciences
A. Explain the characteristics, cycles and patterns involving Earth and its place in the solar system. (03-05)
01. Describe how night and day are caused by Earth's rotation. (05)
02. Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth. (05)
03. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis and spherical planet). (05)

Lesson 13: Problems and Solutions

Problems and Solutions

Standard Benchmark and Indicator
S04. Science and Technology
B. Describe and illustrate the design process. (03-05)
03. Explain how the solution to one problem may create other problems. (05)

Lesson 14: Refraction: Bent Light

Refraction: Bent Light

Standard Benchmark and Indicator
S03. Physical Sciences
F. Describe the properties of light and sound energy. (03-05)
05. Explore and summarize observations of the transmission, bending (refraction) and reflection of light. (05)

Lesson 15: Reflection: Bounced Light

Reflection: Bounced Light

Standard Benchmark and Indicator
S03. Physical Sciences
F. Describe the properties of light and sound energy. (03-05)
05. Explore and summarize observations of the transmission, bending (refraction) and reflection of light. (05)

Lesson 16: Nature of Sound

Nature of Sound

Standard Benchmark and Indicator
S03. Physical Sciences
F. Describe the properties of light and sound energy. (03-05)
06. Describe and summarize observations of the transmission, reflection, and absorption of sound. (05)
07. Describe that changing the rate of vibration can vary the pitch of a sound. (05)

Lesson 17: The Role of Producers

The Role of Producers

Standard Benchmark and Indicator
S02. Life Sciences
B. Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive. (03-05)
01. Describe the role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis. (05)

Lesson 18: Simple Food Chains and Food Webs

Simple Food Chains and Food Webs

Standard Benchmark and Indicator
S02. Life Sciences

B. Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive. (03-05)
03. Trace the organization of simple food chains and food webs (e.g., producers, herbivores, carnivores, omnivores and decomposers). (05)

Lesson 19: The Nature of Energy

The Nature of Energy

Standard Benchmark and Indicator
S03. Physical Sciences
D. Summarize the way changes in temperature can be produced and thermal energy transferred. (03-05)
01. Define temperature as the measure of thermal energy and describe the way it is measured. (05)

Lesson 20: The Nature of Energy Part II

The Nature of Energy (Part II)

Standard Benchmark and Indicator
S03. Physical Sciences
D. Summarize the way changes in temperature can be produced and thermal energy transferred. (03-05)
01. Define temperature as the measure of thermal energy and describe the way it is measured. (05)
02. Trace how thermal energy can transfer from one object to another by conduction. (05)

Lesson 21: The Nature of Energy – Electricity - Part 1

Electricity (Part 1)

Standard Benchmark and Indicator
S03. Physical Sciences
E. Trace how electrical energy flows through a simple electrical circuit and describe how the electrical energy can produce thermal energy, light, sound and magnetic forces. (03-05)
03. Describe that electrical current in a circuit can produce thermal energy, light, sound and/or magnetic forces. (05)

Lesson 22: The Nature of Energy – Electricity Part 2

Electricity (Part 2)

Standard Benchmark and Indicator
S03. Physical Sciences
E. Trace how electrical energy flows through a simple electrical circuit and describe how the electrical energy can produce thermal energy, light, sound and magnetic forces. (03-05)
03. Describe that electrical current in a circuit can produce thermal energy, light, sound and/or magnetic forces. (05)

Lesson 23: The Nature of Energy – Electricity Part 3

Electricity (Part 3)

Standard Benchmark and Indicator
S03. Physical Sciences
E. Trace how electrical energy flows through a simple electrical circuit and describe how the electrical energy can produce thermal energy, light, sound and magnetic forces. (03-05)
03. Describe that electrical current in a circuit can produce thermal energy, light, sound and/or magnetic forces. (05)
04. Trace how electrical current travels by creating a simple electric circuit that will light a bulb. (05)

Lesson 24: The Nature of Energy Electricity – Part 4

Electricity (Part 4)

Standard Benchmark and Indicator
S03. Physical Sciences
E. Trace how electrical energy flows through a simple electrical circuit and describe how the electrical energy can produce thermal energy, light, sound and magnetic forces. (03-05)
04. Trace how electrical current travels by creating a simple electric circuit that will light a bulb. (05)

Lesson 25: The Impact of Technology-Human Activity and Technology

The Impact of Technology - Human Activity and Techology

Standard Benchmark and Indicator
S04. Science and Technology
A. Describe how technology affects human life. (03-05)
01. Investigate positive and negative impacts of human activity and technology on the

environment. (05)

Lesson 26: The Impact of Technology-Engineering

The Impact of Technology - Engineering

Standard Benchmark and Indicator
S04. Science and Technology
B. Describe and illustrate the design process. (03-05)
02. Revise an existing design used to solve a problem based on peer review. (05)

Lesson 27: Change over Time

Change Over Time

Standard Benchmark and Indicator
S06. Scientific Ways of Knowing
A. Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained. (03-05)
01. Summarize how conclusions and ideas change as new knowledge is gained. (05)

Lesson 28: Scientific Ways of Knowing

Scientific Ways of Knowing

Standard Benchmark and Indicator
S06. Scientific Ways of Knowing
B. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions. (03-05)
03. Explain why an experiment must be repeated by different people or at different times or places and yield consistent results before the results are accepted. (05)

Lesson 29: The Work of Scientists

The Work of Scientists

Standard Benchmark and Indicator

careers in all fields of science. (03-05)
06. Identify a variety of scientific and technological work that people of all ages, backgrounds and groups perform. (05)

Lesson 30: Renewable and Non-renewable Resources

Renewable and Nonrenewable Resources

Standard Benchmark and Indicator
S01. Earth and Space Sciences
C. Describe Earth's resources including rocks, soil, water, air, animals and plants and the ways in which they can be conserved. (03-05)
05. Explain how the supply of many non-renewable resources is limited and can be extended through reducing, reusing and recycling but cannot be extended indefinitely. (05)

Lesson 31: Conservation of Renewable Resources

Conservation of Renewable Resources

Standard Benchmark and Indicator
S01. Earth and Space Sciences
C. Describe Earth's resources including rocks, soil, water, air, animals and plants and the ways in which they can be conserved. (03-05)
06. Investigate ways Earth's renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained. (05)

Lesson 32: Plants- What are They Good For?

Plants – What Are They Good For?

Standard Benchmark and Indicator
S02. Life Sciences
B. Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive. (03-05)
02. Explain how almost all kinds of animals' food can be traced back to plants. (05)

Lesson 33: Ecosystem

Ecosystem

Standard Benchmark and Indicator
S02. Life Sciences
C. Compare changes in an organism's ecosystem/habitat that affect its survival. (03-05)
04. Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms. (05)

Lesson 34: Biomes and Adaptations

Biomes and Adaptations

Standard Benchmark and Indicator
S02. Life Sciences
C. Compare changes in an organism's ecosystem/habitat that affect its survival. (03-05)
04. Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g., food, water, shelter, air, carrying capacity and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms. (05)
05. Support how an organism's patterns of behavior are related to the nature of that organism's ecosystem, including the kinds and numbers of other organisms present, the availability of food and resources, and the changing physical characteristics of the ecosystem. (05)

Lesson 35: Organisms and Environmental Change

Organisms and Environmental Change

Standard Benchmark and Indicator
S02. Life Sciences
C. Compare changes in an organism's ecosystem/habitat that affect its survival. (03-05)
06. Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g., beaver ponds, earthworm burrows, grasshoppers eating plants, people planting and cutting trees and people introducing a new species). (05)

Lesson 36: Final Exam