6th Grade Science

Link Community Charter School

UNITS (6/6 SELECTED)	SUGGESTED DURATION
Unit 1: Solar System and the Universe	*16 lessons*
Unit 2: Earth-Sun-Moon System	*13 lessons*
Unit 3: History of Earth	*13 lessons*
Unit 4: Plate Tectonics	*16 lessons*
Unit 5: Minerals and Rocks in the Geosphere	*16 lessons*
Unit 6: Weather in the Atmosphere	*19 lessons*

Unit 1: Solar System and the Universe

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS1-2
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3
Analyze and interpret data to determine scale properties of objects in the solar system.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS1.A.2
Earth and its solar sy stem are part of the Milky Way galaxy, which is one of many galaxies in the univ erse. (MS-ESS1-2)
ESS1.B.1
The solar sy stem consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its grav itational pull on them. (MS-ESS1-2),(MSESS1-3)
ESS1.B.3
The solar sy stem appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
3.1
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.
4.2
Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
4.4
Analyze and interpret data to provide evidence for phenomena.
2.5

Develop and/or use a model to predict and/or describe phenomena.

Unit 1: Solar System and the Universe

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
Scientists use evidence to piece together how celestial bodies formed (and continue to form), better understand our own origins, and discover how other planetary systems might support or develop life. In this topic, students examine the evidence and models that support scientists understanding of the universe.

Transfer
Students will be able to independently use their learning to explain what kind of data and evidence helps us to understand the universe.

Meaning	
Big Ideas & Understandings	**Essential Questions**
• Students analyze data to compare and contrast the planets and other objects in the solar system. • Students describe how technology is used to detect electromagnetic radiation and produce images in order to provide information about the universe. • Students classify stars based on their physical characteristics of absolute brightness, color, and temperature. They also learn the role gravity plays in the formation of a star. • Students learn the theory behind the formation of the universe and apply the concept of scientific notation as a means for scientists to measure the vastness of the universe.	Students will keep considering... • How do the characteristics of the planets, moons, and smaller objects in the solar system compare? • What is the role of gravity in the motions of planets, moons, and smaller objects in the solar system? • What are the relationships between the sun ad the planets in the solar system? • How does the electromagnetic spectrum help scientists learn about the universe • How do scientists use technology to learn about the universe? • What are the properties of a star? • How do scientists classify stars? • What is the role of gravity in the formation of a star? • How can we determine the sizes of and distances between stars and galaxies? • What makes up galaxies of different sized and shapes?

Acquisition	
Knowledge	**Skills**
Students will know the meanings for the following terms... • solar system, astronomical unit, sun, planet, moon, asteroid, meteoroids, comets • electromagnetic radiation, visible light, spectrum, wavelength, telescope • nebula, protostar, white dwarf, supernova, apparent brightness, absolute brightness • galaxy, universe, light-year, big bang	Students will be skilled at • developing models to predict and/or describe phenomena. • analyzing and interpreting data to determine similarities and difference in findings. • explaining the objects in our solar system are held in orbit around our sun by the sun's gravitational pull • recognizing that Earth and its solar system are part of the Milky Way galaxy. • using scale models to study phenomena that are too small or too large to directly examine. • understanding that models are limited because they can only represent certain aspects of a system.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Engage in Argument Rubric Construct Explanations Rubric Develop Models Rubric Connect to Technology Rubric Structure and Function Rubric Predict Rubric Energy and Matter Rubric Interpret Data Rubric Evaluate Information Rubric Cause and Effect Rubric Apply Concepts Rubric Systems Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 1: Solar System and the Universe

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - Solar System Objects

- Understanding the Solar System
- Structure of the Sun
- Features of the Sun
- Solar System Formation

Lesson 2 - Learning About the Universe

- Collecting Space Data
- History of Space Exploration

Lesson 3 - Stars

- Formation and Development of Stars
- Life Span
- Star Properties
- Classifying Stars

Lesson 4 - Galaxies

- From Stars to Galaxies
- The Universe
- Understanding the Universe

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

Unit 2: Earth-Sun-Moon System

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS1-1
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS1.A.1
Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observ ed, described, predicted, and explained with models. (MS-ESS1-1)
ESS1.B.2
This model of the solar sy stem can explain eclipses of the sun and the moon. Earth’s spin axis is fixed in direction ov er the short-term but tilted relativ e to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the y ear.(MS-ESS1-1)
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
2.5
Develop and/or use a model to predict and/or describe phenomena.
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
1.3
Patterns can be used to identify cause and effect relationships.

Unit 2: Earth-Sun-Moon System

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
In this topic, students explore how the sun and moon affect Earth. They will study how different objects, including the Earth, sun, and moon, move through space. Students will also see how the motion and position of Earth, the sun, and the moon affect each other.

Transfer
Students will be able to independently use their learning to explain how the sun and the moon affect Earth.

Meaning	
Big Ideas & Understandings	Essential Questions
• Students investigate the different objects seen in the night sky and how Earth, the sun, and other planets move through space. • Students investigate how Earth and the moon remain in orbit and how Earth's motion affects the amount of daylight and the seasons. • Students investigate how the sun and moon affect tides, the causes of different types of eclipses, and the phases of the moon.	Students will keep considering... • What objects can you see in the night sky? • Why do stars in the night sky seem to move? • How do objects in the solar system move? • How does Earth's motion affect the amount of daylight and the seasons? • Why do Earth and the moon remain in orbit? • Why does the moon appear to change shape? • What causes solar and lunar eclipses? • How do the sun and moon affect the tides?

Acquisition	
Knowledge	**Skills**
Students will know the meanings for the following terms... • satellite, star, planet, meteor, comet, constellation, geocentric, heliocentric, ellipse • axis, rotation, revolution, orbit, solstice, equinox,	Students will be skilled at... • developing models to predict and/or describe phenomena. • interpreting diagrams of natural phenomena to

Acquisition	
gravity, law of universal gravitation, inertia • phase, eclipse, umbra, penumbra, tide, spring tide, neap tide	identify temporal and spatial relationships. • describing and predicting movements of the sun, the moon, and the stars. • explaining how a model of our solar system can explain eclipses of the sun and moon. • recognize that patterns can be sued to identify cause-and-effect relationships. • using models of systems to demonstrate the interactions occurring within them.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Infer Rubric Construct Explanations Rubric Cause and Effect Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 2: Earth-Sun-Moon System

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - Movement in Space

- The Night Sky
- Movement in the Sky
- Models of the Solar System

Lesson 2 - Earth's Movement in Space

- How Earth Moves
- The Seasons
- Gravity and Orbits

Lesson 3 - Phases and Eclipses

- The Appearance of the Moon
- Eclipses
- Tides

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

Unit 3: History of Earth

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS1-4
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS1.C.1
The geologic time scale interpreted from rock strata provides a way to organize Earth’s history . Analyses of rock strata and the fossil record prov ide only relative dates, not an absolute scale. (MS-ESS1-4)
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
3.1
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
6.3
Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students’ own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Unit 3: History of Earth

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
The long history of Earth, its geologic features, and its living organisms frames this topic. By studying the ages of rocks and arranging living things and geologic events into a timeline, students recognize just how deep time is and how geologic events have impacted the evolution of living things.

Transfer
Students will be able to independently use their learning to organize Earth's past events.

Meaning	
Big Ideas & Understandings	**Essential Questions**
• Students investigate the different ways to determine the relative and absolute ages of rock layers, as well as events that can affect those layers. • Students model the long history of Earth, first into eras, then into periods, each marked by its own unique organisms and geologic features. • Students investigate how major events in Earth's history have shaped evolution as well as geologic features and provided the beginning and ending points of eras and periods.	Students will keep considering... • How do geologists describe the ages of rocks? • How do geologist determine the relative ages of rocks? • How do geologists determine the absolute ages of rocks? • What is the purpose of the geologic time scale? • How do events help geologists define and divide geologic time? • How did Earth change in the Paleozoic era? • How did Earth change in the Mesozoic era? • How did Earth change in the Cenozoic era?

Acquisition	
Knowledge	**Skills**
Students will know the meanings for the following terms...	Students will be skilled at...

Acquisition	
• relative age, absolute age, law of superposition, fossil, unconformity, radioactive decay, radioactive dating • geologic time scale, era, period • invertebrate, amphibian, reptile, mass extinction, mammal	• interpreting graphical displays of data to identify relationships among organisms. • applying scientific reasoning to explain why evidence is adequate to support a conclusion. • constructing an argument supporting a model for a natural phenomenon. • recognizing that the geological time scale can be inferred from layers of rock. • using patterns to draw scientific conclusions. • understanding that geologic periods are not drawn to scale in timelines of Earth's history.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Construct Explanations Rubric Apply Scientific Reasoning Rubric Evaluate Information Rubric Construct Explanations Rubric Stability and Change Rubric Cite Evidence Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 3: History of Earth

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - Determining Ages of Rocks

- Describing the Ages of Rocks
- Determining Relative Ages of Rocks
- Determining Absolute Ages of Rocks

Lesson 2 - Geologic Time Scale

- The Geologic Time Scale
- Dividing Geologic Time

Lesson 3 - Major Events in Earth's History

- Major Events in the Paleozoic Era
- Major Events in the Mesozoic Era
- Major Events in the Cenozoic Era

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

Unit 4: Plate Tectonics

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS2-2
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
MS-ESS3-2
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS1.C.2
Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3)
ESS2.B.1
Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)
ESS2.A.2
The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)
ESS3.B.1
Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
1.2
Patterns in rates of change and other numerical relationships can provide information about natural and human designed systems.

3.1
Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.
1.4
Graphs, charts, and images can be used to identify patterns in data.
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
6.3
Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
4.7
Analyze and interpret data to determine similarities and differences in findings.

Unit 4: Plate Tectonics

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
Throughout this topic, students evaluate evidence of plate motion and the continued impact of plate tectonics on Earth's surface. Students recognize the relationship between plate boundaries and the resulting changes to Earth's surface over varying time scales.

Transfer
Students will be able to independently use their learning to explain how geological processes change Earth's surface.

Meaning	
Big Ideas & Understandings	**Essential Questions**
• Students investigate evidence that supports the hypothesis of continental drift and the existence of Pangaea. • Students examine how convection drives plate motion and how the movement of Earth's plates has greatly changed the locations of the continents and the size and shape of the ocean basins. Students learn the ways that plates move at plate boundaries. • Students learn how tension, shearing, and compression produce faults and other features. Students then analyze these features and events at Earth's surface to determine their relationship with plate boundaries.	Students will keep considering... • What evidence supported the hypothesis of continental drift? • What roles do mid-ocean ridges and ocean trenches play in the movement of plates? • How do Earth's plates move? • How do Earth's surface features support the theory of plate tectonics? • What are the products of plate movement at different scales? • How do plate movement and stress produce new landforms? • What are earthquakes and tsunamis, and why do they occur? • How can the effects of earthquakes and tsunamis be mitigated?

Acquisition	
Knowledge	**Skills**

Acquisition	
Students will know the meanings for the following terms... • mid-ocean ridge, sea-floor spreading, subduction, ocean trench • divergent boundary, convergent boundary, transform boundary • stress, tension, compression, shearing, fault, earthquake, magnitude, tsunami	Students will be skilled at... • interpreting diagrams to identify temporal and spatial relationships. • constructing a scientific explanation based on valid and reliable data. • recognizing that energy flows and matter cycles within and among Earth's systems. • understanding that Earth's plates have moved great distances, collided, and spread apart. • recognizing that mapping the history of previous hazards can help scientists forecast the likelihood of future hazards. • understanding that patterns can reveal past and present events in geological history. • using proportional relationships to gather information about the magnitude of a process.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Cause and Effect Rubric Infer Rubric Use Mathematics Rubric Connect to Nature of Science Rubric Stability and Change Rubric Interpret Data Rubric Structure and Function Rubric Develop Models Rubric Construct Explanations Rubric Model Phenomena Rubric Explain Phenomena Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 4: Plate Tectonics

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - Evidence of Plate Motions

- Hypothesis of Continental Drift
- Mid-Ocean Ridges
- Sea-Floor Spreading
- Ocean Trenches

Lesson 2 - Plate Tectonics and Earth's Surface

- The Theory of Plate Tectonics
- Plate Boundaries

Lesson 3 - Earthquakes and Tsunami Hazards

- Stress and Earth's Crust
- New Landforms From Plate Movement
- Earthquakes
- Earthquake Risks and Tsunamis

Lesson 4 - Volcanoes and Earth's Surface

- Volcanoes
- Volcanoes and Plate Boundaries
- Volcano Landforms
- Volcano Hazards

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

Unit 5: Minerals and Rocks in the Geosphere

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS2-1
Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS2.A.1
All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
MS-ESS3-1
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
ESS3.A.1
Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
7.1
Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales, including the atomic scale.
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
2.5
Develop and/or use a model to predict and/or describe phenomena.

Unit 5: Minerals and Rocks in the Geosphere

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
Earth processes are at the center of this topic. Students learn the processes by which rocks and minerals form and how they are recycled as a result of energy flow.

Transfer
Students will be able to independently use their learning to construct explanations for how events formed Earth's rocks.

Meaning

Big Ideas & Understandings	Essential Questions
• Students investigate how scientists study Earth's materials and model its layers. • Students study the processes that form minerals and the characteristics and properties of minerals. • Students study the three basic types of rocks and how rocks form. • Students investigate the materials that make up Earth, how they are continuously cycled, and what energy flows drive Earth's processes.	Students will keep considering... • How do geologists study Earth's layered interior? • What roles do heat and pressure in Earth's interior play in the cycling of matter? • What are the patterns and effects of convection in Earth's mantle? • What are the characteristics and properties of minerals? • What processes result in the formation of minerals? • What processes explain the distribution of mineral resources on Earth? • What are the three major types of rocks and how do they form? • How is the formation of rocks the result of the flow of energy and cycling of matter within Earth? • How are Earth's materials cycled in the rock cycle? • How does the flow of energy drive the processes of the rock cycle?

Acquisition	
Knowledge	**Skills**
Students will know the meanings for the following terms... • seismic wave, crust, mantle, outer core, inner core • mineral, crystal, crystallization • igneous rock, sedimentary rock, sediment, metamorphic rock • rock cycle	Students will be skilled at... • developing models to predict and/or describe phenomena. • applying scientific evidence to build an explanation for a natural phenomenon. • recognizing that Earth's history has been shaped over billions of years. • understanding that resources derived from the geosphere are limited and ay not be renewable. • describing how the transfer of energy drives processes such as the rock cycle. • explaining that stability can be disturbed by sudden events or gradual changes over time.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Construct Explanations Rubric Evaluate Evidence Rubric Cause and Effect Rubric Develop Models Rubric Analyze Properties Rubric Use Models Rubric Analyze Data Rubric Identify Patterns Rubric Construct Explanations Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 5: Minerals and Rocks in the Geosphere

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - Earth's Interior

- Learning about Earth's Interior
- Earth's Layers
- Movement in Earth's Mantle

Lesson 2 - Minerals

- Defining Minerals
- Mineral Formation

Lesson 3 - Rocks

- Describing Rocks
- How Rocks Form

Lesson 4 - Cycling of Rocks

- The Cycling of Earth's Materials

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications

Unit 6: Weather in the Atmosphere

6th Grade Science - *Last Updated on August 6, 2021*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades 6-8 - Science (2020)
MS-ESS2-4
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-5
Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
MS-ESS3-2
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
MS-PS1-4
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
MS-ESS2-6
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
Next Generation Science (NGSS) - Middle School - Earth and Space Sciences - Disciplinary Core Ideas
ESS2.C.2
The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MSESS2-5)
ESS2.D.2
Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5)
ESS3.C.1
Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)
ESS3.C.2

Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MSESS3-3),(MS-ESS3-4)
ESS2.C.1
Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)
ESS2.C.4
Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)
ESS2.D.1
Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)
ESS2.D.3
The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)
Next Generation Science (NGSS) - Middle School - Physical Sciences - Disciplinary Core Ideas
PS1.A.3
Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)
PS1.A.4
In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)
PS1.A.6
The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)
Next Generation Science (NGSS) - Grade 6-8 - Crosscutting Concepts
2.2
Cause and effect relationships may be used to predict phenomena in natural or designed systems.

4.2
Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.
5.2
Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.
Next Generation Science (NGSS) - Middle School - Science and Engineering Practices
2.5
Develop and/or use a model to predict and/or describe phenomena.
3.4
Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions.

Unit 6: Weather in the Atmosphere

6th Grade Science - *Last Updated on August 6, 2021*

DESIRED RESULTS

Established Goals
The impact of weather and climate on severe storms is the context of this topic. While studying the water in the atmosphere and the interaction between air masses, students recognize the direct relationship between weather and climate.

Transfer
Students will be able to independently use their learning to construct explanations for what determines weather on Earth.

Meaning

Big Ideas & Understandings	Essential Questions
• Students investigate the composition and structure of Earth's atmosphere and the way that energy from the sun affects Earth's atmosphere. • Students investigate how water is always moving between the surface of Earth and the atmosphere, the processes that drive the water cycle, and how the water cycle affects the weather. • Students investigate the movement of air masses of different temperatures and humidities to identify the type of fronts and the types of weather that can develop. • Students learn how meteorologists use direct observations, pattern analysis, and technology to predict the weather. • Students examine and describe damage associated with sever storms, as well as measures that can be taken to ensure safety in a storm.	Students will keep considering... • What is the composition and structure of Earth's atmosphere? • How does energy from the sun affect Earth's atmosphere? • What processes make up the water cycle? • How does energy drive the processes of the water cycle? • How does the water cycle affect weather? • How do global patterns such as the jet stream, affect air masses? • How do air masses interact to form fronts? • How do the interactions of air masses result in changes in weather? • How do meteorologists use the interactions of air masses to forecast changes in weather? • How does technology aid in collecting and analyzing weather data? • How do weather maps help to model current weather and predict future weather?

Meaning	
	• How does sever weather affect human life? • How do humans protect themselves from sever weather?

Acquisition	
Knowledge	**Skills**
Students will know the meanings for the following terms... • atmosphere, air pressure, altitude, wind • water cycle, evaporation, condensation, dew point, humidity, relative humidity, precipitation • air mass, jet stream, front, cyclone, anticyclone • meteorologist • storm, thunderstorm, hurricane, tornado, storm surge, flood, drought	Students will be skilled at... • developing models to predict and/or describe natural phenomena. • evaluating the accuracy of data collection methods. • using graphical displays such as maps to identify temporal and spatial relationships in phenomena. • understanding how the movement of water in the atmosphere influences local weather conditions. • understanding that because weather patterns are so complex, storm predictions are based on probabilities. • learning that mapping the history of natural hazards such as floods can help forecast the locations of future events. • using cause-and-effect-relationships to predict phenomena in natural systems. • recognizing that models are limited because they can only represent certain parts of a system. • following the transfer of energy as it travels within natural systems.

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists: Construct Explanations Rubric Develop Models Rubric Systems Rubric Cause and Effect Rubric Patterns Rubric Draw Conclusions Rubric System Models Rubric Explain Phenomena Rubric Construct Arguments Rubric Apply Scientific Reasoning Rubric	Performance Task(s): • uConnect Labs • uDemonstrate Labs • Interactivities • Hands-On Labs • uInvestigate Labs • Lesson Check • Lesson Quiz • Quest Check-In • Case Study • Topic Review and Assess • Topic Test • Quest Findings
	Other Evidence: • Reading Checks • Checking for Understanding Figures • Model It! • Math Toolbox • Connect It! • Plan it!

Unit 6: Weather in the Atmosphere

6th Grade Science - *Last Updated on August 6, 2021*

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Lesson 1 - The Atmosphere Around You

- Earth's Insulator
- Energy in the Atmosphere

Lesson 2 - Water in the Atmosphere

- Water Enters the Atmosphere
- Water Leaves the Atmosphere
- The Water Cycle

Lesson 3 - Air Masses

- Major Air Masses
- Types of Fronts
- Cyclones and Anticyclones

Lesson 4 - Predicting Weather Changes

- How to Predict Weather
- Learning from Weather Maps

Lesson 5 - Sever Weather and Floods

- Types of Severe Storms
- Floods and Droughts
- Storm Safety

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

Click here to view all possible modifications