6th Grade Science

Science

Grade(s) 6th, Duration 1 Year, 1 Credit
Required Course

Course Overview

Earth Science is the study of Earth's systems. The students will learn how to observe, predict, study, and question. Emphasis will be placed on the development of lab skills. Students will be encouraged to "think like scientists" and investigate issues to determine a conclusion on their own. This course covers topics in the Water Cycle, Weather and Climate, Geoscience, The Solar System, and Human Impact.

Scope And Sequence

Timeframe	Unit	Instructional Topics
1 Week(s)	Lab Safety	1. Lab Safety Lab
7 Week(s)	Earth's Place in the Universe	1. The Solar System (ESS1.A.2) 2. Formation & Motion of Galaxies (ESS1.A.3) 3. The Earth, Sun, & Moon Systems (ESS1.A.1) 4. Tying it all together (ESS1.B.1)
7 Week(s)	Geology	1. Earth Materials (ESS2.A.1) 2. Plate Tectonics (ESS2.B.1) 3. Geologic History of the Earth (ESS1.C.1) 4. Geoscience (ESS2.A.2)
9 Week(s)	Weather and Climate	1. The Water Cycle (ESS2.C.1) 2. Predicting Weather (ESS2.C.2) 3. Influences of Weather & Climate (ESS2.C.3)
10 Week(s)	Human Impact on the Environment	1. Natural Hazard Predictions (ESS3.B.1) 2. Human Activities and Global Climate Change (ESS3.D.1) 3. Human Impact on the Environment (ESS3.C.1) 4. Human Dependence on Natural Resources (ESS3.A.1) 5. Human Impact Tying it all Together (ESS3.C.2)
Ongoing	Scientific Method and Research	1. Scientific Method 2. Science Fair 3. Science Fair

Materials and Resources

Stemscopes
Vocab Sheets
Graphic Organizers
K-W-L Charts

Course Details

Unit: Lab Safety

Duration: 1 Week(s)

Unit Description

Lab Safety and Introductions

Topic: Lab Safety Lab

Duration: 1 Day(s)

Topic Description (short)

Students will explore where lab safety equipment is and how to use it properly.

Materials and Resources

Lab Safety Expectations

Unit: Earth's Place in the Universe

Duration: 7 Week(s)

Unit Description

Earth's Place in the Universe

Enduring Understandings (Knowledge & Skills)

Analyze and interpret data to determine scale properties of objects in the solar system.
Explain the cyclical pattern of seasons using a model of the Earth-Sun system.
Develop and use a model to describe how gravity affects the solar system.
Explain the cyclic patterns of lunar phases and eclipses of the sun and moon using a model.

Academic Vocabulary

Lunar Eclipse

Solar Eclipse
Partial solar eclipse
total solar eclipse
equinox
solstice
inertia
astronomical unit (AU)

Summative Assessment
Pre-test
Formative 1
Formative 2
Formative 3
Post test

Materials and Resources (optional)
Stemscopes

Teacher Created Resources

Topic: The Solar System (ESS1.A.2)

Duration: 2 Week(s)

Topic Description (short)
The Earth's seasons are caused by Earth' movement in relation to the Sun.

Formative Assessment
Pre-Assessment: Solar System Objects
Formative 1: Model Construction

Materials and Resources
Stemscopes:The Solar System

Teacher's resources:
https://nasaeclips.arc.nasa.gov/video/ourworld/our-world-suns-position
Name that Season Sort Activity
Earth's Seasons

Learning Targets
ESS1.A.2 Develop and use a model of the Earth-sun system to explain the cyclical pattern of seasons, which includes the Earth's tilt and directional angle of sunlight on different areas of Earth across the year.

Learning Targets linked to Priority Standard = ✣

Topic: Formation & Motion of Galaxies (ESS1.A.3)

Duration: 2 Week(s)

Topic Description (short)
The role of gravity in the motions within galaxies and the solar system.

Formative Assessment
Formative 2: TYC 8998-760-1 System

Materials and Resources
Stemscopes:
Formation & Motion of Galaxies

Teacher's Resources:
Gravity Quiz
Modeling Orbits Lab
Gravity within Galaxies and the Solar System Activity

Learning Targets
ESS1.A.3 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

Learning Targets linked to Priority Standard = ✣

Topic: The Earth, Sun, & Moon Systems (ESS1.A.1)

Duration: 2 Week(s)

Topic Description (short)
Use the Earth-sun-moon system to explain the cyclic patterns of lunar phases and eclipses of the sun and moon.

Formative Assessment
Formative 3: Moon Phases

Materials and Resources

Stemscopes: The Earth, Sun, & Moon Systems

Teacher's Resources:
The Earth-Sun-Moon System
Modeling the Earth-Moon System Activity
Moon Phases Activity

Learning Targets

ESS1.A.1 Develop and use a model of the Earth-sun-moon system to explain the cyclic patterns of lunar phases and eclipses of the sun and moon.

Learning Targets linked to Priority Standard = ✣

Topic: Tying it all together (ESS1.B.1)

Duration: 1 Week(s)

Topic Description (short)

Analyze and interpret data to determine scale properties of objects in the solar system.

Formative Assessment

Post Assessment: Solar System Objects

Learning Targets

ESS1.B.1
Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.]

Learning Targets linked to Priority Standard = ✣

Unit: Geology

Duration: 7 Week(s)

Unit Description

Investigate how convection currents drive formation of the surface
Create a demonstration of how the surface of the Earth constantly changes through geological processes
Compare and contrast land and ocean layer formation
Summarize plate tectonics and the movement of continents
Apply the Law of Super positioning to evaluate rock layer formation

Enduring Understandings (Knowledge & Skills)

How geological processes shape the Earth.
Why the flow of energy and the cycling of matter alters the Earth’s crust?
How do Fossils supply evidence about the geological history of Earth?
How do Humans and global climate change negatively impact the geology of the Earth?

Academic Vocabulary

Constructive forces
Destructive Forces
Hydrosphere
Biosphere
Geosphere / Lithosphere
Atmosphere
Magnetic Field
Crust
Mantle
Inner Core
Outer Core
Pressure
Chemical weathering
Mechanical weathering
Erosion
Deposition
Density
Convection currents
Continental Drift
Pangea
Carbon dating
Fossils
Transform boundaries
Convergent boundaries
Divergent boundaries
Earthquakes
Volcanoes
Focus

Epicenter
Subduction

Materials and Resources (optional)
Stemscope

Teacher created resources

Topic: Earth Materials (ESS2.A.1)

Duration: 2 Week(s)

Topic Description (short)
Energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean seafloor at ridges, submergence of ocean seafloor at trenches, mountain building and active volcanic chains.

Formative Assessment
Pre-Test
Formative 1: Continental Drift Worksheet

Materials and Resources
Stemscopes:
Earth Materials
Weathering & Erosion

Teacher's Resources:
Spheres of the Earth Slides
Earth's Spheres interaction worksheet
History of Earth Slides
Geologic Time WebQuest
Starburst Rock Cycle Activity
Pangaea Interactive Slides
Continental Drift Worksheet

Learning Targets
ESS2.A.1 Develop and use a model to illustrate that energy from the Earth's interior drives convection which cycles Earth's crust leading to melting, crystallization, weathering and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building and active volcanic chains.

Learning Targets linked to Priority Standard = ✣

Topic: Plate Tectonics (ESS2.B.1)

Duration: 2 Week(s)

Topic Description (short)
fossils and rocks, continental shapes, and seafloor structures

Formative Assessment
Formative 2: Earthquake Safe/Resistant Engineering Lab

Materials and Resources
Stemscopes:
Plate Tectonics
Sea floor spreading

Teacher Resources:
Earth's Layers Activity
Introducing Earth Powerpoint
Plate Tectonics Slide show
Oreo Cookie Tectonic Plates Lab
Earth Quake Slides
Earthquake Safe/Resistant Engineering Lab

Learning Targets
ESS2.B.1 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Learning Targets linked to Priority Standard = ✣

Topic: Geologic History of the Earth (ESS1.C.1)

Duration: 2 Week(s)

Formative Assessment
Formative 3: Volcano/Earth Quake Project

Materials and Resources

Stemscopes:
Geologic History of Earth

Teacher's Resources:
Volcano Slides?
Volcano worksheet
Volcano/Earth Quake Project

Learning Targets
ESS1.C.1 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's history.

Learning Targets linked to Priority Standard = ✙

Topic: Geoscience (ESS2.A.2) **Duration:** 1 Week(s)

Topic Description (short)
how geoscience processes have changed Earth's surface at varying time and spatial scales

Formative Assessment
Post test

Materials and Resources
Stemscopes:
Weathering & Erosion
Geoscience Process

Learning Targets
ESS2.A.2
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

Learning Targets linked to Priority Standard = ✙

Unit: Weather and Climate **Duration:** 9 Week(s)

Unit Description
Earth Systems- Factors affecting global weather and climate

Academic Vocabulary
thermal energy
greenhouse effect
air masses

Topic: The Water Cycle (ESS2.C.1) **Duration:** 3 Week(s)

Topic Description (short)
The cycling of water through Earth's systems driven by energy from the sun and the force of gravity

Formative Assessment
Pre-Assessment
Formative 1: Create model of water cycle

Materials and Resources
Stemscopes:
Teacher's Resources:
Water Cycle video (Edpuzzle or Youtube)
Water cycle activity

Learning Targets
Design and develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

Learning Targets linked to Priority Standard = ✙

Topic: Predicting Weather (ESS2.C.2) **Duration:** 3 Week(s)

Topic Description (short)
How the motions and complex interactions of air masses result in changes in weather conditions.

Formative Assessment
Formative 2: describe how air masses will move to affect weather

Materials and Resources

Stemscopes:
Predicting Weather

Teacher's Resources:
Interactive Weather simulator from the Smithsonian Institute
Weather Tools Presentation

Learning Targets
ESS2.C.2
Research, collect, and analyze data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

Learning Targets linked to Priority Standard = ✙

Topic: Influences of Weather & Climate (ESS2.C.3) **Duration:** 3 Week(s)

Topic Description (short)
How unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Formative Assessment
Formative 3:
Post-test:

Materials and Resources
Stemscopes:
Ocean Currents
Influences of Weather & Climate

Teacher's Resources:
compare the temperatures of cities on the same latitudes activity
Convection Currents Lab

Learning Targets
ESS2.C.3
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.

Learning Targets linked to Priority Standard = ✙

Unit: Human Impact on the Environment

Duration: 10 Week(s)

Unit Description
Natural disasters and human's impact on the environment

Enduring Understandings (Knowledge & Skills)
Analyze evidence to identify factors that have caused changes in global temperatures over the past century.
Explain the cause and effect of human population increase on the consumption of natural resources.
Critique technology used to mitigate the effects of natural hazards.
Interrupt data mapping the natural hazards of one specific region over time.
Classify renewable and non-renewable resources.
Construct an explanation of how human activity and geoscience processes cause uneven distribution of earth’s resources.
Evaluate and design solutions to minimize human impact on the environment.

Academic Vocabulary
global climate change
global warming
greenhouse gasses
atmosphere
carbon footprint
green energy
fresh water crisis
fossil fuels
phenomena
consumption
weathering
erosion
natural hazards
non-renewable resources

Topic: Natural Hazard Predictions (ESS3.B.1) **Duration:** 2 Week(s)

Topic Description (short)
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate

their effects.

Formative Assessment
Pre-Test:
Formative 1:

Materials and Resources
Stemscopes:
Natural Hazard Predictions

Teacher's Resources:
Natural Disasters Plan

Learning Targets
SC.6-8.ESS3.B.1 -- Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

Learning Targets linked to Priority Standard = ✣

Topic: Human Activities and Global Climate Change (ESS3.D.1)

Duration: 2 Week(s)

Topic Description (short)
evidence of the factors that have caused the change in global temperatures over the past century.

Formative Assessment
Formative 2:

Materials and Resources
Stemscopes:
Human Activities & Global Climate Change

Teacher's Resources:
Climate Time Machine
Factors of Global Climate Change Project

Learning Targets
ESS3.D.1
Analyze evidence of the factors that have caused the change in global temperatures over the past century

Learning Targets linked to Priority Standard = ✣

Topic: Human Impact on the Environment (ESS3.C.1)

Duration: 3 Week(s)

Topic Description (short)
The relationship for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

Formative Assessment
Formative 3:

Materials and Resources
Stemscope:
Human Impact on the Environment

Teacher's Resources:
Human Impact Worksheet
Average Global Temperature Worksheet

Learning Targets
ESS3.C.1
Analyze data to define the relationship for how increases in human population and per-capita consumption of natural resources impact Earth's systems

Learning Targets linked to Priority Standard = ✣

Topic: Human Dependence on Natural Resources (ESS3.A.1)

Duration: 2 Week(s)

Topic Description (short)
The uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes and

human activity.

Materials and Resources
Stemscopes:
Human Dependence on Natural Resources

Teacher's Resources:
Uneven Distribution of Earth's Resources Slides

Learning Targets
ESS3.A.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 and human activity.

Learning Targets linked to Priority Standard =

Topic: Human Impact Tying it all Together (ESS3.C.2) **Duration:** 1 Week(s)

Topic Description (short)
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Formative Assessment
Post-Test

Materials and Resources
Teacher's Resources:
Human Impact Lab

Learning Targets
ESS3.C.2
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Learning Targets linked to Priority Standard =

Unit: Scientific Method and Research **Duration:** Ongoing

Topic: Scientific Method **Duration:** 1 Week(s)

Topic Description (short)
A deep dive into the scientific method and its application. A Comparison of CER to the Method.

Learning Targets
SC.6-8.ETS1.A.1 -- Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
SC.6-8.ETS1.B.1 -- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
SC.6-8.ETS1.B.2 -- Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
SC.6-8.ETS1.B.3 -- Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Learning Targets linked to Priority Standard =

Topic: Science Fair **Duration:** 2 Week(s)

Topic Description (short)
Student self study on approved science fair project. Projects to be presented by student to class. Contest teams selected from this project for Kaysinger Science Fair.

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