

## **COURSE INFORMATION**

Grade Level:	8: Earth Science
Length:	1 Year (180 days)
Period(s) Per Day:	1 (46 minutes)

## **ESSENTIAL UNDERSTANDING:**

*Earth Science is an exploration of the Earth and space as well as the theories relating to their formations and dynamics. In earth science, students will learn about the following topics: Earth's systems, the history of the Earth, Earth's changing surface, weather and climate, space systems, and human impact on the Earth. Students will explore and gain a detailed understanding of these topics through a variety of different labs, activities, reading assignments, group and individual projects, performance tasks, quizzes, tests, and alternative assessments.*

## **THEME SAMPLES:**

1. Exploring Earth
2. Geologic Changes
3. Weather and Climate
4. Water and Other Resources
5. Exploring the Universe

## **Course Objectives and Expectations:**

1. Apply the scientific method and scientific principles to answer questions and solve problems in the natural world/universe.
2. Develop and use models to describe events, objects, systems, and their interactions.
3. Identify, describe, and explain Earth's place in the universe.
4. Apply cause and effect relationships to predict phenomena in natural systems.
5. Identify and describe patterns in the universe and determine the cause/effect of these patterns.
6. Use data and models to make predictions.
7. Analyze and interpret data to determine similarities and differences in findings.
8. Apply scaling techniques to compare/contrast the size and movement of objects within the solar system, galaxy, and universe.

**Student Objectives:**

1. Students will be able to model the formation and changing of rocks and minerals.
2. Students will be able to describe the sources of energy as well as the forces that drive these changes.
3. Students will observe locations during solar and lunar eclipse, various phases of the moon, and the tilt of the axis in relation to the Earth's seasons.
4. Students will model and explain how objects in space continue to orbit and move around each other in space.
5. Students will be able to identify properties of each type of object in the solar system and will be able to describe their basic size and distance in relation to each other.
6. Students will explain how layers of rock can be used to study and understand changes in earth. Students may create a timeline to model periods and events in Earth's history. Students may conduct experiments to determine relative depth of rocks and their age of creation.
7. Students will be able to model and explain how Earth's surface is constantly changing and will be able to identify the processes constantly at work in the Earth and on its surface.
8. Students will model continental drift and sea-floor spreading. Students will explain how each theory was derived and the evidence that can be used to support each theory.
9. Students will be able to discuss the Theory of Plate Tectonics and explain how it originated from other theories.
10. Students will be able to model the water cycle and each process that moves water through the cycle (Condensation, Precipitation, and Evaporation).
11. Students will diagram and map air masses and fronts. Students will be able to describe the temperature and humidity for each type of air mass.
12. Students will diagram and model Earth's major wind patterns. Students will compare and contrast local and global winds.

13. Students will model and explain how certain areas of Earth have larger bodies of fossil fuels, minerals, and groundwater.
14. Students will compare natural disasters and will use data from modern technology to model and determine if a disaster is predictable.
15. Students will research and identify how to monitor habitats, populations, and water sources for damage.
16. Students will explain the cause and effect relationship between human population and the loss of natural resources.
17. Students will interpret and graph data recorded over the last 150 years to determine the amount of temperature change and will predict temperature change for the next 150 years.

***PACING***

***STANDARDS***

WEEK 1 ---INTRODUCTIONS AND CLASS EXPECTATIONS/RULES/ STUDENT HANDBOOK

WEEKS 2-3 ---INTRODUCTION TO THE SCIENTIFIC METHOD/SCIENTIFIC INQUIRY

**QUARTER 1 EXPLORING THE UNIVERSE**

EXPLORING SPACE; STARS AND GALAXIES MSESS 1-2

SUN-EARTH-MOON SYSTEM MSESS 1-1

THE SOLAR SYSTEM MSESS 1-3

**QUARTER 2 WEATHER AND CLIMATE**

EARTH'S ATMOSPHERE MSESS 2-6

WEATHER; CLIMATE MSESS 2-5

EARTH'S WATER; OCEANS; FRESHWATER	MSESS 3-2
MAPPING THE EARTH	MSESS 2-4
	MSESS 3-4
	MSESS 2-1
	MSESS 3-3
<b>QUARTER 3 GEOLOGIC CHANGES</b>	MSESS 3-1
EARTH'S STRUCTURE	MSESS 2-2
PLATE TECTONICS	MSESS 2-3
EARTH DYNAMICS	MSESS 2-1
EARTHQUAKES AND VOLCANOES	MSESS 3-2
CLUES TO EARTH'S PAST	MSESS 2-3
<b>QUARTER 4 EXPLORING EARTH</b>	
GEOLOGICAL TIME	MSESS 1-4
WEATHERING & SOIL; EROSION & DEPOSITION	MSESS 2-2
NATURAL RESOURCES	MSESS 3-4
MINERALS	MSESS3-1
ROCKS	MSESS 2-3

***Timeline***

***Approximate length to teach unit***

**Quarter One:**

Scientific Method/Inquiry	Week 1-2
Ch. 19-22 Exploring Space: Stars and Galaxies	Week 3-4
Ch. 21 Sun-Earth-Moon System	Week 5-6
Ch. 20 The Solar System	Week 6-9

**Quarter Two:**

Ch. 12 Earth's Atmosphere	Week 10-11
Ch. 13-14 Weather/ Climate	Week 11-12

Ch. 15-16-17 Earth's Water/ Oceans/ Freshwater	Week 13-16
Ch. 1 Mapping the Earth	Week 17-18
<b>Quarter Three:</b>	
Ch. 2 Earth's Structure	Week 19-21
Ch. 7 Plate Tectonics	Week 22-23
Ch. 8 Earth's Dynamics	Week 24-25
Ch. 9 Earthquakes/ Volcanoes	Week 26
Ch. 10 Clues to Earth's past	Week 27
<b>Quarter Four:</b>	
Ch. 11 Geologic Time	Week 28
Ch. 5 Weathering/Soil	Week 29-30
Ch. 6 Erosion/Deposition	Week 31-32
Ch. 18 Natural Resources	Week 32-33
Ch. 3 Minerals	Week 33-34
Ch. 4 Rocks	Week 35-36

### **Montana Content Standards**

- MSESS 1-1 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
- MSESS 1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system
- MSESS 1-3 Analyze and interpret data to determine scale properties of objects in the solar system
- MSESS 1-4 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

- MSESS 2-1 Develop a model to describe the cycling of earth's materials and the flow of energy that drives this process
- MSESS 2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time scales and spatial scales
- MSESS 2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions
- MSESS 2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity
- MSESS 2-5 Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions
- MSESS 2-6 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
- MSESS 3-1 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
- MSESS 3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects
- MSESS 3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment
- MSESS 3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems including indigenous populations
- MSESS 3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century

## **Resources**

Montana Earth Science Content Standards

<http://opi.mt.gov/LinkClick.aspx?fileticket=woYjYAdWhrs%3d&portalid=182>

Text Book:

2012 McGraw-Hill Glencoe Earth and Space iScience