



## **Science 6 GT**

### **Semester A Summary:**

Science 6A explores natural objects and phenomenon on our planet, in our Solar System, and beyond. This course uses multiple media sources to foster scientific inquiry and spark curiosity. The student will use models to investigate the relationship between the Sun, Moon, and Earth as they formulate explanations of lunar phases, eclipses, and seasons. Scientific views and evidence of how the earth and other objects in the universe were formed are presented as the student learns about galaxies, asteroids, and stars. The student will analyze and interpret data from rock layers and fossils giving clues to Earth's age. They will also discover how Earth's surface has changed over time as connections between earth's energy systems and plate tectonics are made. Throughout the course, the student will engage in activities that promote critical thinking, explore increasingly complex conceptual relationships, and encourage them to be curious about the world they live in and explore ways to test and apply their ideas.

### **Semester A Outline**

#### **1. Course Overview**

1. Science 6 Course Overview

#### **2. Sun, Moon, Earth**

1. Sun, Moon, Earth Introduction
2. Introduction to Space

- In this section, you will develop models to explain how objects in the night sky appear to move because of Earth's motions.

3. Moon Phases

- In this section, you will develop models to explain how objects in the night sky appear to move because of Earth's motions.
- In this section, you will explain the cause of lunar phases.
- In this section, you will explain the cause of lunar phases.

4. Eclipses

- In this section, you will explain the cause of lunar and solar eclipses.

5. Reason for the Seasons

- In this section, you will explain the reasons for the seasons using models of the sun, the moon, and Earth

6. Not Enough Hours

- In this section, you will explain how the number of daylight hours is related to seasons.

7. Not Enough Hours Discussion
  8. Asteroid Impact Portfolio 1
    - In this section, you will examine features of scientific diagrams and determine whether they clearly display information.
    - In this section you will evaluate different models of the solar system.
    - In this section, you will compare diagrams and 3-D models to determine the advantages and disadvantages of each.
  9. Asteroid Impact Portfolio 2
    - In this section, you will compare diagrams that show lunar phases and how they change.
    - In this section, you will compare diagrams that show how Earth's tilt and revolution cause the seasons.
    - In this section, you will use a model to predict how lunar phases might change if the moon was hit by an asteroid.
  10. Asteroid Impact Portfolio 3
    - In this section, you will use a model to predict how seasons might change if an asteroid hit Earth and changed Earth's tilt.
  11. Sun, Moon, Earth Review
  12. Sun, Moon, Earth Unit Test
- 3. Solar System**
1. Solar System Introduction
  2. Gravity and Orbits
    - In this section, you will describe how gravity keeps less massive objects orbiting around more massive objects in space.
    - In this section, you will create a model that shows how gravity keeps less massive objects orbiting around more massive objects in space.
  3. Moon and Planets
    - In this section, you will compare and contrast Earth and its moon.
    - In this section, you will compare types of planets by group.
  4. Orbiting Bodies' Properties
    - In this section, you will examine data to compare characteristics of different planets.
    - In this section, you will compare comets and asteroids to planets and moons.
    - In this section, you will use evidence to explain how Earth's natural greenhouse effect allows life to exist on Earth.
  5. Galaxies and the Universe
    - In this section, you will illustrate how Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.
  6. Solar System Distances
    - In this section, you will develop a model to show the distance between objects in the solar system.
    - In this section, you will develop a model of the solar system to show distances noting the advantages and limitations of models.

7. Solar System Scale
  - In this section, you will develop a scale model to represent the sizes of the planets.
8. Gravity
  - In this section, you will describe gravity's role in forming solar systems.
9. Earth's Formation
  - In this section, you will use evidence to explain how Earth was formed, how Earth got its water, and what is at Earth's center.
10. Geologic Time Scale
  - In this section, you will use evidence from rocks to explain how the geologic time scale is used to explore events such as extinctions.
11. Solar System Apply
  - In this section, you will develop a "designer alien" that has at least two adaptations that would help it survive on a planet other than Earth.
12. Solar System Review
13. Solar System Unit Test
- 4. The Universe**
  1. The Universe Introduction
  2. Galaxies
    - In this section, you will describe the three types of galaxies in the universe.
  3. Characteristics of the Universe
    - In this section, you will describe characteristics of the universe.
  4. Theories About the Universe
    - In this section, you will describe current scientific views on how the universe formed and how those views were formed.
    - In this section, you will compare different scientific views of how the universe formed.
    - In this section, you will use evidence to explain that the universe began with a period of rapid expansion.
  5. The Universe Apply
    - In this section, you will create an animation that demonstrates how the universe began according to the Big Bang Theory.
  6. The Universe Review
  7. The Universe Unit Test
- 5. Earth's Changing Surface**
  1. Earth's Changing Surface Introduction
  2. Plate Tectonics
    - In this section, you will explain the theory of plate tectonics.
  3. Rocks Under Pressure
    - In this section, you will create a visual that shows how tectonic plate motions formed the shapes of the continents and structures on the seafloor.
  4. Ring of Fire
    - In this section, you will describe how earthquakes and volcanoes

are related to plate movement.

5. Volcanoes Change Earth's Surface

- In this section, you will use evidence to explain that volcanoes have changed Earth's surface with varying speeds throughout Earth's history.

6. Earthquakes and Tsunamis

- In this section, you will use evidence to explain how earthquakes and tsunamis have changed Earth's surface and describe the destruction they can cause.

7. Physical Weathering

- In this section, you will describe examples of physical weathering of rock.

8. Soil

- In this section, you will explain the factors responsible for the formation of soil.
- In this section, you will explain that soil is a loosely arranged material that contains nutrients and weathered rock.
- In this section, you will examine soil characteristics.

9. Chemical Weathering

- In this section, you will describe examples of chemical weathering of rock.
- In this section, you will understand how to develop a hypothesis, identifying independent and dependent variables. You will also create a hypothesis about chemical weathering.

10. Shaping Earth's Surface

- In this section, you will use evidence to explain how surface weathering and erosion
- have changed Earth's surface and created different landforms.

11. Plate Boundaries

- In this section, you will explain how the movement of Earth's plates has affected where minerals and energy resources are found.

12. Mining Groundwater

- In this section, you will explain the effects of mining groundwater.

13. Earth's Changing Surface Apply

- In this section, you will draw a cross-section diagram that shows what occurs at the boundary between two plates.

14. Earth's Changing Surface Review

15. Earth's Changing Surface Unit Test

**6. Earth's Energy Systems**

1. Earth's Energy Systems Introduction

2. The Structure of Earth

- In this section, you will summarize Earth's layers based on the position of layers of Earth to each other, what they are made out of, and their densities.
- In this section, you will understand the elements that make up the oceans, their relationships to atoms, and their importance.

3. Earth's Interior Energy
    - In this section, you will develop a model to describe how energy flows into Earth's interior and out from Earth's interior.
  4. Radiation from the Sun
    - In this section, you will develop a model to describe how energy flows into Earth's interior and out from Earth's interior.
    - In this section, you will investigate that Earth's energy budget relates to living systems and Earth's processes.
  5. The Water Cycle
    - In this section, you will explain how energy is present in the water cycle and causes water to move in the water cycle.
    - In this section, you will understand the unique physical properties of water and its role in the natural and human-made environment.
  6. Physical Weathering of Rock
    - In this section, you will describe the physical processes that change rock.
  7. Chemical Weathering of Rock
    - In this section, you will describe the chemical processes that change rock.
  8. The Rock Cycle
    - In this section, you will develop models of the rock cycle.
  9. Plate Tectonics and the Rock Cycle
    - In this section, you will develop a model to describe the energy flow that causes tectonic plates to move, causes the rock cycle, and leads to different types of rocks.
  10. Energy Systems Portfolio 1
    - In this portfolio activity, you will compare and interpret diagrams, then create a diagram or model to account for energy flow and interactions between different Earth processes.
    - In this section, you will compare diagrams of the water cycle based on how clearly each presents and describes information.
    - In this unit you will compare diagrams of the rock cycle for readability and depth of information provided.
    - In this section, you will identify how symbols and graphics on diagrams contribute to meaning.
  11. Energy Systems Portfolio 2
    - In this section, you will identify how symbols and graphics on diagrams contribute to meaning.
    - In this section, you will create a diagram or model to describe energy flow and how different Earth processes interact.
  12. Earth's Energy Systems Review
  13. Earth's Energy Systems Unit Test
- 7. The Age of Earth**
1. The Age of Earth Introduction
  2. How Old is the Grand Canyon?
    - In this section, you will describe how the position of rock layers

is used to determine relative ages of rocks and fossils in the rock layers.

3. Absolute Age of Rocks and Fossils
  - In this section, you will describe how index fossils and carbon dating are used to determine the ages of rocks and fossils.
  - In this section, you will explain why most organisms that lived in the past never formed fossils.
  - In this section, you will investigate the main elements found in living things.
4. Could Mesosaurus Swim Across an Ocean?
  - In this section, you will describe how the locations of rocks and fossils around the world are due to the movement of tectonic plates.
5. The Growing Atlantic Ocean
  - In this section, you will examine data and evidence about Earth's features and identify relationships that can be used to make inferences, through specific study of seafloor spreading and patterns of age of seafloor.
6. The Age of Earth Apply
  - In this section, you will predict how seafloor spreading at the East Pacific Rise will affect plate movement along the North American West Coast.
7. The Age of Earth Review
8. The Age of Earth Unit Test

### **Semester B Summary:**

Science 6B uses multiple media sources to foster scientific inquiry and spark curiosity. The student will discover ways that scientists use data, models, and technology gather information and make predictions. Throughout this course, the student will investigate topics such as weather, climate, and natural resources. The student will collect and analyze data to discover how changes to weather conditions occur. They will also use scientific models to investigate how atmospheric circulation produces climate patterns and how thermal energy transfer affects climate. This course explains renewable and non-renewable resources and the environmental implications associated with methods of managing and using energy resources. The student will identify and describe human activities that contribute to global climate change. The student will also learn about natural hazards and how scientists use historical data to forecast and prepare for future catastrophic events. Throughout the course, the student will engage in activities that promote critical thinking, explore increasingly complex conceptual relationships, and encourage them to be curious about the world they live in and explore ways to test and apply their ideas.

### **Semester B Outline**

## 1. **Course Overview**

1. Science 6 Course Overview

## 2. **Weather**

1. Weather Introduction
2. Relative Humidity
  - In this section, you will describe relative humidity.
3. Air Pressure
  - In this section, you will explain how data about air pressure is used to describe weather.
4. Air Masses
  - In this section, you will describe patterns of how air masses interact and change over time.
5. Air Mass Interactions
  - In this section, you will identify how air masses interact and change causing changes in weather.
  - In this section, you will analyze weather-based data to track patterns of how air masses interact and change over time and produce changes in weather.
  - In this section you will analyze weather-based data to track patterns of how air masses interact and change over time and produce changes in weather.
6. Predicting Weather
  - In this section, you will explain that weather can only be predicted based on how likely it is to happen because it is complicated and has multiple causes.
7. Many Things Affect Weather
  - In this section, you will explain how the sun, landforms, and water bodies affect weather.
8. Predicting Weather Portfolio 1
  - In this section, you will interpret the meanings of symbols used to identify pressure systems and precipitation on a weather map.
  - In this section, you will interpret a weather map to describe the weather on that day in that region.
9. Predicting Weather Portfolio 2
  - In this section, you will describe patterns of movement of pressure systems by interpreting maps that show the movement of a weather system over several days.
  - In this section, you will describe patterns of precipitation by interpreting weather maps over several days.
10. Predicting Weather Portfolio 3
  - In this section, you will predict the weather for the next day from a sequence of weather maps.
  - In this section, you will predict the weather for the next day in a particular region.
11. Weather Review
12. Weather Unit Test

## 3. **Natural Hazards**

1. Natural Hazards Introduction
  2. Tracking Earthquakes
    - In this section, you will identify regions likely to have earthquakes and volcanoes by using seismic data.
    - In this section, you will describe how scientists use data to find the epicenter of an earthquake.
  3. Volcanic Eruptions
    - In this section, you will describe technologies that make the effects of volcanoes less.
    - In this section, you will describe how people can be more prepared for a volcanic eruption.
    - In this section, you will describe technologies that make the effects of volcanoes less.
  4. Tracking Hurricane Dorian
    - In this section, you will describe how the intensity and track of a hurricane is predicted.
    - In this section you will analyze and interpret data to track a hurricane and predict effects at landfall.
    - In this section you will analyze and interpret data to track a hurricane and predict effects at landfall.
  5. Learning from Hurricane Katrina
    - In this section, you will describe technologies that make the effects of hurricanes less severe.
    - In this lesson, you will identify and describe technologies that make the effects of hurricanes less severe.
  6. Using Data to Predict Wildfires
    - In this section, you will examine data to make predictions about wildfires.
    - In this section, you will examine data, including maps, to make predictions about drought or wildfires.
    - In this section, you will examine data, including maps, to make predictions about drought or wildfires.
  7. Mitigating the Effects of Wildfires
    - In this section, you will describe technologies that make the effects of wildfires less severe.
  8. Natural Hazards Apply
    - In this section, you will describe a natural hazard that has happened where you live, including the history of the event, how people prepared for it, and how it ended.
  9. Natural Hazards Review
  10. Natural Hazards Unit Test
- 4. Climate**
1. Climate Introduction
  2. Heating Patterns
    - In this section, you will describe how and why the sun heats Earth unevenly.
    - In this section, you will understand the importance of water quality in areas where freshwater is scarce.



3. Atmospheric Currents
  - In this section, you will explain how air currents are caused by the heating and rotation of Earth.
  - In this section, you will describe air currents on Earth.
  - In this section, you will explain how air currents are caused by the heating and rotation of Earth.
4. Ocean Currents
  - In this section, you will explain how the ocean currents are caused by the heating and rotation of Earth.
  - In this section, you will describe the major ocean currents.
  - In this section, you will explain how the ocean currents are caused by the heating and rotation of Earth.
5. Atmospheric Circulation
  - In this section, you will explain how atmospheric currents affect climate patterns.
6. Ocean Circulation
  - In this section, you will explain how ocean currents affect climate patterns.
7. Thermal Energy
  - In this section, you will explain how the flow of thermal energy affects climate.
8. The Climate System
  - In this section, you will describe how the parts of the climate system are connected.
  - In this section, you will understand how to determine the credibility, accuracy, and possible bias of science publications.
  - In this section, you will investigate the health and safety issues related to water quality and ocean life.
9. Earth's Biomes
  - In this section, you will investigate how living things depend on and compete for biotic and abiotic factors within an ecosystem.
  - In this section, you will describe the differences between Earth's major biomes.
  - In this section, you will describe the differences between Earth's major biomes.
10. Climate Apply
  - In this section, you will analyze factors that affect Earth's climate for a specific location on Earth and use the information to write a narrative about the climate of the area.
11. Climate Review
12. Climate Unit Test

## 5. **Atmosphere**

1. Atmosphere Introduction
2. Atmospheric Layers
  - In this section, you will interpret diagrams to understand the five layers of Earth's atmosphere.
  - In this section, you will interpret diagrams to show that water and gases cycle through Earth's four spheres—the lithosphere,

biosphere, hydrosphere, and atmosphere.

3. Fossil Fuels and Climate Change
  - In this section, you will describe how burning fossil fuels contributes to climate change.
  - In this section, you will understand how major health and safety issues associated with air quality affect human health.
  - In this section, you will understand how to determine the credibility, accuracy, and possible bias of science publications.
4. Human Activities and Climate Change
  - In this section, you will describe human activities that contribute to climate change.
5. Polar Ice and Climate Change
  - In this section, you will explain how melting polar ice contributes to cycles that affect climate change.
6. Atmosphere Apply
  - In this section, you will examine things you do everyday for their impact on Earth's climate and design a plan to reduce that impact.
7. Atmosphere Review
8. Atmosphere Unit Test

## 6. **Natural Resources**

1. Natural Resources Introduction
2. Renewable and Nonrenewable Resources
  - In this section, you will distinguish between renewable and nonrenewable resources based on availability and sustainability.
3. Rocks and Minerals
  - In this section, you will describe how rocks and minerals are natural resources.
4. Fossil Fuels
  - In this section, you will explain why fossil fuels are considered nonrenewable resources by describing how they form.
5. Energy Exploration
  - In this section, you will explain the environmental dangers of obtaining energy resources from Earth.
6. Using Energy Resources
  - In this section, you will explain the environmental dangers of managing and using energy resources from Earth.
7. Land and Soil Resources
  - In this section, you will describe how land and soil are natural resources.
8. The Role of Watersheds
  - In this section, you will explain what a watershed is, the main features of Chesapeake Bay, and what biological and non-biological factors can affect watershed health.
9. Conservation
  - In this section, you will describe ways to conserve natural resources.

- In this section, you will describe ways to conserve natural resources.
  - In this section, you will investigate the relationship between human activity, poor air and water quality and health.
  - In this section, you will investigate the cost/benefit tradeoffs in conservation policies
10. Natural Resources Apply
    - In this section, you will develop a plan for a new park and playground that has a sustainable design and uses renewable resources as much as possible.
  11. Natural Resources Review
  12. Natural Resources Unit Test
- 7. Impact of Humans**
1. Impact of Humans Introduction
  2. Consumption of Mineral Resources
    - In this section, you will interpret data that shows how an increasing human population and increasing use of natural mineral resources impacts Earth. In this section, you will explore how energy production can affect the environment.
  3. Conserving Mineral Resources
    - In this section, you will examine ways of monitoring and reducing the impact of the use of mineral resources on the environment.
  4. Consumption of Bioresources
    - In this section, you will interpret data that shows how an increasing human population and increasing use of natural bioresources impact Earth.
  5. Conserving Bioresources
    - In this section, you will examine ways of monitoring and reducing the impact of the use of bioresources on the environment.
  6. Conserving Bioresources Discussion
  7. Mitigating Human Impact Portfolio 1
    - In this section, you will propose questions about a specific design problem related to human impact on the environment.
    - In this section, you will develop and write questions about a specific design problem related to human impact on the environment.
    - In this section, you will design two ways to monitor and reduce your impact on the environment.
  8. Mitigating Human Impact Portfolio 2
    - In this section, you will identify and describe what your design needs to be successful and what limitations there are to your design.
    - In this section, you will create and use a rubric to check how well your two designs meet the standards.
  9. Mitigating Human Impact Portfolio 3
    - In this section, you will examine the data you collect for each

design method and determine how to present it so that other people can use it.

- In this section, you will examine data from tests of different design solutions to identify the best characteristics of each to combine into a new solution that better meets the standards.

10. Impact of Humans Review

11. Impact of Humans Unit Test