

# Syllabus

## Science 6, Semester B

### Course Overview

Science is the study of the natural world. It relies on investigations and evidence to describe the natural events that occur around us. Science 6B is an integrated science course that covers topics selected from Earth and space science and life science. This course discusses Earth's history, its ecosystems, and its climate and weather. In the first unit, you'll explore the history of Earth and how natural forces such as wind and water shape its formation. In the second unit, you'll study the relationships between the physical and biological elements of Earth's ecosystems. In the last unit, you will discover how the uneven heating of Earth from the Sun leads to its various climates and weather patterns.

### Course Goals

By the end of this course, you will be able to do the following:

- Develop a model to describe the cycling of Earth's materials during weathering and erosion.
- Explain the role of water and wind in shaping Earth's surface.
- Compare the physical properties of minerals: hardness, color, luster, and streak.
- Develop a model that describes the cycling of Earth's materials and flow of energy during the rock cycle.
- Use historical data to explain the positions of the continents and the formation of volcanoes.
- Identify relationships between organisms in ecosystems.
- Understand how changes to the physical or biological components of an ecosystem affect populations of organisms.
- Identify competitive, predatory, and mutually dependent relationships between organisms in various ecosystems.
- Develop a model of a food web that explains how energy cycles through the organisms in the ecosystem.
- Use modeling of ocean currents to explain geological processes in the ocean.
- Describe how the uneven heating of Earth affects its weather and climate.
- Use data from weather maps to explain the motion of air masses.
- Use data collection tools to draw conclusions about current weather conditions.
- Collect data to show how the mixing of air masses causes weather changes.
- Develop and use a model to explain how landforms affect the weather and climate.

## **General Skills**

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Complete basic operations with presentation software, such as Microsoft PowerPoint or Google Docs presentation.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

*For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.*

## **Credit Value**

Science 6B is a 0.5-credit course.

## **Course Materials**

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft PowerPoint or equivalent
- equipment listed in Appendix B

## **Course Pacing Guide**

This course description and pacing guide is intended to help you stay on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

# Unit 1: The History of Earth

## Summary

In this unit, you will explore the effects of weathering and erosion, with a focus on how water and wind shape Earth's surface. You'll describe the rock cycle and build a model to show how magma flow can affect Earth's surface. You'll use historical data to study plate movement on Earth and compare plate tectonic theory with past theories on continental drift. You'll use evidence from relative dating of rock layers and fossils to explain how plate movement affects Earth's surface. Finally, you'll learn about the geologic time scale, a method used to track the history of Earth.

Day	Activity/Objective	Type
1 day: 1	<b>Syllabus and Plato Student Orientation</b> <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
4 days: 2–5	<b>Modeling Weathering and Erosion</b> <i>Develop a model to describe the cycling of Earth's materials and the flow of energy during the processes of weathering and erosion.</i>	Course Activity
3 days: 6–8	<b>Weathering and Erosion</b> <i>Use evidence to explain the role of water and wind in shaping Earth's surface.</i>	Lesson
2 days: 9–10	<b>Properties of Rocks and Minerals</b> <i>Compare the physical properties of minerals, including hardness, color, luster, and streak.</i>	Course Activity
3 days: 11–13	<b>The Rock Cycle</b> <i>Develop a model that describes the cycling of Earth's materials and the flow of energy during the rock cycle.</i>	Lesson
2 days: 14–15	<b>Magma and Lava Flow</b> <i>Construct a model of a volcano, and investigate the effects of viscosity on lava flow. (Task 3 requires about a week to yield results.)</i>	Course Activity

<b>Day</b>	<b>Activity/Objective</b>	<b>Type</b>
4 days: 16–19	<b>Plate Tectonics</b> <i>Use historical data to explain the positions of the continents and the formation of volcanoes.</i>	Lesson
4 days: 20–23	<b>Earth’s Changing Surface</b> <i>Use evidence to explain how plate movement affects Earth’s surface.</i>	Lesson
1 day: 24	<b>Magma and Lava Flow</b> <i>Task 3: Analyze the rock candy model to explain how igneous rocks form.</i>	Course Activity
4 days: 25–28	<b>Unit Activity and Discussion—Unit 1</b>	Unit Activity/ Discussion
1 day: 29	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: The Interdependence of Ecosystems

### Summary

You’ll begin this unit by building a model of the water cycle and describing the cycles of Earth, including the carbon cycle. You’ll also explain the different types of relationships that exist in an ecosystem. You’ll discover the types of resources that an organism needs for survival and determine the cause-and-effect relationship that this need has on the availability of resources. Next, you’ll explore the effects that humans and other environmental factors have on the populations of organisms in an ecosystem and research the effects of humans on the ocean ecosystem. In a hands-on activity, you’ll observe a plant growing in a sealed bottle and explain the effect of interdependence on the plant’s growth. Finally, you will develop a model of a food web that explains how energy cycles through the organisms in the ecosystem.

<b>Day</b>	<b>Activity/Objective</b>	<b>Type</b>
3 days: 30–32	<b>Modeling the Water Cycle</b> <i>Build a model of the water cycle.</i>	Course Activity

Day	Activity/Objective	Type
4 days: 33–36	<b>The Cycles of Earth</b> <i>Develop a model that shows how gravity and the Sun’s energy drive the cycling of water through Earth’s systems.</i>	Lesson
3 days: 37–39	<b>What Is an Ecosystem?</b> <i>Construct an explanation that relates the influence of environment and genes on the growth of organisms.</i>	Lesson
3 days: 40–42	<b>Relationships in an Ecosystem</b> <i>Identify competitive, predatory, and mutually dependent relationships between organisms in various ecosystems.</i>	Lesson
3 days: 43–45	<b>Resource Availability</b> <i>Analyze the cause-and-effect relationships between the availability of resources and the growth of organisms in an ecosystem.</i>	Lesson
7 days: 46–52	<b>Build a Pop-Bottle Biome</b> <i>Define the criteria and constraints of a design problem, and build a pop-bottle biome.</i>	Course Activity
3 days: 53–55	<b>Food Webs</b> <i>Develop a model of a food web that explains how energy cycles through the organisms in the ecosystem.</i>	Lesson
4 days: 56–59	<b>Unit Activity and Discussion—Unit 2</b>	Unit Activity/ Discussion
1 day: 60	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: The Weather and Climate

### Summary

In this unit, you will model ocean currents and convection. Then you'll learn about the effect that the uneven heating of Earth has on different materials and how this leads to different climates on Earth. You'll explore the relationship between weather and the movement of air and water in Earth's atmosphere. After building your own data collection tools, you will use them to gather data on current weather conditions. You'll see how professional data collection tools track weather changes and the properties of air masses. At the end of the unit, you'll explore how landforms affect weather and climate and compare the weather and climate of two locations at the same latitude.

Day	Activity/Objective	Type
3 days: 61–63	<b>Modeling Ocean Currents</b> <i>Develop a model of ocean currents using household tools, and explain how your model relates to larger geological processes in the ocean.</i>	Course Activity
4 days: 64–67	<b>The Uneven Heating of Earth</b> <i>Develop and use a model to show how the uneven heating of Earth determines its climates.</i>	Lesson
4 days: 68–71	<b>The Mechanics of Weather</b> <i>Use data from weather maps to explain the motion of air masses.</i>	Lesson
3 days: 72–74	<b>Tools for Collecting Weather Data</b> <i>Use data collection tools to draw conclusions about current weather conditions. (Task 1 requires gathering a week's worth of weather data.)</i>	Course Activity
4 days 75–78	<b>Collecting Data about Weather</b> <i>Collect data to show how the mixing of air masses causes weather changes.</i>	Lesson
4 days 79–82	<b>Earth's Structures and Climate</b> <i>Develop and use a model to explain how landforms affect regional climates.</i>	Lesson

Day	Activity/Objective	Type
1 day: 83	<b>Tools for Collecting Weather Data, Follow-Up</b> <i>Task 1: Analyze temperatures collected in sunlight and shade.</i>	Course Activity
4 days: 84–87	<b>Unit Activity and Discussion—Unit 3</b>	Unit Activity/ Discussion
1 day: 88	<b>Posttest—Unit 3</b>	Assessment
1 day 89	<b>Semester Review</b>	
1 day 90	<b>End-of-Semester Test</b>	Assessment

## Appendix A: Safety Notes and Disclaimer

Each Course Activity and Unit Activity that includes a lab/experiment component will highlight key safety guidelines using the safety icon (⚠️), which appears directly in the activity. In addition to adhering to those guidelines, you must ensure that you follow these general safety practices:

- Work slowly and safely at all times, and abide by the safety notes and icons.
- Pay attention and be alert at all times. Limit any distractions.
- Keep your hands away from your nose, eyes, mouth, and skin. Wash your hands before and after experiments.
- If you don't understand something, ask a teacher or an adult before proceeding.
- Wear the required protective gear.
- Adult supervision is required for all activities involving an experiment/lab component.
- Do not perform experiments that have not been approved. Follow the procedure.
- Follow good housekeeping practices. Keep your work area clean.
- Abide by all disposal instructions and icons to protect yourself and our planet.
- Report any problems or complications to an adult.

**Note:** *Edmentum assumes no liability for personal injury, death, property damage, equipment damage, or financial loss resulting from the instruction included in this course.*



## Appendix B: Equipment List for Course Activities and Unit Activities

Unit	Activity Name	Task	Equipment List
1	Course Activity: Modeling Weathering and Erosion	Task 1: Modeling the Effects of Weathering and Erosion	<ul style="list-style-type: none"> <li>• 2 cake pans</li> <li>• 10 cups of sand</li> <li>• spray bottle with water</li> <li>• 4–6 ice cubes</li> <li>• straw</li> <li>• pair of goggles</li> <li>• blow-dryer</li> <li>• newspaper or other table covering</li> </ul>
		Task 2: Modeling Landforms	<ul style="list-style-type: none"> <li>• spatula</li> <li>• pen</li> <li>• cup</li> <li>• 12 tooth picks</li> <li>• 10 cups of sand</li> <li>• water</li> <li>• spray bottle with water</li> <li>• textbook</li> </ul>
1	Course Activity: Properties of Rocks and Minerals	Task 1: Testing the Properties of Rocks	<ul style="list-style-type: none"> <li>• 3 different rocks</li> <li>• 1 wire nail</li> <li>• 1 masonry nail</li> <li>• 1 white ceramic tile or plate (must have an unglazed side)</li> <li>• 1 copper penny</li> <li>• desk lamp</li> </ul>
		Task 2: Testing Common Household Minerals	<ul style="list-style-type: none"> <li>• ½ cup of rock salt (used for deicing)</li> <li>• ½ cup of 100% talcum powder, no perfume (baby powder)</li> <li>• 1 piece of white chalk (not molded chalk)</li> <li>• water</li> <li>• clear plastic cup</li> <li>• vinegar</li> <li>• knife</li> <li>• spoon</li> </ul>

Unit	Activity Name	Task	Equipment List
1	Course Activity: Magma and Lava Flow	Task 1: Modeling Lava Flow	<ul style="list-style-type: none"> <li>• 1 container: a clear jar, a plastic bottle, or a plastic cup</li> <li>• modeling clay, enough to mold a cone around the container</li> <li>• vinegar</li> <li>• dish soap</li> <li>• paper towels</li> <li>• baking soda</li> <li>• pan or tray large enough to hold the container and modeling clay</li> <li>• water</li> <li>• goggles</li> <li>• plastic gloves</li> <li>• plastic apron</li> </ul>
		Task 2: Modeling Lava Viscosity	<ul style="list-style-type: none"> <li>• tablespoon or graduated cylinder</li> <li>• 15 milliliters (1 tablespoon) each of water, cooking oil, and light corn syrup</li> <li>• 1 small block about 4 centimeters (1.5 inches) in height, or a stack of books</li> <li>• nonstick cookie sheet, at least 25 centimeters (10 inches) long</li> <li>• paper towels</li> <li>• stopwatch or timer</li> <li>• metric ruler</li> <li>• calculator</li> </ul>
		Task 3: The Rock Candy Experiment	<ul style="list-style-type: none"> <li>• wooden skewer or chopstick</li> <li>• 2 clothespins</li> <li>• clear jar or glass</li> <li>• 4 cups sugar</li> <li>• 2 cups water</li> <li>• saucepan or small pot</li> <li>• spoon</li> <li>• paper towels</li> <li>• stove or electric hot plate</li> <li>• oven mitt</li> <li>• magnifying glass or cell phone camera that can zoom</li> </ul>

Unit	Activity Name	Task	Equipment List
1	Unit Activity: The History of Earth	Task 1: Modeling Rock Weathering	<ul style="list-style-type: none"> <li>• 1 small balloon</li> <li>• 1 cup of plaster of Paris</li> <li>• 16-ounce freezer-safe plastic container</li> <li>• 8-ounce plastic cup</li> <li>• water at room temperature</li> <li>• 2 effervescent antacid tablets</li> <li>• stopwatch or timer</li> <li>• knife or metal spoon</li> </ul>
		Task 2: Testing Soil Composition	<ul style="list-style-type: none"> <li>• 3 cups of soil collected from your garden, a forest, a riverbed, or purchased from a garden store</li> <li>• 3 identical glasses (about 8 ounces each)</li> <li>• spoon</li> <li>• small bucket</li> <li>• ½ cup of vinegar</li> <li>• 3 tablespoons of baking soda mixed with 1 cup of water</li> <li>• fine mesh strainer or a colander lined with a large paper coffee filter</li> <li>• ½ cup of sand</li> <li>• ½ cup of pebbles</li> <li>• tablespoon</li> <li>• measuring cup</li> </ul>
2	Course Activity: Modeling the Water Cycle	Task 1: Build a Model of the Water Cycle	<ul style="list-style-type: none"> <li>• oven mitts</li> <li>• 1 clear mixing bowl or flat-bottomed container, heat-resistant so it does not melt</li> <li>• 1 small cup, heavy enough so it does not float</li> <li>• teakettle with hot water</li> <li>• stove or electric hot plate</li> <li>• plastic wrap</li> <li>• 8–12 ice cubes</li> </ul>
		Task 2: Evaporation and Area of a Surface	<ul style="list-style-type: none"> <li>• 1 tall glass or a tall, narrow vase</li> <li>• 1 shallow plastic container</li> <li>• water</li> <li>• measuring cup</li> </ul>

Unit	Activity Name	Task	Equipment List
2	Course Activity: Build a Pop-Bottle Biome	Task 1: Building a Pop-Bottle Biome	<ul style="list-style-type: none"> <li>• 1 two-liter pop bottle, with the label removed</li> <li>• 1 cup of dirt or potting soil</li> <li>• 1 or 2 small green plants (no cactuses) that grow in wet to moderately wet environments with direct sunlight</li> <li>• scissors or knife</li> <li>• a small thermometer that fits inside the bottle</li> <li>• tape (optional)</li> </ul>
		Task 2: Designing a Desert Biome	<ul style="list-style-type: none"> <li>• 1 two-liter pop bottle, with the label removed, or other container</li> <li>• 1 or 2 small cacti of your choice that will fit in the container</li> <li>• a small thermometer that fits inside the container</li> <li>• planting materials of your choice</li> <li>• a pair of thick work gloves (to handle the cactus)</li> </ul>
2	Unit Activity: The Interdependence of Ecosystems	Evaluating Solutions	None
3	Course Activity: Modeling Ocean Currents	Task 1: Evaporation of Salt Water	<ul style="list-style-type: none"> <li>• 1 sheet of colored construction paper</li> <li>• clear plastic or glass container, just large enough to hold the construction paper</li> <li>• large drinking glass</li> <li>• 3 teaspoons of salt</li> <li>• a teaspoon</li> <li>• ¼ cup water at room temperature</li> </ul>

Unit	Activity Name	Task	Equipment List
		Task 2: Salinity of Water and Density	<ul style="list-style-type: none"> <li>• food coloring (1 color)</li> <li>• 1-cup measuring cup</li> <li>• 1 sheet of colored construction paper</li> <li>• clear plastic or glass container, large enough to hold 4 cups of water</li> <li>• drinking glass</li> <li>• 8 teaspoons salt</li> <li>• a teaspoon</li> <li>• 4 cups water at room temperature</li> </ul>
		Task 3: Build a Model of the Ocean Currents	<ul style="list-style-type: none"> <li>• 2 drinking glasses or small snack bowls</li> <li>• food coloring (2 different colors)</li> <li>• measuring cup</li> <li>• clear plastic or glass container, about 6 × 10 inches and 2.5 inches deep</li> <li>• water (1 cup hot, 1 cup cold, and enough room temperature water to fill half the container)</li> </ul>
3	Course Activity: Tools for Collecting Weather Data	Task 1: Monitoring Temperature in Sun and Shade	<ul style="list-style-type: none"> <li>• 2 alcohol thermometers (preferably the same model). Double-check that the thermometers measure the range of temperatures your area regularly experiences.</li> </ul>
		Task 2: Building a Sling Psychrometer	<ul style="list-style-type: none"> <li>• plastic soda or water bottle</li> <li>• scissors or knife</li> <li>• plastic soda/water bottle</li> <li>• 1.5-foot piece of string or yarn</li> <li>• masking tape or duct tape</li> <li>• 2 alcohol (not mercury) thermometers</li> <li>• cotton medical gauze</li> <li>• water</li> <li>• rubber band</li> <li>• safety goggles</li> </ul>

Unit	Activity Name	Task	Equipment List
		Task 3: Building an Anemometer	<ul style="list-style-type: none"> <li>• two plastic straws</li> <li>• pencil with eraser</li> <li>• thumbtack or pushpin</li> <li>• stapler with staples</li> <li>• 4 paper drinking cups (3 ounce, bathroom-cup size)</li> <li>• permanent marker</li> <li>• stopwatch, timer, or cell phone stopwatch app</li> <li>• fan (optional)</li> <li>• string</li> <li>• scissors</li> <li>• ruler or tape measure</li> </ul>
3	Unit Activity: The Weather and Climate	Task 1: The Weather and Climate	None