

Lessons at a Glance

Science Content: Big Ideas

The Earth's Changing Surface Unit concentrates on the following Big Ideas. Along with the scientific Habits of Mind discussed on pages 6–7, these concepts are reinforced throughout the unit. The lessons in which each Big Idea is introduced or is a major focus are indicated in parentheses.

Lessons

- Landforms are the result of changes to the earth's surface. (Lessons 1, 2, 13)
- Moving water, ice, and wind break down rock, transport materials, and build up the earth's surface. (Lessons 3–8, 10)
- The earth's rock is slowly weathered or broken down into smaller fragments. (Lesson 9)
- Movements of the earth's crust shape the surface of the earth. (Lessons 11–12)

Skill Building Activities

- Observation is a powerful tool for learning about something. Detailed and accurate descriptions of your observations help you communicate them to others. (Skill Building Activity: Observing and Describing)
- Paying attention to a book's organization can assist reading comprehension. (Skill Building Activity: Reading Science Books)
- Scientists use models to represent things that are too big, small, fast, slow, far away, or dangerous to observe in the real world. (Skill Building Activity: Using Models in Science)

Lesson Overviews

The following overviews briefly summarize each lesson in the Earth's Changing Surface Unit. Suggestions for scheduling are shown in gray. Asterisks with the lesson title indicate a core lesson.

Lesson 0: Doing Science

Students sharpen their awareness of scientific thinking and become familiar with the "I Wonder" circle as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of

scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

Lesson 1: Looking for Changes to the Earth’s Surface: Part 1*

Students think about whether the earth’s surface changes. They tour the school grounds looking for evidence of change, then discuss the causes and period of time involved for the changes they observed.

Consider teaching the Skill Building Activity “Observing and Describing” on pages 252–261 prior to this lesson.

Consider teaching the Skill Building Activity “Reading Science Books” on pages 262–271 after this lesson.

Lesson 2: Looking at Landforms*

Students observe relief maps or globes and note the large landforms on them. To become familiar with the diversity of landforms on Earth, they examine and discuss photographs of various landforms and guess how they were formed.

Consider teaching the Skill Building Activity “Using Models in Science” on pages 272–278 prior to this lesson.

Lesson 3: Rivers Shape the Land*

Students explore how moving water can shape the earth’s surface when they set up a model to simulate a river. They observe the pathways carved by water and how moving water carries sediment from one location to another. Then they identify the parts of a river. To conclude, students discuss their observations and consider how the process of water erosion and deposition shapes the earth’s surface.

Lesson 4: Rivers Shape the Land in Different Ways*

Students continue to explore how moving water can shape the earth’s surface. They experiment with ways to alter a river’s shape. Then they reflect on what they’ve learned from the exploration to better understand the factors that affect how moving water shapes the earth’s surface and the landforms that can result.

This lesson is conducted over two sessions.

Lesson 5: Abrasion Wears Down Rock*

Students review their understanding of the processes that shape the earth's surface and build a foundation for future lessons. They review and discuss their observations of *erosion* and *deposition* over the past three lessons. Then they engage in a science talk about the question: "What happens to rocks over time?" Students further explore this question by conducting a simple investigation about abrasion. Finally, they begin an investigation to explore water's effect on abrasion.

This lesson is conducted over two sessions.

Lesson 6: Glaciers Carve the Land*

Students explore how glaciers shape the earth's surface. They use model glaciers to explore how glaciers abrade and erode the surface of the earth. Then they observe their melted glaciers to learn how glaciers deposit the sediment they carry and consider how glaciers have shaped the land in the past, and continue to do so today.

This lesson is conducted over three sessions.

Lesson 7: Wind Erodes Hoodoos*

Students examine pictures of landforms shaped by wind. They speculate about how wind shapes landforms through abrasion and erosion and then use a "windstorm" box to model windblown sand. They discuss their results and relate their findings to the images of wind-eroded landforms they observe at the beginning of the lesson.

Lesson 8: Wind Deposits Dunes*

Children examine sand dunes and other landforms made by wind deposition and discuss how windblown materials can build up or erode the earth's surface. They use a "windstorm" box to model sand dune formation and to observe how plants help stabilize sand dunes. They share and discuss their exploration results and connect their observations to natural landforms built by wind deposition.

Lesson 9: Weathering Breaks Down Rock*

Students discuss processes that weather rocks. They gain an appreciation of how “soft” rocks and “hard” rocks break down as they watch a variety of rocks get broken down, then observe and describe the results. Students also share observations they recorded about their rock jar investigations, and complete their investigations by observing, describing, and comparing the ways the various rocks abrade.

This lesson is conducted over two sessions.

Lesson 10: Looking for Changes to the Earth’s Surface: Part 2

Students take a walk around the school grounds to look for evidence of weathering, erosion, and deposition. They deepen their understanding of these processes by comparing their observations from today’s walk with their observations from their walk in Lesson 1.

Lesson 11: Plate Movements Form Mountains*

Students explore how plate movements form mountains. They discuss how they think mountains form and learn about the layers of the earth. They are introduced to plate tectonics, and then model a consequence of plate movements—the folded mountains that form when plates collide. They also compare two folded mountain chains: the Appalachians and the Himalayas.

This lesson is conducted over three sessions.

Lesson 12: Volcanoes Build Up the Earth’s Surface*

Students learn how some volcanoes are formed when magma that emerges from beneath the surface of the earth is deposited on the surface. They set up a model of a volcanic mountain. Then they simulate a volcanic eruption to see that lava deposited on the earth’s surface builds up the earth’s surface over time. They also discuss how moving water, ice, and wind weather and erode volcanoes.

This lesson is conducted over two sessions.

Lesson 13: Touring Landforms*

Students take “virtual” field trips to view Bryce Canyon National Park and Mt. St. Helens National Volcanic Monument. They apply what they have learned about the processes that change earth’s surface as they explore and make observations through photographs. Alternatively, students go on a field trip to observe local landforms.

Skill Building Activity: Observing and Describing

Students practice making accurate and detailed descriptions before and after observing a familiar object. They discover the importance of careful observation and detailed description in science.

Skill Building Activity: Reading Science Books

Students familiarize themselves with the organization and layout of the *Earth’s Changing Surface Student Reference Book*. They are encouraged to look through each section before they begin reading so they can use visual and text cues—such as headings, margin notes, and illustrations—to help understand the material and its relationship to what they already know.

Ongoing reading strategies to help children absorb new information and vocabulary are included at the end of the lesson.

Skill Building Activity: Using Models in Science

Students study various types of models and consider how they are used in science. They also make models of their own.