

3rd Grade Earth's Changes Unit

Unit Overview

The Earth's Changes unit, taught using BSCS T.R.A.C.S. *Investigating the Changing Earth*, provides students an opportunity to become aware of the many kinds of changes that happen to the surface of the earth. Students generally assume that their outdoor environment remains constant. Unless the devastation of a flood or the tragedy of a large earthquake has affected them, students do not think of Earth's surface as something that constantly changes. This is due, in part, to the fact that many changes to the surface of the earth happen on the grand scale of geologic time, measured in millions of years, which has little meaning to a child. And, while catastrophic changes to Earth's surfaces—earthquakes, volcanoes, and landslides—have always captured students' interest, smaller changes are harder to observe. If students become aware of the kinds of changes that happen to Earth's surface, however, they can begin to develop an understanding of the incremental steps that have led to the formation of the familiar landforms that they see in today's landscape. (*Investigating the Changing Earth*, p. 8)

The unit introduces students to the concepts of weathering and erosion. Students create models of some changes to Earth's surface that are hard to observe in real life in a short amount of time. They use stream tables to observe erosion caused by the downhill movement of water and simulate weathering using sugar cubes and water. They make *Sand Blasters* to observe the effect of wind on the surface of the earth. Following each experiment, they compare their lab observations to what they have seen on the surface of the earth. Throughout the lab investigations, students discuss and model good scientific practices.

Essential Questions:

1. How does nature cause the surface of the earth to change?
2. What are good scientific practices?
3. What is the nature of science and who "does" science?

Unit Questions:

1. What happens to Earth materials on steep slopes?
2. How can flowing water change the surface of the earth?
3. How can wind change the surface of the earth?
4. How have humans changed the surface of the earth?
5. Why do results of experiments rarely turn out exactly the same?
6. Why is it important to follow directions and keep accurate records of experiments?
7. How do the models used in the unit show how the real-life processes work? What can be learned from models?

Lesson Summary (Pages 14-17 in BSCS T.R.A.C.S. *Investigating the Changing Earth* Teacher's Guide)

Lesson 1: Students become “science sleuths” and suggest the relative age of tombstones by comparing how weathered the tombstones appear. Students make sugar-cube models of tombstones and use water to simulate the effect of rain on actual tombstones. They discuss scientists’ use of models and explore the possibility that some rocks might react to water in a similar way.

Lesson 2: Students continue to explore the question, What happens to earth materials that always are out in the weather? In this lesson, students look at the effects of wind by making a “sand blaster.” They make their own sandpaper and use it as a springboard to discuss how moving sand grinds away rocks. Then, they read about how blowing sand weathers rocks over long periods of time.

Lesson 3: Students explore the downhill movement of sand particles in piles of sand. First, they try to make a tall sand pile using dry sand. They divide the pile of sand and observe what happens to the sand grains. They use water to make the sand pile higher and observe the sand as it dries. Finally, students read about a fictitious road cut into a rocky hill. They relate potential problems with rock slides along the new road to their investigation with the sand piles.

Lesson 4: Students explore the downhill movement of water on the surface of Earth by making models. Teams construct models of the watershed of the Mississippi River and track the movement of water from higher to lower elevations. Teams present their models to the class and demonstrate how models help scientists learn about the world around them.

Lesson 5: Students suggest the components of a stream and then construct models of a stream. Teams test their models, observe as small streams form, and investigate questions about the changes that streams make to the surface of Earth. They relate the changes they observe to the processes of erosion. As an optional activity, students observe what happens to a model town when a stream floods. They read about a midwestern flood of 1993 and discuss the positive and negative effects of flooding.

Lesson 6: Students observe a demonstration model of a stream table and compare the speed of water and stream loads in nearly level and steeper streams. Students explain the activity of streams in terms of erosion and deposition, using appropriate terminology. They read about Niagara Falls and learn that slow changes to the rocks under the falls have resulted in big changes to the falls over time. Finally, students learn how scientists, using measurements they can make in the present, predict how the surface of Earth will change in the future.

Lesson 9: Students review the class chart from Lesson 1. They propose additions and changes to the list and generate a new list titled *Ways the Surface of Earth Changes*. From this list, students select a change that they represent in a display of Earth’s surface “before the change” and “after the change.” Then, students prepare and present a report, describing the change and what caused it.