Cross-Curricular Activities Connected to Earth Science, Grade 4

The following activities from ***Changing Earth,*** integrate math, social studies, English Language Arts (ELA), art, and more into earth science topics. These cross-curricular connections help students see how science is related to their lives, and the world they live in. These activities reinforce and extend ideas about geological events and the history of Earth and are perfect for learning-from-home lesson plans. Permission is granted to incorporate these activities into teacher and parent lesson plans.

Layer the Fractions (Math)

Earth's crust is only about 1 percent of the thickness of the entire Earth. One percent (1%) is the same as 1/100, which is equivalent to 10/1000. Challenge students to make an equivalent fraction to determine the thickness of the entire Earth if Earth's crust is about 30 km thick. Then have them convert the answer from kilometers into miles.

Countries of Fire (Social Studies)

Have students use the Internet to research the different countries that are connected to the Ring of Fire. Ask them to find stories of natural disasters in those countries and discover what the citizens did to recover from the disaster.

Science in the News (Social Studies)

Select an article about an earthquake or volcanic eruption. Choose an article that discusses the event and how people were affected by it. See Appendix B for more information on this. There is a Teacher Sheet to help you select articles, an Article Report Template to give to students to help them summarize the article, and a Credibility Rubric to help you or your students choose unbiased articles.

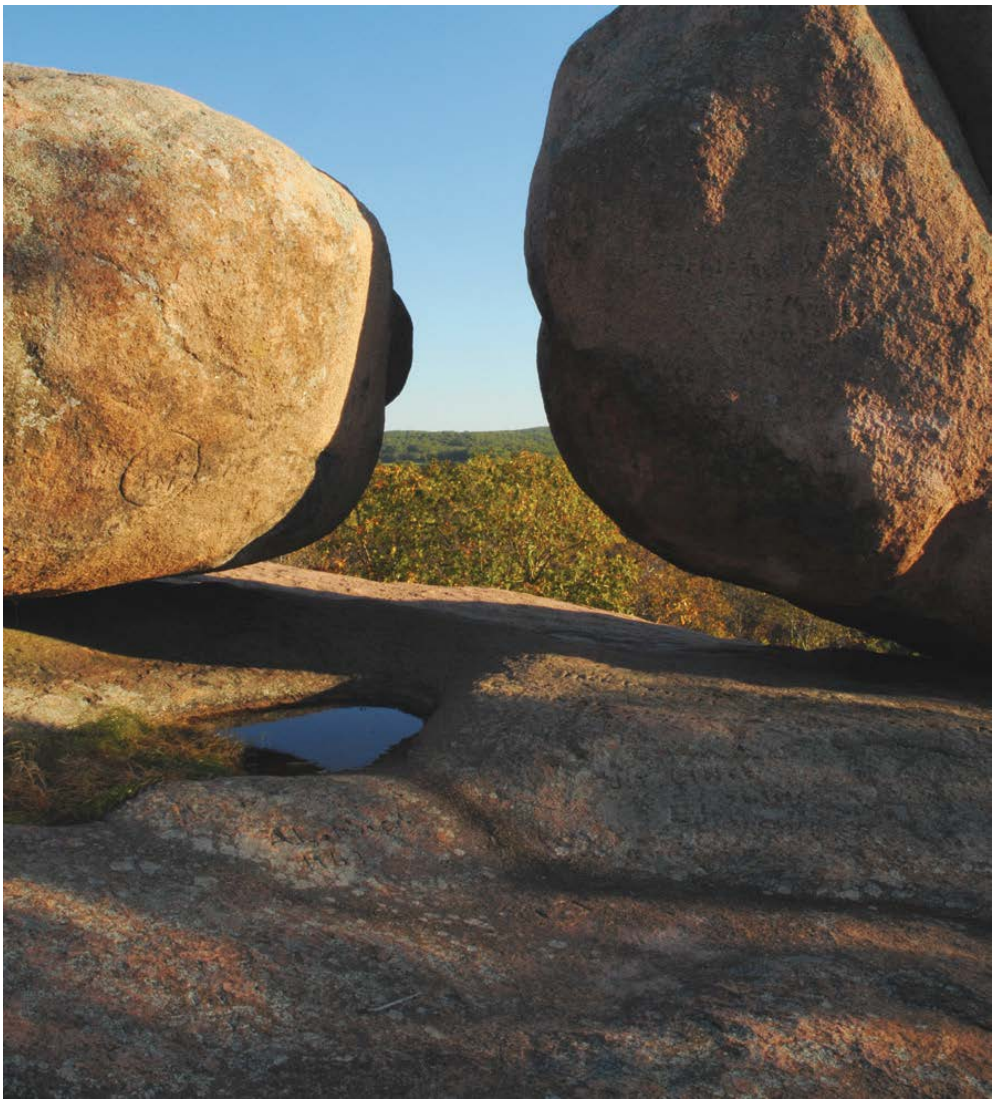
Mountain Math (Math)

Challenge students with the following word problem:

- Mount Rock Cycle is made up of three different types of rock. Two-thirds of the mountain is metamorphic rock and one twelfth is sedimentary rock. What fraction of Mount Rock Cycle is igneous rock? (One-fourth)

Between a Rock and a Hard Place (ELA)

An idiom is a phrase that should not be taken in the literal sense but has a meaning of its own, often completely unrelated to the meanings of its individual words. For example, the idiom “A rolling stone gathers no moss” is a phrase that originally meant that people who do not stay in one place will not prosper because a rolling stone does not have time to grow moss if it is moving. In recent times, the same idiom has come to have the opposite meaning—that a person with ambition is more successful than a person not trying to achieve anything. In this understanding, the moss would be slowing the progress of the stone. Invite students to make up an idiom for how it is important it is to work hard and have ambitions using words about landforms.



Flowing Math (Math)

Have students measure the width and depth of the canyon created by water flowing through the soil when the stream table is on a flat surface. Students should reset the soil and place a large textbook or block under the side of the stream table with the hill. Direct students to pour water into the stream cup and measure to see if a different-size landform is created. Challenge students to think of another way to change the water flow and allow them to test their ideas. Students should record data during their investigation in a chart and then use their data to create a bar graph.

Variables of water flow	Width of canyon (cm)	Depth of canyon (cm)

Cracking Up (Literacy)

Read aloud Cracking Up by Jacqui Bailey. Discuss the causes and effects of the changes that happened to the cliff in the story.

Flowing Paint (Science and Art)

Because liquid moves freely, there are many twists and turns, called meanders, in a river. What happens to a drop of liquid paint if you blow on it with a straw? Does the liquid move in one direction? Invite students to place a small drop of paint in the middle of a sheet of paper and blow on the paint through a straw. Students should see that the air moves the paint on the paper.

Holding Water (Engineering)

Explain that one reason engineers design and build dams is to retain water for drinking. Challenge students to use classroom materials to build a dam to retain the water in their stream tables and prevent it from flowing downhill.

Earth's History (Social Studies and Science)

Geologists divide Earth's long history into eras. The Paleozoic Era was a time of early life on the planet. The Mesozoic Era, or the time of the dinosaurs, is considered the time of "middle life." The Cenozoic Era, which began when the non-avian dinosaurs went extinct, describes more recent life. Students learned in Lesson 3 that the Grand Canyon was formed over millions of years through the processes of erosion and uplift. The Grand Canyon is striking for another reason: it is one of the few places on Earth where the rocks span from two billion years old to 230 million years old. This means that the rocks are from both the Paleozoic and early Mesozoic Eras. Have students investigate what era the rocks in their local area are from. Might they hold dinosaur fossils, or are the rocks too old or too young?

River Carvings (Geography and Science)

The Colorado River, which flows through the Grand Canyon, is not the only river to have carved a path through millions of years of history. Have students research other rivers that have left their mark on Earth's surface. Examples include the Red Deer River in Canada, the Amazon River in South America, and the Nile River in Africa.

Mountains Shrinking, Mountains Growing (Geography)

Explain that some mountain chains, such as the Appalachian Mountains in the eastern United States, are very old. Long ago they were much taller, but over the years, wind and rain have weathered and eroded them. As a result, they are shrinking. On the other hand, the Himalayan Mountains are growing. Two of Earth's plates are colliding, and where they meet, they push up the land around them. Because of this, the Himalayan Mountains are the tallest in the world, and they continue to get taller. Ask students to learn more about this using books in the school library or online resources.

Table Measures (Math)

Give each student a ruler and ask them to measure the length and width of the stream table. Challenge them to use these measurements to calculate the perimeter, area, and volume of the stream table.

Changing Words (ELA)

Good readers can determine the meaning of an unfamiliar word based on prior knowledge of the root or affixes of the word. For example, sedimentary rocks are made from sediment. A good reader can determine the meaning of the word "sediment" based on existing knowledge of sedimentary rocks: Sediment is formed by the erosion of rock and is deposited to form sedimentary rocks. "Sediment" must refer to bits and pieces of material because small pieces of rock are pressed together to make sedimentary rock. Challenge students to determine the meanings of the following words using what they have learned from the unit.

- Erode
- Morph
- Elevate

Make Rocks (Art and Science)

The class can make its own sedimentary rocks using different layers of homemade clay. Follow the directions below to prepare the clay. Next, invite students to layer the colors. Can they identify which layer of their sedimentary rock is the oldest? Which layer is the youngest?

- Mix three-quarters cup flour, one-half cup salt, and one-half cup cornstarch in a bowl.
- Divide the mixture into 2–4 different parts, each in its own bowl.
- Prepare one cup of warm water and food coloring for each bowl of dry mix.
- Add the warm, colored water to the dry ingredients and mix until the mixture becomes slightly hardened. Knead the mixture.

Plugging the Volcano (ELA)

In science-fiction movies, brilliant scientists invent fanciful machines to solve outrageous problems. Have students think about the sci-fi movies they have seen. What are some of the problems the world faces, and how do the scientists solve them? As a class, make a list of these movies. Then list the problems and solutions presented in each. Put a check mark next to the solutions that students believe could someday happen and cross out those they think are too outrageous to ever happen. Next, discuss the possibility of some of these solutions.