



## Layer Cake Geology

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Grade Level: K-5

Preparation Time: 5 minutes or less

Activity Duration: TBD

### Concepts Addressed

- Sedimentary rocks form layers.
- When deposited, younger (more recent) sedimentary rock layers sit on top of older rock layers (Law of Superposition).
- Sedimentary rock layers and time can be correlated.
- Relative ages of rocks can be determined based on rock layer position.
- Relative ages of fossils within rock layers can be determined based on position.

### Objectives

The student will:

- Understand the concept of the Law of Superposition.
- Explain how layers of rock represent periods of time.
- Determine relative ages of rock layers.
- Determine relative ages of different types of fossils associated with different rock layers.

### Materials Included

- Colored foam layer cake (5 layers)
- Laminated Fossil Fauna Icons (5)
- *Layer Cake Geology Worksheet*

### Materials Not Included

- Paper for copies of worksheets
- Markers, crayons or colored pencils
- Straight pins

### Background

Because of the ways in which it can form, sedimentary rocks almost always form in relatively flat layers. Sediment carried by water in rivers, lakes, ponds or seas settles out of the water due to density and gravity and may be deposited over broad areas in a flat layer. Sedimentary rocks formed by precipitation (chemicals that were dissolved in water remain after liquid evaporates)

also tend to form in relatively uniform and broad expanses (these formation mechanisms are explored in detail in the sedimentary rock activity section). In any given formation setting, sedimentary rock builds upwards, and over time, as environments changes, new layers of sedimentary rock form over the top of old layers. Because the methods of sedimentary rock formation are understood, it is assumed by scientists that unless other geologic forces have changed the position of rock layers (faulting, folding, etc.) that younger sedimentary rock layers sit on top of older layers. This is called the Law of Superposition, and is important in using rock layers in understanding the order of events over vast periods of time.

## **Part 1—Sedimentary Rocks form Layers/Law of Superposition**

### **Procedure**

#### **Prior to Activity**

1. Set out layers, icons, markers or crayons and pins.
2. Photocopy worksheets—one per student.

#### **During Activity**

1. Explain to the class that rocks, especially sedimentary rocks, tend to form in flat layers (refer to background information above). Ask the class to think about sedimentary environments (explored in detail in the *Sedimentary Rock and Formation of Fossils* activities) such as lakes, rivers and shallow seas and how the sediment settles in these areas.
2. Explain to the class that over time, new sedimentary environments form on top of the older ones, and deposit new sedimentary layers over the older layer. Over time, these layers build up like a giant layer cake.
3. Using the foam layers, demonstrate how layers form from the lowest level upwards (put the pink layer down first, then orange, purple, yellow and blue on top).
4. Ask the following questions for the students to answer:
  - a. Which layer is the oldest? (the bottom--pink)
  - b. Which layer is the newest/youngest? (the top--blue)
  - c. Which layer formed first? (the bottom-pink)
  - d. Which layer formed last? (the top--blue)
  - e. Did the purple layer form before or after the yellow layer (before), etc.?
5. When it is clear that the students have an understanding of the concept of rock layers and the correlation between the layer position and the relative age of the layer, move on to Part 2.

## **Part 2—Rock layers and relative age**

1. Explain to the students that we can use rock layers to help understand when dinosaurs and other animals lived in relation to each other.
2. Using the foam layer cake, start at the top and insert the human icon into the side of the first (blue) layer. Explain to the students that the top of the cake is the present and that we find human fossils in Earth's most recent layers of sedimentary rock.
3. Continue to move downward through the cake layers adding icons in the following order:
  - a. Human (blue layer)

- b. Mammoth (yellow layer)
  - c. Non-avian dinosaur (purple layer)
  - d. Trilobite (orange layer)
  - e. Microbe (pink layer)
4. Once the layers of the cake are labeled with the icons, ask the students some of the following questions:
  - a. Which lived first—dinosaurs or mammoths? (dinosaurs)
  - b. Which is older—dinosaurs or trilobites? (trilobites)
5. Hand out copies of the *Layer Cake Geology Worksheet*.
6. Instruct the students to color the cake layers on the worksheet as labeled (the same colors and order as the foam cake example) and use the cake to answer the questions on the worksheet based on their new knowledge. Go over the answers together as a class.

### **Extension**

- After you have worked with students to determine the relative layers/ages for each representative fossil icon, discuss the idea of the fossil record with the students. Can students come up with any statements about evolution or the fossil record based on this model (*for example, fossils appear to progress from more simple to more complex forms over time*).