

# Worksheet: Sedimentation

## Create a sediment bottle!

**Purpose:** In this experiment, we will make a sedimentary layer model using gravel, sand, chalk powder and a water bottle. The sedimentary layer will demonstrate how sedimentary rocks are formed in rivers, lakes, and oceans.

**Objectives:** Students will be able to:

- identify with the sedimentation process.
- create a sediment jar.
- observe and identify the process of heavier materials sinking to the bottom.

**Skills:** Students can demonstrate:

- Classifying
- Communicating
- Hypothesizing and predicting
- Inferring
- Observing
- Posing questions

**Time Required:** 45 minutes

**Group Size:** Individually or by working in teams of 2-3 students.

**Materials/Preparation:** Includes:

- Small Clear Plastic Water Bottle and Cap
- Gravel
- Sand
- Chalk Powder
- Water
- Coffee Filter
- Scissors
- Tablespoon

**Background:** The exposure of rocks to the forces of wind, rain, snow, and ice at the Earth's surface breaks them down into smaller particles. The particles are transported by wind, water, and gravity and eventually deposited as sediments in or near streams and rivers. It is a continual process of eroding and depositing, riverbanks are cut and sandbars are deposited.

Sediment bottles are models of this process. Sediments are suspended in a solution and as the water slows they are deposited. As the solution spins more energy is added and as it slows the materials drop out in layers, causing the definition of the sedimentary layers.



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**Activity:** Follow these steps:

1. First take the scissors and cut a small hole in the middle of the coffee filter. Make the hole just large enough so the gravel will be able to fall through.
2. Shape the coffee filter into a funnel and place it into opening spout of the bottle.
3. Measure out 5 tablespoons of sand and pour it into the bottle.
4. Measure out 5 tablespoons of gravel and pour it into the bottle.
5. Measure out 5 tablespoons of chalk powder and pour it into the bottle.
6. Pour water into the bottle until it is 1/2 way full.
7. Student to write name on bottle cap. Screw the cap onto the bottle. Shake the bottle for 20 seconds to mix up everything.
8. Set the bottle down and let it sit for a few minutes and observe what happens.
9. You should observe the ingredients settle to the bottom of the bottle in different layers.

**Observations:** After the sediment bottle has been allowed to stand undisturbed:

- (a) what does the student observe?
- (b) student to draw and label what is seen on a diagram of the sediment bottle.
- (c) student to predict what will happen after the sediment bottle is allowed to sit undisturbed for one week.
- (d) Which types of sediments float? Which ones move along the bottom?
- (e) If you were to continue moving the bottle for a long time, what would happen to the large sediments?

**Teacher Notes:** When we shook up the bottle, all the particles of the various materials mixed together in the water much like what happens in rivers, lakes, and oceans. When we set the bottle down, the particles sank to the bottom and arranged themselves by size and weight. The particle sediments that were the heaviest sank to the very bottom of the bottle (gravel).

The next heaviest sediment layer formed on top of the gravel (sand). And finally the lightest sediment particles settled on the top layer (chalk).

Sedimentary rocks are formed when small particles of earth materials break apart and when weathered away by wind and water.

These small particles eventually get carried away and washed down rivers, lakes, streams, and oceans. Once in the water, the particles settle to the bottom in layers formed by their size and weight. We call this sediment. Over time the layers of sediment get hot due to the pressure and weight of other layers on top of them. The heat and pressure turns the sediment layers into rock. These sedimentary rocks have layers of the particles inside.

**Closure:** Place the sediment bottle in a location where it will not be disturbed. Observe how the layers define over time. Discuss, as a class and then ask the students how this relates to real-world sediment.

**Suggested Student Assessment:** Ask students to write and/or illustrate what they did during this activity and what they learned from their participation in the activity.

**Extending the Lesson:** Ask students to create other sediment bottles with different materials. Encourage students to do some research on the different layers of sediment found in Abu Dhabi.