

## Sedimentation Demonstration

Age: High School

### Objective

To help students understand how the grain sizes of different soil types affects their physical properties and how they settle in water.

### Background Lesson

Soil is far more complex than most people think. The way it is moved by the environment affects habitats and ecosystems. And the way it is used and distributed by people is important to reducing erosion and managing agriculture. Scientists usually classify it by particle sizes:

- Clay < 0.002 mm
- Silt 0.002 – 0.05 mm
- Sand 0.05 – 2.0 mm
- Gravel < 2.0 mm

Dirt is any mixture of the above, combined with dead/dying/rotted organic matter – small bits of wood, shell, bones, leaves, etc. The finer the particles are, the longer they remain suspended in the water especially if they are being agitated, such as in a stream or river.

### The Activity

#### Materials

- Clay
- Silt
- Sand
- Dirt
- Gravel
- 5 basins
- Water
- A small scoop or shovel
- A jar with a watertight lid

#### Preparation

Lay out the basins in an area that is easy to clean up and pour in some water.

## **Procedure**

- 1. Mix the water in each basin with an equal amount of clay, silt, sand, dirt and gravel. Have students try to put objects on top or press their hands into each mixture and compare what it feels like**
- 2. Scoop up some clay, silt, sand, dirt and gravel and place the three together in a jar. Add enough water to cover, the secure the lid tightly and shake vigorously for 30 seconds.**
- 3. Have students note what the sediment and water in the jar looks like immediately and some time after shaking and being left alone. How many layers can be seen? What does the jar look like after sitting for 10 seconds? A minute? A day?**
- 4. Take the jar outside and tip the contents out on a bare surface such as asphalt or concrete. Have students write down the flow pattern as the water and soil spreads out. Try pouring out the basins with only one type of soil size for comparison.**

## **Post Activity Discussion**

- What was the sand and water in the basin feel like? How does it compare to quicksand you see in the movies?**
- What kind of pattern was formed when the water-soil mixtures were poured out?**
- What material flowed the shortest distance from the jar or basin? What flowed the farthest?**

## **Possible Assignments**

- Have students look at and compare overhead pictures of notable river deltas in river areas such as the Nile (Egypt), Mississippi (United States), Rhine (Netherlands), Po (Italy), Yangtze (China), Tigris-Euphrates (Turkey, Syria, Iraq) or Ganges (India) (satellite photos can be found online). What do they have in common with the way the water-soil mixture in the jar spread out? With each other (compare environmental and ecological aspects, as well as human agriculture, populations and activities)?**
- Have students write a report on erosion and desertification. What causes it? What happens to the topsoil? How does it affect us? How can it be prevented?**
- Have students read and then write a report about the Dust Bowl in North America during the Great Depression in the 1930's. How was society affected? What effects are still felt today? What should we do to prevent this?**

**One Fish at a Time**