Beavertail Geology

Superposition

The law of superposition is simple. It means that things settle in order, one on top of another. Therefore, the things that settled first will be near the bottom of a stack and the last things will be near the top.

The law of superposition is a very powerful tool when used to understand the stories that rocks can tell about the deep history of Earth. It has a long and colorful history because many times it has caused strongly held ideas to be overturned.

Sedimentologists

Today you are a sedimentologist, a scientist that is an expert on the way rock particles settle to make new rock. You are about to learn two ways that you can determine the *Direction of Younging* in a rock exposure. Don't let this new term bother you, it simply means the up direction when looking at a stack of layers. Remember that the last things to fall, the youngest, will be at the top of the stack.

Activity Overview

In this activity, you will mix several batches of slurpy mud and dump them into a half-filled soda bottle. By observing the patterns that form, you will be able to identify *Graded Bedding* and *Cross Bedding*.

Materials

Newspaper

Mixing spoon

1 large empty soda bottle

1 small empty soda bottle

Buckets of water and dirt

Bucket for waste

Instructions

First read all of the steps and think through what you are going to do. Now you are ready to begin.

1. Gather all of the materials that you'll need.
2. Spread newspaper over your work area. When you clean up, all you'll have to do is roll it up.
3. Add an inch of water to the bottom of the large soda bottle.
4. Add water and dirt to the small soda bottle and mix it up so that it makes a thick slurpy mud 3 to 4 inches deep.
5. Pour the mud into the large bottle in one smooth motion.
6. Wait about three minutes.
7. Repeat steps 4 - 6, two times. If the water gets too close to the top of the large bottle, carefully pour off some into the waste bucket.
8. You will have added three batches of mud to the large bottle. After the last mud pouring, set the large bottle aside and clean up your work area. Figure 1 shows a finished mud bottle.

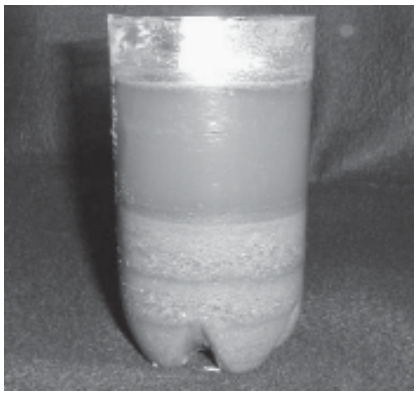

Figure 1

Interpreting Bedding

The bits of rock that are carried and deposited by wind, water, or ice are called *Sediment*. You have built a miniature sediment formation in your soda bottle. Carefully examine the layers of sediment that formed in the large soda bottle. You will see that in each layer there is a pattern of particle size and usually, color change. This pattern stops at the top of each layer and repeats itself in the layer above. This pattern is called *Graded Bedding*. In the space below, write a brief description of how the particle size and color pattern changes as you look from bottom to top of each layer.

Now look to see if there is any place where the top of one layer is cut off by the bottom of a new layer above it. You can spot these cutoffs because they end against the unbroken bottom of the layer above. This is called *Cross Bedding*. The trick to reading cross bedding is to remember that "young cuts old". This means that the cutoff layer was the older layer. As the new, younger layer was laid down, it cut across the older layer.

Now make a sketch of cross bedding in the space below.

Graded Bedding Size

Graded Bedding Color

Cross Bedding Sketch

Words to Know and Understand

Cross Bedding - Where younger sedimentary layers cut off older layers.

Direction of Younging - In an exposure of rock layers, the direction of the youngest, or last added, sediment.

Graded Bedding - Where the size of particles in a sedimentary layer changes from course to fine in the direction of younging.

Sediment - Bits of rock material that are carried and deposited by wind, water, or ice.