

How

Nature Moves

Sediments and

Rocks By

Erosion

Erosion on Earth's surface is happening all around us all the time. Sometimes it happens so slowly or subtly that we don't know it is happening. Other times it can happen quickly right before our eyes. It is important for students to know what erosion is and how it is different from weathering. The definition of erosion is movement of sediments and rocks from one place to another. The forces water, wind, and gravity cause erosion.

- Water run-off will carry with it a lot of sediments and even rocks off to other places. These are called deltas.
- Blowing wind will pick up sediments and carry them off to other places. These are called dunes.
- Waves crashing against cliffs will disturb the soil and weather the rock on the cliffs. The loose soil and rock will fall into the ocean and be carried off by the undercurrents and taken to other places. These are called beaches.
- As glaciers slide down the side of a mountain, they pick up a lot of dirt on their way down. When the glacier reaches the bottom of the mountain it makes a pile of dirt. These are called moraines.
- As rocks break off high cliffs by ice in cracks they fall great distances. This falling is erosion since the rocks are moving from a high place to a low place by gravity. These are called piles of rocks.

Water Run-off

When it rains or snow is melting, the water will collect together while going downhill in the form of a stream. The stream will carry with it a lot of sediments and even rocks if the stream is moving fast enough. Where the streams drop the sediments are called deltas.

Experiment #1 A Race to the Bottom

1. You have a plastic tub of sand in front of you. Make a mountain range out of the sand. How do you think mountains are formed?

Uplift from under the crust of the earth.

2. Put some water in the can without the holes. Hold the can with the holes in the bottom over the mountain range. Have your partner pour some water in the can half way. Move the can over the mountain range so all parts of the mountain get “rained” on. Describe what happened.

As the water goes down the side of the mountain, the sand is carried down with it. It is forming gorges in the mountain.

3. Have the partner hold the can over the mountain range and do the same thing. Further describe what happened.

The same thing happens. However, a lake is forming down at the bottom of the mountain.

4. What is forming at the bottom of the mountainsides?

Sand is gathering down at the bottom of the mountain. These are called deltas.

5. What type of rocks could form at the bottom of the “lake”?

Sedimentary rocks: conglomerate, sandstone, shale, and limestone.

6. How is weathering happening at the same time the water is running down the mountainsides?

The small rocks could be hitting against each other breaking down.

Blowing Sand

If the wind blows strong enough it pick up the sediments and carry off to some other place. Where the wind has blown the sand are called sand dunes.

Experiment #2 Blowing in the Wind

1. Level out the sand with your hand. With your hand acting as wind, gently push the sand with your hand. Describe what you saw happen.

There are sand dunes starting to form.

2. Continue to gently push the sand with your hand. Describe what has happened on both sides of the dune.

On side of the hill the slope is gentle on the side the wind is blowing on. On the other side of the hill the slope is steep where the sand is spilling over on.

3. How is weathering happening at the same time sand is blowing through the air?

As sand is blowing in the air, it is hitting stone formations and wearing them down.

Waves Against the Cliffs

On the coasts of oceans, waves crash up against the cliffs and break down the rocks and disturb the soil. The small sediments and small rocks that fall into the ocean are then carried off by the undercurrents and taken somewhere else. The place where these sediments are taken by the undercurrent are crating a new beach or adding to an old one.

Experiment #3 Crashing and Trashing Water

1. Make a cliff out the sand on one side of the plastic tub. Put water on the other side of the tub making it look like an ocean. With your hand, gently push the water against the cliff one or two times. Describe what you see happening to the cliff.

As the water is hitting against the cliff, it is wearing it away and taking the sediments back into the ocean.

2. Push water against the cliff a couple times more. Describe what you seen forming at the bottom of the cliff.

There is a gradual beach forming at the bottom, gradually sloping up toward the cliff.

3. What type of rocks could form at the bottom of the “ocean”?

Sedimentary rocks: conglomerate, sandstone, shale, and limestone.

4. How is weathering happening at the same time the water is crashing into the cliffs?

As the rocks are falling in the cliff, they are hitting each other and breaking.

Glaciers

Experiment #4 Sliding Glaciers

Glaciers are made by snowfall piling up year after year on mountainside without them melting. Soon, glaciers can be 100 feet deep. Their thickness makes them very heavy, and therefore, gravity will start pulling on them. As they slide down the hill they dig out the dirt under them and take the dirt with them. When the snow melts, they the dirt is left in piles that look like hills. These piles are called moraines.

1. Make a mountain range out of your sand.
2. Put snow (ice) on both sides of the mountain range.
3. Since the sun is in the southern part of the sky, it will melt the southern slopes of the mountain, but not the northern slopes too much. Take off the snow (ice on the southern slope but leave the snow (ice) on the northern slope.
4. Repeat this three times by putting snow on both slopes and taking off the snow off the southern slope representing melting) and leaving the snow on the northern slope.
5. What do you see happening on the northern slope?

The snow pack is getting deeper and deeper because it doesn't have a chance to melt.

6. In real life, gravity will begin to pull the snow down the slope and carrying dirt with it. To simulate this, use your hand to push the snow down the hillside making sure that you take some soil with it. How is this like a real glacier moving down the mountain?

As glaciers move down the mountainside, it not only carries the snow but it also carries soil with it.

7. The snow will now melt because it is at a lower elevation. Take the snow off the dirt that is at the bottom of the mountain. What is left?

Soil is left at the bottom of the mountain in a hill-like structure.

8. Now look at the tip of the mountain. What does it look like?

The top of the mountain looks very sharp and pointed.

9. Why does it look like this?

As the glacier took soil with it going down the mountain, it left a sharp peak where it started.

Gravitational Pull

Experiment #5 Falling Rocks

As rocks break off high cliffs by ice in cracks or temperature change, they fall great distances. This falling is erosion because the rocks are moving from a high place to a low place by the force of gravity. The place where they fall is a pile of rocks.

1. Get some big, heavy rocks that are at least 6 inches in diameter. One after another, drop them at arms-length so they come crashing down onto the ground. Explain how erosion is happening when you are dropping the rocks.

As the falling rocks are hitting the other rocks on the ground, the force of the gravity on the rocks gives it a lot of energy because of weight and speed breaking the rocks as they hit each other.

2. How is weathering happening when the rocks are hitting the ground?

Draw Pictures of each of these erosional forces and the outcome of what the moved soil looks like.