

Teacher station list for Weathering and Erosion lesson

Station 1

Materials:

- One clear plastic cup per student pair
- A marker to label and mark the cups

At this station, students will do a test to show that water expands as it freezes by filling a cup with water and marking the water level on the cup before freezing and after freezing. Comparing the before to after freezing water level, they should make predictions on how this particular behavior of water will impact rocks. Students will need to set this up on Day 1, place their cups in the freezer, and observe again on Day 2.

Station 2

Materials:

- 2 copper pennies (before the year 1981 works the best) per student pair
- 2 beakers per student pair
- 1 tsp. of salt (the salt makes the reaction go more quickly)
- A teaspoon
- Vinegar
- Water
- Pair of tweezers to remove the penny on Day 2
- A marker and tape to label the beakers

Here students test the effect of “acid rain” (modeled using vinegar and salt) on “copper-bearing rocks” (pennies). Students should place a penny in each cup. In one cup (the acid rain experiment) they should sprinkle 1/2 tsp. of salt over the pennies and then pour enough vinegar in to cover the penny. This cup should be labeled “acid rain”. In the other cup, they should cover the penny with water and label it “uncontaminated rain”. Students should record their observations initially, after 10 minutes, and again the following day.

Station 3

Materials:

- 2 Alka-Seltzer or other brand antacid tablets per student pair
- Pair of tweezers to remove tablet
- A small beaker
- Water
- Timer or clock

This experiment will test the effect water has on “carbonate rocks” (Alka-Seltzer tablets). Students should place one tablet in the small beaker or bowl and cover with water. They should make observations during the first few minutes of the experiment and after about 3 minutes (the tablet will be completely dissolved after about 5 minutes) remove the tablet from the water and compare its surface to the second tablet that was not immersed in water to get information about how water affects carbonate rocks. Students will need to clean the used beaker after their experiment to make sure it is ready for the next group to use.

Station 4

Materials:

- 2 pieces of chalk per student pair
- A mortar and pestle
- Pair of tweezers for removing the “rocks”
- Water
- Vinegar
- 2 small beakers

At this station students will test the effect of water and “acid rain” on “limestone” (chalk). Depending on the state of the chalk you provide, they may need to crush it up a bit using the mortar and pestle. Make sure they don’t crush it too fine or it will simply mix with the liquids and dissolve immediately. You want students to have some small pieces of chalk about the size of pebbles to observe the changes. Then they should put equal amounts of the chalk pieces in the 2 beakers. In one beaker, cover the chalk with water. In the other, cover it with vinegar. Make observations of what happens to the surfaces of the “rocks” in each situation. Students can take the rocks out of the solutions to observe if that is easier. At this station, students will need to clean the mortar and pestle and the beakers after their experiment so they are ready for the next group to use.

Station 5

Materials:

- Super-fine iron wool (1 clump per student pair) (this can be found in paint or hardware stores; the steel wool you find in grocery stores is usually stainless steel and will resist rust)
- Pair of tweezers for removing the iron wool
- Water
- One small beaker per student pair
- Tape and a marker to label beaker with

In this experiment, students will place a clump of iron wool in the beaker and cover it with water. They should make observations of the wool before it is placed in water and then return the next day to remove it and make a second set of observations. Make sure they label the beaker so they will know which one is theirs the following day. This models the effect of water on iron-bearing rocks.

Station 6

Materials:

- Sugar cubes (approximately 5-7 per student pair)
- One baby food jar or canning jar with lid
- Gravel (one handful per student pair)

To model how erosion breaks down rocks for instance when rocks are tumbled with sand in the ocean or a river, students will put sugar cubes and a small handful of gravel into a jar with a lid. The sugar cubes represent a softer type of rock and the gravel a harder rock type. Students will shake the jar vigorously for about 5 minutes and make observations about what happens to the “softer rocks” (the sugar cubes). They will need to clean out the jar after their experiment to have it ready for the next group.

Station 7

Materials:

- Sandpaper (a 50 grain or similarly coarse sandpaper will work best for this) (1 small piece per student pair)
- Rough samples of a soft stone such as calcite, limestone, dolomite, fluorite, rhyolite or similar stone with a hardness of about 3-4 on the Mohs hardness scale.

In this investigation, students will explore how wind erosion can erode rocks. Due to the impracticality of using actual blowing sand against rocks, sandpaper will substitute. Students should choose a rock sample that has not been used by any previous groups and sand it down for their 5-10 minutes at the station. If you can have multiple rock types available, they can compare how different rock types affect the rate of erosion. They should record initial and final observations of the rock surfaces. You will need to make sure students set aside the already used rock samples when they’ve finished so that the next group to arrive at the station doesn’t inadvertently use the same ones and find that there is no change in the look and feel of the surface since its already been sanded!

Station 8

Materials:

- Water
- A beaker with a pouring lip

- Shallow pan (an 8x8 baking dish works well)
- Dry sand (enough for each student pair to fill the shallow pan once)

To make observations of splash erosion, students will need to pack the shallow pan with dry sand and then drop or pour water from the beaker onto the surface to make observations of how dropping water can erode rock surfaces. They can start this with the dry sand and as it gets wet, repack it and smooth it down and try again to make observations of the differences. Students can also mound the dirt up into piles and sprinkle water over the piles to simulate rain and notice some interesting shapes appearing in the sand. If you can find one, you may want to have a sample of rock with a hole eroded into it at the lab station to demonstrate how solid rock (in place of the packed sand) that has water dripping on it for a long period of time can wear down. When each student pair is finished, you will need to provide them some place to dispose of the wet, used sand so that the next group can start with a pan of dry sand.

Station 9

Materials:

- Large pan (a turkey roasting pan or plastic tub works well)
- 2-3 textbooks
- Dirt (enough to fill the pan a few times over depending on your class size)
- Water
- Beaker with a pouring spout

Students will model erosion on slopes by creating a “hillside” of packed dirt in a pan that is propped up using heavy textbooks. Students should pour water down the hill and observe erosion. Make sure students repack the dirt for the next group. You will need to keep an eye on this station because depending on how many student pairs you have rotating through the stations, you may need to replace the packed dirt if/when it gets too water-logged to effectively complete this demonstration.

Station 10

Materials:

- Large pan (a turkey roasting pan or plastic tub works well)
- Water
- Sand (enough to make a “beach” at one end of the pan)

Demonstrate beach erosion in this experiment by using a pan of sand with enough water to slosh back and forth when it is picked up and moved. Have students make a sand pile at one end and then slide the pan back and forth to create wave motion. You might start by putting the amount of water in the pan that you feel is safe for students to slosh around. Provide them with a bucket or bowl to put any used wet sand into after their turn. Ask them to make predictions about what would happen to larger rocks undergoing this process over long periods of time. You could have a piece of sea glass sitting at this station to provide some evidence of how this process can erode solid materials.

Station 11

Materials needed by teacher:

To make the “mini glaciers” you will need ...

- small plastic bowls (1 per student pair)
- gravel and sand (a handful per bowl)
- water

Fill the bowl half full of water and throw in some sand and gravel. Freeze overnight. The following day, throw more sand and gravel on top of the already frozen water and fill again with water to freeze again. You should then have a “mini glacier” with some sand and gravel distributed throughout the ice.

Materials needed by students:

- A “mini glacier”
- A thick layer of clay (about the length and width of a brick)
- A brick (1 brick for every 2 pairs of students)

Students will model glacial erosion by moving their “mini glacier” slowly over the clay and/or the brick surface. Each group will need their own “mini glacier” since it will melt over the course of their 10-15 minutes at the station. This melting process will leave sand, gravel, and water all over the area where students are experimenting, so if needed you may want to have them do all of this in a large pan or a surface that is okay to get wet and dirty. Students should make observations of the surfaces of the bricks and clay. Make sure they actually feel the brick’s surface. Although the texture of the brick changes as it is eroded, its appearance can be quite similar before and after, so touching it before and after will give students a better idea of how eroded it is. The clay should show very clear markings where the sand and gravel scraped over it. The bricks will smooth out very quickly, so you’ll need a brick for every two groups (one side per pair of students).