Lesson 17

How does acid rain affect copper-bearing rocks?

With this lab you will investigate how acid rain affects copper-bearing rocks. To model acid rain, you will use vinegar with a little salt added. To model copper-bearing rocks, you will use pennies which contain small amounts of copper.

Materials:

* 2 copper pennies
* 2 glasses
* Approximately 1 tsp. of salt
* Vinegar
* Water
* Pair of tweezers to remove the penny for observation
* A marker to label the beakers
* A teaspoon

Procedure:

Day 1

1. In your lab notebook, record your observations of the two pennies
2. Place one penny in each of two glasses
3. Using the tape and a marker write your name on each glass
4. On one glass, write “Acid Rain” on the label
5. On the other glass, write “Pure Rain” on the label
6. In the glass labeled “Acid Rain” sprinkle 1 tsp of salt over the penny and then add enough vinegar to cover the penny
7. In the glass labeled “Pure Rain” add enough water to cover the penny
8. Set these glasses aside for 10 minutes and then take another look. Record your observations in your lab notebook. Does the “acid rain” penny look different from the “pure rain” penny? How? Describe what the pennies look like in your notebook
9. Set them aside again and taken another look tomorrow

Day 2

1. Take a look at the two pennies and record your observations in your lab notebook. Use the tweezers to take the pennies out of the glass to get a closer look
2. In your lab notebook, write down our thoughts about how acid rain might alter copper-bearing rocks
3. In your lab notebook, record whether you think this exploration demonstrated chemical weathering, mechanical weather, or erosion

Lesson 18

How does water affect carbonate rocks?

With this lab you will investigate how water affects carbonate rocks. To model this you will use antacid tablets (Alka-Seltzer is one brand of antacid tablets) that contain carbonates.

Materials:

* 2 Tums or other brand antacid tablets
* A small glass
* Water
* Pair of tweezers to remove the tablets for observation
* Timer or clock

Procedure:

1. Take a look at the Tums tablet and record your careful observations
2. Place one tablet in a small glass and cover it with water and add 1 tsp of vinegar.
3. Make careful observations for 3 minutes. Use the timer or a clock to watch the time
4. After 3 minutes, use the tweezers to remove the tablets and then record our observations of the surface of the tablet in your lab notebook. Compare the tablet to an unused one to make sure your observations are accurate.
5. In your lab notebook, write down your thoughts about how water might alter carbonate rocks
6. In your lab notebook, record whether you think this exploration demonstrated chemical weathering, mechanical weathering, or erosion

Lesson 19

How does water affect limestone rocks? How does acid rain affect limestone rocks?

With this lab you will investigate how water and acid rain affect limestone. To model limestone you will use Tums Antacid, which is a type of limestone. To model acid rain, you will use vinegar.

Materials:

* 2 pieces of Tums Antacid
* Steel bowl, screwdriver, and hand towel
* Water
* Vinegar
* 2 small glasses
* Pair of tweezers to remove the Tums for observation
* Tape and a marker to label the glasses

Procedure:

1. You need to have pebble-size pieces of Tums for this experiment. If you need to, use the steel bowl, screwdriver, and towel to break the Tums into smaller pieces
2. In your lab notebook record your observations of the Tums. How does it feel? What does its surface look like?
3. Place half of the Tums pieces in one glass and label it “Acid Rain”
4. Place the other half of the Tums pieces in the other glass and label it “Water”
5. In the glass labeled “Acid rain” cover the Tums with vinegar
6. In the glass labeled “Water” cover the Tums with water
7. Record your observations in your lab notebook. After waiting about 3-5 minutes, you can try to take the Tums pieces out of the glasses if you want to make additional observations. Otherwise, record your final observations in your lab notebook.
8. In your lab notebook, write down your thoughts about how water and acid rain might affect limestone rocks
9. In your lab notebook, record whether you think this exploration demonstrated chemical weathering, mechanical weathering, or erosion
10. When you’re all finished, make sure to rinse out the bowl and glasses

Lesson 20

How does water affect iron-bearing rocks?

With this lab, you will investigate how water affects iron-bearing rocks. To model iron-bearing rocks you will use pieces of iron wool. Iron wool contains iron just like iron-bearing rocks.

Materials:

* Super-fine iron wool
* Water
* One small glass
* Pair of tweezers to remove the iron wool for observation
* Tape and a marker to label glass

Procedure:

Day 1

1. Take a close look at the iron wool. Record your observations of what the iron wool looks like
2. Use a piece of tape and the marker to write your name on the glass
3. Put a small clump of iron wool in a glass and cover it with water
4. Set it aside until tomorrow

Day 2

1. Using the tweezers, remove the iron wool and record your observations
2. In your lab notebook, write down your thoughts about how water might alter iron-bearing rocks
3. In your lab notebook, record whether you think this exploration demonstrated chemical weathering, mechanical weathering, or erosion

Lesson 21

How does shaking affect different types of rocks?

With this lab, you will explore how rocks are altered by vigorous movement such as ocean waves, falling down a rocky mountain slope in a rock or snow avalanche, or tumbling down a turbulent river. To model rocks of different hardness’s you will use gravel (a harder rock) and sugar cubes (a softer rock). Shaking them will mimic the vigorous motion that occurs in ocean waves, rock avalanches, or riverbeds.

Materials:

* Sugar cubes (approximately 5-7)
* One jar with lid
* Gravel (a small handful)

Procedure:

1. Pick out 5-7 sugar cubes and record your observations of the sugar cubes in your lab notebook
2. Pick out a handful of gravel and record your observations of the gravel in your notebook
3. Put both the sugar cubes and gravel in a jar and close the lid tightly. Then shake the contents of the jar vigorously for about 5 minutes.
4. After five minutes open the jar and look carefully at the sugar cubes and gravel. Record your observations in your lab notebook
5. In your lab notebook, write down your thoughts on how abrasion (whether tumbling down a mountain, being tossed around in waves, or washed down a riverbed) might affect different types of rocks
6. In your lab notebook, record whether you think this exploration demonstrated chemical weathering, mechanical weathering, or erosion
7. When you’ve finished, clean out the jar