

Lab #14: Geology 2 (Chapter 9)

Speleology I

INTRODUCTION:

The objective of this lab is to demonstrate hypogene speleogenesis.

MATERIALS

- Ruler
- Scissors
- 1 Mason/canning jar (with relatively straight sides, that does not “bottle neck” at the top) at least 7 inches tall with a roughly 3-inch diameter
- Wash rag
- Frying pan with relatively shallow sides, filled halfway with water
- 4 thin (less than one inch thick) washing sponges/scouring pads with a diameter/side length at least as long as the diameter of the jar
- Sugar cubes (roughly 30)
- Stove
- Empty soda can
- Stop watch or clock

METHODS

1. Place the wash rag in the pan of water and begin heating the pan of water on the stove.
2. Fill the Mason jar with roughly 3 inches of hot tap water. [If the jar is smaller, adjust accordingly.]
3. Cut the sponges to a diameter slightly larger than that of the jar, so that the sponges will fit snugly within the jar, completely filling the opening.
4. Use the can to push a sponge down into the jar, **keeping the sponge horizontal**, until the sponge is about ½ inch above the water.
5. Stack two layers of sugar cubes on top of the sponge, tightly filling the entire surface area of the sponge.
6. Push the second sponge into the jar, keeping the sponge horizontal, so that it touches the sugar cubes. [Note: do not push so hard that the bottom sponge begins soaking up much water.]
7. Place the jar on the rag in the pan and heat until the water in the jar begins to boil. **Observe** and **record** what happens.
8. When the water reaches the sugar cubes, time how long it takes for the sugar cubes to completely dissolve.



9. If the water does not reach the sugar cubes quickly, using the can of water, slowly push the top sponge downward roughly $\frac{1}{4}$ - $\frac{1}{2}$ inch, so that the bottom sponge begins moving into the water. Be sure to apply pressure evenly across the top sponge, so that the sponge edges do not detach from the sides of the jar, allowing water to move upward between the sponge and the jar. **Observe** and **record**. [If the water does not reach the sugar cubes, push the sponge another $\frac{1}{4}$ - $\frac{1}{2}$ inch.] Again, time how long it takes for the sugar cubes to completely dissolve.

RESULTS/DISCUSSION

1. What does the water in the jar represent?
2. What does the stove represent?
3. What do the sponges represent?
4. What do the sugar cubes represent?
5. What is being represented by pushing the top sponge downward?
6. What does the jar represent?
7. What was the result when the sugar cubes came into contact with water? What was created?
8. What were the two main causes of the hot water being able to reach the sugar cubes?
9. How does the experiment parallel hypogene speleogenesis?
10. What would happen if the applied pressure to the top sponge was much higher than your application? What would that represent?
11. What would have happened if the bottom sponge had large cracks in it? What would those cracks represent?
12. What would be predicted to happen if an even stronger acid (e.g., sulfuric acid) was used instead of water?

