

Dripping Limestone

ACTIVITY SUMMARY: Students will analyze how water passes through different types of limestone

DURATION: Approximately 1 hour

OBJECTIVES:

The students will be able to:

1. Recognize the different kinds of limestone.
2. Express how liquids pass through limestone at different rates.
3. Understand the effects of limestone on water after it has passed through limestone.

VOCABULARY: Buda Limestone, Edwards limestone, Georgetown limestone Flow rate

MATERIALS REQUIRED:

3 types of foam each with a different cell structures to model the three types of limestone found in Wonder Cave.

3 large jars or similar container. Ideally they would have gradients on at least the bottom half to measure volume..

Additional measuring cups

Water

timer

Pieces of Buda, Edwards, and Georgetown limestone

PROCEDURE:

1. Before the activity begins, If the containers do not have measurement markings add them.

Pre-cut the foam to snugly fit in the containers

2. List the three types of limestone found in Wonder Cave. show examples and allow students to examine the differences.

3. Divide the class into groups of two or three. Each group will be acting as a research team and will analyze Flow rates. Distribute the Dripping limestone activity sheets at this time.

4. Distribute the following to each group: 3 types of foam, three identical containers

5. Create a model of a cave. Visually divide the containers vertically into quarters. Leave space in bottom half of the container. Fill the next quarter with ONE type of foam representing one type of limestone. Leave the top quarter empty. Repeat with the other two containers and foam.

6. Distribute the following to each group: Timer, measuring cup, water, Dripping limestone Worksheet.

Dripping Limestone

Limestone is a sedimentary rock, which means it was formed from small particles of rock or stone that have been compacted by pressure. Sedimentary rock is important because it often contains fossils and gives clues about what type of rock was on the Earth long ago. Just like a tree's rings tell a lot about its environment, layers found in sedimentary rock can tell about important changes in the environment.

Limestone is formed in two ways. It can be formed with the help of living organisms and by evaporation.

Ocean-dwelling organisms such as oysters, clams, mussels and coral use calcium carbonate (CaCO_3) found in seawater to create their shells and bones. As these organisms die, their shells and bones are broken down by waves and settle on the ocean floor where they are compacted over millions of years, creating limestone from the sediments and the pressure of the ocean water.

The second way limestone is formed is when water containing particles of calcium carbonate evaporates, leaving behind the sediment deposit. The water pressure compacts the sediment, creating limestone.

Your team will be measuring flow rates through various types of limestone found in Wonder Cave.

Assign each member of your team one of the following jobs:

Data Clerk who is responsible for keeping track of the data onto the worksheet.

Water keeper who is responsible for measuring and pouring water during the experiment

Time keeper measures the time it takes for water to drip through the container.

Process:

Read all instructions carefully. Confirm each member knows their responsibilities for the experiment.

measure 2c of water

Simultaneously start the timer and pour water into the top of one of the containers over the foam piece.

At each time marker check level of water that has passed through the limestone

Team of scientists:

Data:

Amount of water in container after:	Buda limestone	Georgetown limestone	Edwards limestone
5 sec			
30 sec			
60 sec			
90 sec			
120 sec			

Which limestone had the slowest flowrate? Why?

Which limestone had the fastest flowrate? Why?

Did all of the water flow through the lime stone?

What happened to the rest of the water?

In nature what are other materials that water must flow through to reach the aquifer? How might this affect flow rates?

Would this process have a filtration effect? Explain.

How could you test this Hypothesis?