

Stalactites and Stalagmites

Introduction

Have you ever been in a cave and seen formations growing from the ceiling and floor? In this activity, students will learn how stalactites and stalagmites are formed.

Concepts

- Stalactites
- Stalagmites
- Crystallization

Materials

Magnesium sulfate, $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$, approx. 130 g	Dish or saucer
Water, 250 mL	Paper twine, 18"
Erlenmeyer flasks or clear glass containers, 125 mL, 2	Washers or hex nuts, 2

Safety Precautions

Magnesium sulfate heptahydrate is considered nonhazardous. Wear chemical-splash goggles, chemical-resistant gloves and a chemical resistant apron. Use caution with glass containers. Clear plastic jars may be used as a substitute if Erlenmeyer flasks and glass jars are not available. Please review current Safety Data Sheets for additional safety, handling, and disposal information.

Pre-Lab Preparation

1. Prepare a saturated magnesium sulfate solution by filling a jar about half full with magnesium sulfate and then fill to the top with warm water. Shake well.
2. Tie the washers on the ends of the twine and soak the twine in solution. Allow twine to soak at least one hour.

Procedure

1. Once again, mix the saturated magnesium sulfate well and then fill two jars equally with the prepared solution. Add more water to each jar until about three-fourths full.
2. Hang the paper twine in the two jars so the center droops but does not touch the tabletop. The center of the twine should hang below the level of the solutions (see Figure 1).

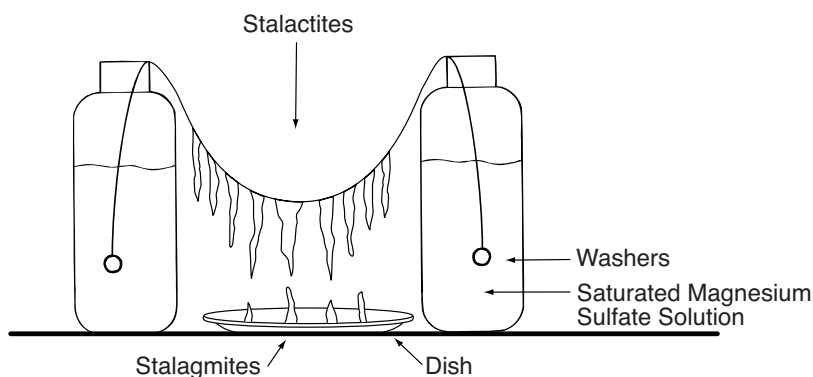


Figure 1.

- Place a dish or saucer below the droop in the twine to collect the drippings.
- Capillary action will draw the magnesium sulfate solution through the twine. The magnesium sulfate will deposit from the twine and form stalactites on the twine and stalagmites on the surface below the twine.

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures, and review all federal, state and local regulations that may apply, before proceeding. The excess magnesium sulfate solution may be rinsed down the drain with excess water according to Flinn Suggested Disposal Method #26b or saved for future use.

NGSS Alignment

This laboratory activity relates to the following Next Generation Science Standards (2013):

Disciplinary Core Ideas: Middle School

- MS-PS1 Matter and Its Interactions
 - PS1.A: Structure and Properties of Matter
- MS-ESS2 Earth's Systems
 - ESS2.A: Earth's Materials and Systems

Disciplinary Core Ideas: High School

- HS-PS1 Matter and Its Interactions
 - PS1.A: Structure and Properties of Matter

Science and Engineering Practices

- Developing and using models
- Planning and carrying out investigations

Crosscutting Concepts

- Patterns
- Cause and effect
- Scale, proportion, and quantity
- Structure and function
- Stability and change

Tips

- Allow several weeks for the full formation of the stalactites and stalagmites.
- This experiment may also be performed with baking soda in place of magnesium sulfate.
- Paper twine, available at craft stores, works well. Certain materials, such as cotton and wool, will not “draw” the solution.

Discussion

In many regions of the world limestone (calcium carbonate) rocks make up a major portion of the rock strata. In limestone regions underground openings such as vugs, crevices, caves and caverns are often found. Calcite (calcium carbonate) and dolomite (carbonate of calcium and magnesium) are the major minerals in these areas. These minerals are slightly soluble so they dissolve in the ground water and the run-off eventually seeps through the rock layers and into the openings and cavities. As the saturated solutions evaporate, crystallization of the minerals occurs. If crystals form from the top (ceiling) of the opening, they are known as stalactites. Their floor-bound counterparts are called stalagmites.

References

Gross, G.; Calangelo E.; Holzer, M. *A Demo A Day—A Year of Earth Science Demonstrations™*; Flinn Scientific Inc.: Batavia, IL, 2001; p 136.

Materials for *Stalactites and Stalagmites* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP6311	Stalactites and Stalagmites—Student Laboratory Kit
M0017	Magnesium Sulfate

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.