

Copper Sulfate Crystals **Teacher Resource**



Grade Level **6-12**

Objectives

1. The student will develop an understanding of crystal growth.
2. The student will employ simple equipment and tools to gather data.
3. The student will demonstrate the use of 21st century technology with a digital microscope to locate, evaluate, and collect information.

National Standards

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| NS.K-4.1 ; NS.5-8.1 ; NS.9-12.1 | Science as Inquiry |
| NS.K-4.2 ; NS.5-8.2 ; NS.9-12.2 | Physical Science |
| NS.K-4.5 ; NS.5-8.5 ; NS.9-12.5 | Science & Technology |
| NT.K-12.1 | Basic Operations and Concepts |
| NT.K-12.3 | Technology Productivity Tools |
| NT.K-12.6 | Technology Problem-Solving & Decision-Making Tools |

Teacher Background Information

Crystallization occurs through a natural process where solid crystals precipitate from either a solution evaporating, by melting, or by a gas. This experiment will demonstrate crystallization occurring by heating water and dissolving copper sulfate into a ‘saturated’ solution. A saturated solution is when the solution cannot dissolve any more of the solvent. When the temperature of the saturated solution begins to lower, crystals will begin to form because the copper sulfate cannot stay in the solution that is evaporating. The copper sulfate

molecules will continue to add themselves to the existing crystals allowing for the growth of the crystals. This is a great experiment to connect with geodes. Geodes are rocks that after millions of years the water and minerals will evaporate leaving only crystals. Remember, copper sulfate is a skin irritant, so make sure to wear gloves and goggles.

MATERIALS

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|-----------------------------------|------------------|
| Digital Microscope | Glass Petri Dish |
| Personal computer | Distilled Water |
| Interactive White Board/Projector | Hot Plate |
| Copper Sulfate Crystals | Glass Beaker |
| Thermometer | Safety Gloves |
| Safety Goggles | |

PROCEDURE

1. Wear safety goggles and gloves at all times.
 2. Pour 100mL of distilled water into the beaker.
 3. Place the beaker on the hot plate and heat to 26°C.
 4. Add the copper sulfate until it does not dissolve any more.
- NOTE: slowly stir while pouring the copper sulfate into the solution.*
5. Pour the saturated solution into the glass Petri dish.
 6. Place the Petri Dish under the digital microscope and record.

NOTE: depending on space available on the computer, you may want to do a time-lapse recording instead of a continuous recording.

7. Record observations daily.

QUESTIONS

1. Describe your crystal. How many faces? What is the shape?
2. What category of minerals has the same geometric shape as your crystal?
3. What is a saturated solution? Supersaturated?

4. What factors allowed the crystal to grow? Were there any factors that inhibited the growth?
5. Think of an example of when crystallization occurs on Earth.