

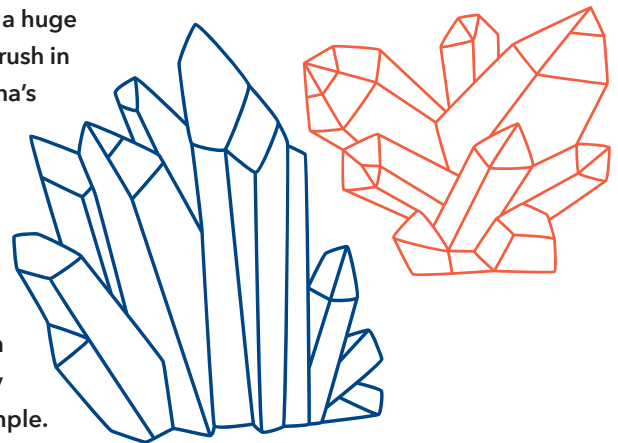
HISTORY OF MINING IN ARIZONA:



As long as there have been people in Arizona they have been mining metals, minerals, and crystals. We know that ancient Arizonans, like the Hohokam, Patayan, Ancestral Puebloan, and Mogollon peoples, mined metals like copper and silver, and precious gems like turquoise and traded those valuable goods with each other. Their descendants, which include O’odham, Quecha, and Hopi people, continued their ancestors’ mining traditions. When the Spanish arrived in the New World and started making their way toward what we now call Arizona, they did so in part because of the rumored mineral and metal wealth of the land. The Spanish began to **industrialize** mining, using enslaved Native and African people to work in the mines they had built on Native land. Mexico gained its independence from Spain in 1821, and one of the revolutionary proclamations **abolished** slavery in Mexico. Mexican miners further industrialized mining in what is now Arizona until 1848 when Mexico had to **cede** about half of its landholdings to the United States following the Mexican-American War. Arizona was an important stopping point for many miners headed to the California gold fields during the gold rush, with many miners settling along the Colorado River to pan for gold or returning to Arizona when they didn’t strike it rich in California. Arizona had a small gold rush in the 1860s, but in the 1870s, huge deposits of silver were discovered, causing a huge population boom. Arizona’s population continued to grow after a copper rush in the 1880s. From the 1880s to the 1950s, copper mining was one of Arizona’s major economic drivers, and continues to be important to the state today. Arizonans have become more critical of mining because of its negative impact on nature and its continued **displacement** of Native people.

So what are crystals?

While most people think of dazzling gemstones when they think of crystals, only some gemstones, like quartz and diamond, are crystals. A crystal is any solid with an organized structure. Other gemstones, like opals or amber, are not crystals: they are rocks or organic matter that have been polished and cut to bring out their beauty. Some crystals are really common--sugar and salt are examples of crystals we use every day!



What are metals, minerals, and rocks?

It all starts with **elements**, the fundamental building blocks for all known materials on earth. Metals are elementary substances, meaning that they are just elements: Cu for Copper, Au for Gold, and Ag for Silver, for example. Minerals are **inorganic** combinations of elements: talc and quartz are both examples of minerals. Rocks are made of a combination of minerals. Some examples of rocks include limestone, obsidian, and marble.



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Grow your own crystals!

You can grow your own sugar crystals to make rock candy! You will need to boil water, so make sure an adult is there to help you!

SUPPLIES

3 cups of sugar	Flavoring/extract (optional)
1 cup of water	Clean jar—glass or plastic work!
Food coloring (optional)	A cotton string or a wooden skewer

Step one: Boil the water and stir in the sugar. Stir until completely dissolved. If you're adding food coloring or favoring, add it now.

Step two: Take the sugar **solution** off of the heat and allow it to cool slightly. While it's cooling, if you plan to make your crystals on a string, tie the string to a butter knife, chopstick, or wooden skewer so you can suspend your string in the jar.

Step three: With the help of an adult, carefully pour the hot sugar solution into the jar.

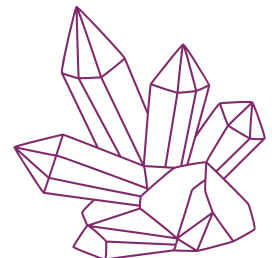
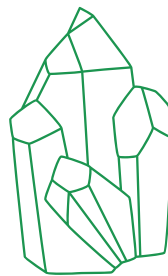
Step four: If you are using a string, lower the loose end into the jar and balance the knife/skewer/chopstick across the top of the jar to suspend the string. If you are using the skewer, simply put one end into the jar and lean the skewer against the opening.

Step five: Cover the jar loosely with a paper towel or coffee filter—it needs to be loose enough to allow for evaporation but covered enough to keep things out of the solution. Place the jar somewhere it won't be disturbed—it could take anywhere from a couple of days to a couple weeks for the crystals to develop. Check up on your jar regularly—if crystals start to form at the top of the jar remove and eat them. If you leave the crystals at the top of the jar your rock candy string/stick won't develop as many crystals as it could.

Step six: When your crystals are developed, remove the jar and carefully enjoy your rock candy!

Why does this work?

Remember that sugar (or sucrose, $C_{12}H_{22}O_{11}$) is a kind of crystal, so it's a material with a highly organized structure. Rock candy is created through **crystallization**, which is when a solid with a highly organized structure (sugar) is dissolved in a **solvent**, in this case, water. When the solvent evaporates, it allows the solid in the solution to reform, or crystallize.



New Vocabulary

Abolished: to formally put an end to a system, practice, or institution

Cede: to give up

Crystallization: when a solid forms and the atomic or molecular structure is highly organized into a crystal structure

Displacement: removing something or someone from its or their original place

Element: A specific grouping of atoms that create the building blocks for all known materials

Industrialize: to build and operate factories and business in a place where they had not been used before

Inorganic: made from material that does not come from plants or animals

Solution: a liquid into which something has been dissolved

Solvent: a liquid that is used to dissolve another substance



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