



BUBBLE & FIZZ

WEEK 1: GEYSERS

EVER WONDER . . . HOW TO MAKE A GEYSER AT HOME ?

What we learned this week:

- ◆ A geyser is a hot spring that shoots water and steam into the air.
- ◆ There are many different types of geysers including fountains and mud pots.

Today's Experiments

1. Tea kettle geyser demo.
2. Create a geyser using a funnel and straw.
3. Experiment with fountain geysers.
4. Mud pot demo.

Did you know?

- ◆ Geysers are underground hot springs that shoot hot water and steam into the air. A geyser is formed when a pool of underground water is heated by nearby magma, which is extremely hot. (Magma is basically liquefied rock. This is what erupts out of volcanoes.) When the water gets hot enough, it begins to bubble, forming steam (just like in our tea kettle). When the pressure from the steam gets strong enough, the water and steam explode through a hole in the earth. Voila -- a geyser! Once the pressure has been released, the water, now cooler, drains back into the underground pool and the process starts over again.



- ◆ The most common type of geyser is the fountain geyser, which usually does not erupt on a consistent schedule. Fountain geysers are formed where there are two or more connected underground pools. The water from the underground pools bubbles up and fills a surface crater to the rim. As steam rises, it causes the above-ground pool to bubble and spray, and every now and then, more water will shoot up high in the air. Some of these geysers refill quickly, while others may take months.



- ◆ A mud pot geyser occurs when the above-ground pool has a lot of dirt in it. When it is heated by steam, the mud bubbles and plops like a thick sauce on the stove. "Paint pot" geysers are mud pots that are colored by white, orange and pink minerals. In our mud pot experiment, the "steam" we created was actually carbon dioxide bubbles. The bubbles in all soda pop are formed by carbon dioxide gas – the same gas we exhale when we breathe out. When we added sugar to the Coke, a chemical

reaction occurred that caused carbon dioxide gas to form even more quickly – which caused an eruption!

- ◆ Geysers are found in many parts of the world, including the United States. Yellowstone National Park in Wyoming is home to more than 400 geysers, including one of the most famous – Old Faithful. Old Faithful is an example "cone geyser." This kind of geyser has only one underground

pool as its source. Because there is only one pool of water to heat up, Old Faithful erupts fairly regularly – about once every 45 minutes to 2 hours. It can spray up to 180 feet into the air!

- ◆ The steam erupting from geysers is very powerful. We humans figured out how to harness this power back in the 1800s, when we began to use steam engines to power trains and boats!
- ◆ Not all fountains are caused by steam pressure; some are caused by water pressure. In our water fountain experiment, when both ends of the tube were level, the fountain did not go very high. But when we raised the funnel end, the water pressure increased (caused by gravity and the force of the water trying to move through the smaller hole in the dropper), and the fountain shot way up in the air! The sprinkler in your backyard works in a similar way.



- ◆ Popcorn pops because there is a drop of water in the kernel that heats up and turns to steam, which eventually causes a mini explosion – much like a geyser!

Amazing Scientist



Robert Wilhelm Bunsen (1811-1899). Robert Bunsen, most well known for his development of the Bunsen burner (used in science labs all over the world), also had a keen interest in geology and earth science. In 1845, he took a trip to Iceland to observe volcanic activity as well as geysers. While he was there, he conducted research about how geysers work. Upon his return home, he created a geyser in the lab. His geyser consisted of a large basin of water with a long tube extending from the bottom. He heated up the tube until the water started to boil. When this happened, the water bubbled up, creating a mini geyser in his lab! This was the first time anyone was able to recreate the action of a geyser and scientists

still use this experiment to understand how geysers work in nature!

Curiosity @ Home

Fun with Funnels! A funnel is a key piece of scientific equipment. Not only can a funnel be used to make geyser and fountain models, but it can be used to do a trick that will amaze your friends! Place a ping-pong ball on a flat surface. Place your funnel upside-down over the ball and blow into the funnel. Keep blowing while you lift up the funnel. The ping pong ball should lift up too! (What happens when you stop blowing?) This trick demonstrates Bernoulli's Principle: when air flows over a surface of an object, the force pushing down on that surface is reduced, and the force pushing up on the surface increases in relation. This causes lift – an important force for anything that flies!

Word Scramble

Can you unscramble these words from today's class?

GMAAM

(the heat source for a geyser)

NFIOAUTN

(a type of geyser)

LDO LFUAFHIT

(famous geyser)

REEYGS

(an underground hot spring that shoots water into the air)

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