

Chillin' Summer Science

Summer is the perfect time for some frosty science fun. Keep your students cool while exploring solubility, changes in state, emulsions and fizzy, foamy and frothy chemical reactions.

Sizzling Ice Volcanoes

There is plenty of science to explore while enjoying this frosty fun. You can investigate the effect of temperature on solubility, changes in state, as well as chemical reactions which produce a gas.



You will need:

Disposable cup
Sandwich bag
Golf ball
Baking soda
Food colouring
Vinegar
Water

What to do:

1. Place the golf ball in the bottom of an empty plastic cup.
2. Open up a plastic sandwich bag and use it to line the inside of the cup. The golf ball will be trapped between the bottom of the cup and the sandwich bag.
3. Dissolve enough baking soda in the water to create a saturated solution. You can tell the solution is saturated when no more baking soda will dissolve. Use food colouring to tint the baking soda solution.
4. Carefully pour the baking soda into the sandwich bag so that the top of the golf ball is below the surface of the water.
5. Put the cup into the freezer and freeze until the water is solid.
6. Lift the plastic bag out of the cup and carefully remove it from your frozen baking soda solution. The golf ball will have created a crater in your lump of ice.
7. Flip the frozen volcano over so that the crater is pointing up.
8. Take the volcano outside or place it in a basin and fill the crater with pickling (or regular) vinegar.

What's happening?

Students should notice that the solution is clear when it goes into the freezer and cloudy when it comes out. Solubility is temperature dependent so some baking soda should precipitate from the solution as the temperature of the water decreases. When vinegar is added to the well, it will begin to react with the baking soda to produce water, a salt called sodium acetate, and carbon dioxide. The carbon dioxide will begin to bubble out of solution, causing some foaming. The reaction may be quite slow at the beginning because chemical reactions are temperature dependent. For a more vigorous reaction, add baking soda to the crater before pouring in the vinegar.

Fizzy Ice Chalk

It's easy to make your own sidewalk chalk and a great way to explore suspensions. Throwing in some baking soda and food colouring and then freezing it allows you to explore changes in state and chemical reactions as well.



You will need:

- Cornstarch
- Baking soda
- Food colouring
- Water
- A measuring cup
- Squirt bottles (optional)
- Ice cube tray
- Spray bottle with vinegar (optional)

What to do:

1. Mix $\frac{1}{4}$ cup of baking soda, $\frac{1}{4}$ cup of cornstarch, $\frac{1}{4}$ cup of water and food colouring in a small measuring cup with a spout. Stir thoroughly to mix.
2. At this point, you can transfer the mixture to squirt bottles and students can use it to create colourful masterpieces on the sidewalk or pavement.
3. To make Ice Chalk, pour the mixture into the ice cube tray and freeze until solid.
4. Once solid, remove from the trays and have students use the chalk to create sidewalk masterpieces. This is a good time to explore the melting and evaporation process.
5. Once their sidewalk picture dries, arm students with a squirt or spray bottle filled with vinegar and have them spritz their picture for some fizzy fun.

What's happening?

Baking soda dissolves in water but cornstarch is not soluble and will remain suspended in the water. As the ice melts water will begin to flow, depositing the baking soda/cornstarch mixture onto the pavement. Depending on the temperature, the water should evaporate fairly quickly, leaving behind the coloured solids. Have students explore the texture of their dried picture with their fingers. Adding a spray or squirt bottle of vinegar adds to the fun. Once spritzed, the baking soda will react with the vinegar to produce carbon dioxide gas. If the vinegar is tinted with food colouring, students can extend their art/science project to include colour mixing.

Summer Snow

It's snowing! It's snowing! Use this chilly activity to combine science and art in one super-cool open exploration of shaving foam. A foam is a colloidal suspension of a gas in a liquid or solid. Unlike a solution where a solvent dissolves a solute to result in only one phase, a colloid has a dispersed phase (in this case the gas) and a continuous phase (in this case, the water/soap). In order to be called a colloid, the mixture must contain undissolved particles which do not settle.



You will need:

Shaving Foam

Baking Soda

Vinegar (optional)

Paint brushes (optional)

What to do:

1. Mix 1 box of baking soda with enough shaving foam to create a moldable substrate.
2. Allow children to explore this summer snow with their fingers. How does it feel?
3. At this point, children can create molded snow masterpieces and spritz or paint their creation with coloured vinegar. Or they can pack their snow onto a baking sheet to create a canvas for spritzing or painting.
4. Once the “canvas” is full, the top layer can be scraped off and the fun can continue.

What’s happening?

What’s more fun than snow in summer? It’s even cool to the touch. A chemical reaction that feels cold to the touch is called an endothermic reaction. It requires heat from the environment in order to proceed. Since we have baking soda mixed into the shaving foam, spritzing or painting with vinegar will cause an acid-base reaction to produce carbon dioxide gas.