INVISIBLE FIRE EXTINGUISHER

THE MOST CREATIVE WAY TO EXTINGUISH BIRTHDAY CANDLES!

SAFETY:

- Always supervise children when working with fire.
- Don't leave a lit candle unattended – blow it out at the end of the experiment.
- Do this activity indoors to avoid wind interference and clear away any flammable materials.

WHAT YOU NEED

- A tealight candle or candles
- Matches or a lighter
- A large jug
- White vinegar
- Bi-carb soda
- A teaspoon
- OPTIONAL: a stack of bricks or other non-flammable materials that you can use to make a set of steps

WHAT TO DO

1. Pour about half a cup of vinegar into the jug.
2. Place 1 tsp of bi-carb soda into the vinegar. Watch bubbles of carbon dioxide appear as the soda reacts with the vinegar.
3. Place the candle on a heat proof surface and light it with matches or a lighter.
4. When the bubbles in the jug have subsided, slowly pour the invisible carbon dioxide over the candle flame. Make sure the liquid does not pour out! It sounds odd, but picturing the invisible gas pouring can help you get the angle and speed right! The candle flame should go out.
5. Try stacking bricks or similar to make a small staircase, then place a tealight on each level and light it. Make some fresh vinegar and bi-carb soda mixture and pour it like you did before over the highest candle. The gas should flow down the steps and extinguish each candle one at a time. Experiment with different quantities of vinegar and bi-carb soda or pouring from different heights to see if you can still extinguish the flame.

WHAT'S HAPPENING?

For a fire to burn it needs a mixture of 3 things: fuel, heat and oxygen. This is sometimes called the 'fire triangle'. A candle flame has fuel from the candle wax, heat from the initial match or lighter, and oxygen from the surrounding air. To extinguish a fire, you simply need to remove one of these 3 components. For instance, water extinguishes a fire by cooling it down, therefore removing heat from the reaction.

When vinegar and bi-carb soda are mixed, they undergo a chemical reaction that creates carbon dioxide gas. Carbon dioxide is denser than the air around us, so will settle in the jug after the reaction. When you tip the jug over the candle, the carbon dioxide flows out and downwards, pushing all the oxygen away from the flame. Without oxygen, the candle can no longer burn and the flame is extinguished. Try this experiment next time you want a creative way to blow out birthday candles!