

Fire fighting

Creating an 'invisible' fire extinguisher



INTRODUCTION

Glass must be heated to high temperatures (over 1400°C) to change from a solid to a liquid, but sudden heat can shock some types of glass into cracking. In this activity, children consider the importance of choosing 'heat resistant' glass for holding candles as they use a chemical reaction to extinguish fires. The children will observe candle flames, discuss what a flame/fire needs in order to burn and consider the implications for fire safety.

LEARNING INTENTIONS



- ✓ To understand the fire triangle
- ✓ To explore a non-reversible chemical reaction
- ✓ To explain their observations

RESOURCES (PER GROUP)



- Heat resistant glass jar (e.g. kilner jar or scented candle jar)
- Beaker or jug (at least 500ml)
- Matches or a lighter
- Sodium bicarbonate (also called bicarbonate of soda, baking soda)
- White vinegar
- Tablespoon
- Tealight

WHAT TO DO:

Today we are going to be fire fighters

This activity may be done as a teacher demonstration or by the children under careful supervision. Children may find it difficult to pour an invisible substance without spilling liquid over the flame.

1. Light a tealight and ask the children to discuss what is needed to support the flame, explaining that the wax is a fuel, a lighter (e.g. a match) provides heat to ignite the fuel and oxygen is present in the surrounding air.
2. Discuss children's ideas about using glass as a candle holder and why it is important to choose heat resistant forms.
3. Blow out the candle and ask the children to explain what has been 'removed' to extinguish the flame.
4. Put the tealight in the glass jar and light it.
5. Into the jug, put about 2 tablespoons of sodium bicarbonate and pour in enough vinegar to produce a lot of fizzing.
6. The bubbles should come near the top of the jug and then subside.
7. At this point, hold the jug over the jar, tilt it gently. Be careful to ensure that the liquid stays in the jug and does not pour into the glass jar.
8. Encourage the children to observe carefully what happens to the flame, noting that no liquid leaves the jug.

KEY QUESTIONS

1. Is it safe to use glass where there are flames or a hot surface, such as an oven? Why do you think this?
2. What do you notice when the vinegar and sodium bicarbonate are mixed? What can you hear?
3. What do you think the bubbles are? Where do they go?
4. What happens when you tilt the jug over the flame in the jar?
5. Why do you think the flame goes out?

KEY VOCABULARY



Chemical change	Liquid
Non-reversible change	Gas
Fire extinguisher	Carbon dioxide
Solid	Flame
	Oxygen
	Reaction
	Wax

EXTENSION / FOLLOW UP ACTIVITIES

Children could explore what happens if they vary the amounts of chemicals being used.

They could try using different chemicals to see if these also work, for example mixing sodium bicarbonate and citric acid crystals (available from pharmacies and supermarkets) in the jug and then adding water.

Invite local firefighters to school to talk to the children about their work and fire safety.

ADDITIONAL RESOURCES (IF REQUIRED):

- Citric acid crystals

ANTICIPATED ACTIVITY TIME: 30 MINS