

## B3 ACTIVITY 1: METAL KITCHEN SIEVE

### Background

The metal in the sieve conducts so much heat away that the candle wax vapour cannot ignite above the wire mesh. The flame will reach the wire mesh, but does not go through it. The flame only passes through the metal lattice if it is made to glow by strong heating.

### Equipment required (per group):

- Candle (lit)
- One metal kitchen sieve
- Metal sieves with smaller and wider meshes
- Access to a strong gas flame

### What to do:

1. Ask the students to hold a metal kitchen sieve in a candle flame as in the diagram. Ask them to consider the following questions:
  - ① *What do you observe about the flame?*
  - ② *Why might this be?*
  - ③ *What do you think might happen if you used a metal sieve with a wider mesh?*
  - ④ *What might happen if a smaller mesh was used?*
  - ⑤ *How near to the flame would the mesh need to be in order to affect the flame?*
2. Ask them to hold the sieve with the smaller mesh over the flame and observe what happens.
3. Ask them to hold the sieve with the wider mesh over the flame and observe what happens.
4. Hold the flame from a strong gas flame close to the mesh and ask the students to observe any differences between holding a mesh to a gentle candle flame, and a stronger gas flame.



Figure 9

### Resources:

- [Click here](#) to view this activity, with a detailed explanation, online.

### B3.1 DISCUSSION POINTS: THE FLAME AND WIRE MESH

1. Predict what happens when the flame is held close to the wire mesh.
2. Explain what you **observe** in detail.
3. Does the **size of the mesh** matter? Explain your answer.
4. Do you **notice** any difference when holding the flame from a strong gas flame close to the mesh? Comment on what you observe.
5. [The Emigrant Flame](#) was lit in [New Ross](#) with a flame taken from the [Eternal Flame on J. F. Kennedy's](#) grave at [Arlington Cemetery](#). How was this possible?
6. The [Olympic Flame](#) is carried by runners from [Olympia in Greece](#) to wherever the Olympic Games are being held. What measures are put in place to make this possible?

### B3.2 HISTORY NOTE C: THE DAVY LAMP

The Davy lamp is a safety lamp that uses the principles encountered in this exercise. It was invented by Sir Humphry Davy in 1815 and was used by coal miners.

The only light source for the miners was an oil lamp. The greatest hazard of coal mining was a build-up of dangerous gases like methane and carbon monoxide in confined spaces, which would catch fire and cause explosions. The Davy lamp is designed to minimise the possibility of fire. A metal lattice surrounding the naked flame takes up so much heat that the gases in the mine cannot ignite.

More sophisticated safety measures are now used in the mining industry, but the concept behind the Davy lamp is still used when transporting a flame over long distances.



Figure 10