

Fire Writing

You are going to draw using a special “ink”, then set fire to your drawing! If you do it right, the paper burns only where you drew on it.

Apparatus and chemicals needed

goggles
bench mat
10cm³ measuring cylinder
100cm³ beaker
stirring rod
paper
small paint brush
pencil
splint
sodium nitrate



Eye protection
must be worn



Job 1

Collect some sodium nitrate on a piece of paper.
Pour 10cm³ of water into a beaker.
Add some solid sodium nitrate. Stir carefully to dissolve it.

If it all dissolves, add a little bit more. Keep going like this until no more will dissolve. This is called a **saturated solution**.

Job 2

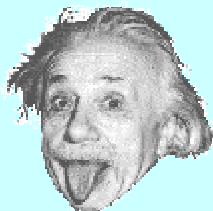
With a small paintbrush, use your saturated solution to write a message on the paper – you can draw pictures if you like.
Make sure you use joined up writing (**don't** complete any loops).

Mark the start of your message or picture with a pencil, and leave the paper to dry.

Job 3

Light the splint then blow it out so its end is just **GLOWING**.
Touch the glowing end to the start of the message until the treated paper starts to glow and char.

Stand back and watch – it's also very smelly!



Sodium nitrate is an **oxidising agent**. This means that it can supply extra oxygen to keep a fire going. The paper with the lines of sodium nitrate burn more easily than the paper on its own, so you get fire writing!

Teacher Guide for Fire Writing

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Activity notes

Fire writing is very easy to do, but you must be careful. We find it works best on sugar paper (which is very absorbent), and the students prefer to draw an image in pencil first. The sodium nitrate solution should not be used too sparingly; otherwise it can be difficult to sustain the smouldering lines. If the fire writing seems to be burning too slowly, it can help if the paper is held almost vertically. Care must be taken, however, that it doesn't burn too vigorously – it can burst into flames unexpectedly. Similarly, take care when disposing of burnt and unburnt paper at the end of the session: we had a small fire in a waste bin in 1999, which was easily put out with a CO₂ fire extinguisher. This was entertaining for the students, but less so for us as the lab was brand new and, until then, never used! Fire writing produces a lot of smelly smoke, so ensure good ventilation in the lab.

Fire writing

Students' checklist

Check you have:

- bench mat
- 10cm³ measuring cylinder
- 100cm³ beaker
- stirring rod
- paper
- small paint brush
- pencil
- splint
- sodium nitrate

Fire writing

Technicians' notes

Per student:

1 x bench mat
1 x 10cm³ measuring cylinder
1 x 100cm³ beaker
1 x stirring rod
1 x small paintbrush
1 x pencil

In the lab:

paper
splints
sodium nitrate