

Write secret messages

Become a secret agent and pass hidden messages. Use spy science to reveal them.



WARNING!
Ask an adult to help you when using the iron.

How does it work?

Fruit juices, like lemon juice, contain compounds of carbon – a chemical element found in all living things. Many carbon compounds are colourless at room temperature. When you leave your message to dry, the water dries out, leaving the remaining parts on the paper. These substances break down when heated, releasing the carbon. Then, carbon combines with oxygen in the air and changes colour, revealing the secret words or pictures.

If you haven't got any lemon juice in the house, you can try this experiment with milk instead. Milk contains a kind of sugar called lactose. When you add heat, the sugar in the milk caramelises, turning brown and exposing the hidden message.

DID YOU KNOW?

In the Second World War, the British secret services trained their agents in how to make invisible inks from common materials.

What you need

- Lemon juice
- Small bowl
- Paintbrush
- White paper
- Helpful adult
- Iron



1 Pour a small amount of lemon juice into a bowl. Dip the paintbrush into the lemon juice.



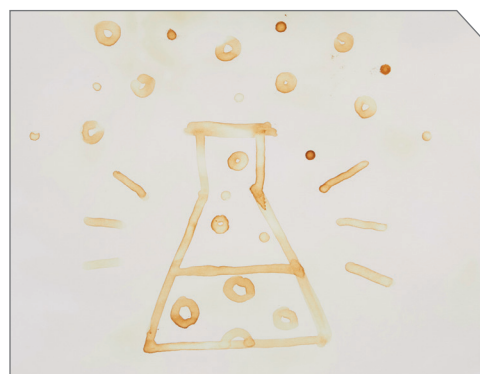
2 Write your message on a piece of white paper then leave to dry. The writing should disappear.



3 To reveal the message, ask an adult to iron the paper. Use a high temperature and no steam.



4 Keep moving the iron around and see if you can spot a colour change taking place.



5 Now that your secret message is fully revealed, try the activity with other liquids.