



Making Invisible Ink

≡ with Lemon Juice and Heat ≡

Name: _____

Date: _____

Experiment #: _____

You can write secret messages using lemon juice! The juice is "invisible" when it's dry, but when you apply heat, the message appears as the juice browns.

QUESTION

How can lemon juice be used to write a message that is invisible at first but then appears with heat?

HYPOTHESIS

If I write with lemon juice and let it dry, then the writing will be invisible until I use heat, because the lemon juice will turn brown.

MATERIALS

- 1 lemon
- Cotton swab or small paintbrush
- Small bowl
- White paper
- Heat source (lamp, hair dryer, or iron) (adult help recommended)
- Paper towel
- Pencil (optional)



PROCEDURE

- 1 Cut the lemon in half and squeeze a small amount of juice into the bowl.
- 2 Dip the cotton swab or paintbrush into the lemon juice.
- 3 Write a secret message or draw a picture on the white paper. (You can use pencil lightly as a guide if you want.)
- 4 Let the paper dry completely. Your message should now be invisible!
- 5 Use a heat source to warm the paper.
Options: Hold under a lamp, use a hair dryer on low, or (with adult help) gently iron on low heat with paper towel over the top.
- 6 Watch as your message appears!
- 7 Let the paper cool. The message will still be visible.



SAFETY FIRST!

- Always ask an adult for help when using heat.
- Do not touch the hot iron.
- Keep the heat source moving and do not stay in one spot for too long.
- Keep your workspace clear and safe.



OBSERVATIONS

What happened? Describe what you saw.



CONCLUSION

Was your hypothesis correct? Why or why not?

WHAT'S HAPPENING?

Lemon juice is mostly water, but it also contains natural acids and sugars. When heated, these break down and cause a chemical change called oxidation, which turns the lemon juice brown. That's why your "invisible" message appears!



TRY THIS!

Experiment with other "inks" like milk, baking soda solution, or vinegar. Do they work too?