



My nature connection

INVISIBLE INK

GRADE LEVEL: 2+
TIME: 10-20 min

WHAT IS INVISIBLE INK?

Have you ever wanted to write a message that looks like it appears out of nowhere? Invisible ink gets its name from the fact that you cannot see the ink unless you heat it up – it is practically invisible at room temperature. Although it seems like magic, the ink becomes visible because the acids in the liquid are reacting to the high temperatures.

WHAT YOU'LL NEED

- Paper
- Paintbrushes or Q-tips
- Hair Dryer
- Bowl
- A few citrus fruits, e.g. lemons, limes, oranges
- Milk (optional)
- Apple juice (optional)
- Vinegar (optional)
- Baking soda (optional)

ACTIVITY

1. INTRODUCTION

Today, we are going to create our own invisible ink drawings or letters and heat them up to reveal our secret messages. We will test out whether different substances work better than others to use as invisible ink.

2. INSTRUCTIONS

First, begin by taking a citrus fruit (lemon, lime, or orange) and cutting it in half. Squeeze the juice from the fruit into a bowl. Dip a paintbrush or Q-tip into the juice and draw a design or message on the paper. Wait for it to dry. Once the paper is completely dry, carefully use the hair dryer to heat the paper. Be careful to not hold the hairdryer close too long or it can burn the paper. Watch as the secret message or drawing slowly begins to appear.

Families will:

Use their creativity to create designs and messages using invisible ink.

Test and compare different liquids in how well they can be used as invisible ink.

3. TEST DIFFERENT SUBSTANCES

Try this experiment out using different different liquids as the ink. How does the reaction work with other citrus fruits, apple juice, vinegar, milk, baking soda (mixed with water), or something else you find in your cupboards. Remember, not everything will work as invisible ink – but you can be the scientist to test out which substances work. Follow the scientific method in the diagram below to help you with your research. You can print off the attached worksheet to test out your liquids or simply use your own paper. Follow the same steps as before: paint the liquid on with a paintbrush or Q-tip, wait for it to dry, and then heat the paper up with the hair dryer to see the message appear.



TRY THE SCIENTIFIC METHOD



CONNECTING WITH QUESTIONS

- Which liquids worked as invisible ink, and which ones didn't?
- Why do you think some substances worked better than others?
- If you didn't have a hair dryer, what else do you think could be used as a heat source for this experiment?
- Can you think of different uses for invisible ink? When would someone want to use it?

4. CREATE A SECRET TREASURE MAP

Invisible ink can be used to write messages that you want to keep hidden. For a fun game to play with your family, draw out a map (using normal ink or markers) of your backyard or an area near your house. If you can't get outside at the moment, draw a map of the inside of your home. Hide "treasures" throughout the area. These could be pictures you drew, pieces of candy, or notes that you wrote.



In invisible ink, mark the spots where you hid the treasure with X's and let the map dry. Give the map to a family member who you would like to send on the treasure hunt. The hairdryer is their key to revealing where the treasure is hidden. Once they heat up the paper, they will use the map to find the X's and discover the treasure.

ADDITIONAL INFORMATION AND RESOURCES

<https://tinkerlab.com/invisible-ink-a-citrus-painting-experiment/>



INVISIBLE INK TEST SHEET

Collect the different substances you will test out as invisible ink. Label each liquid and draw a picture or message in the box below. After blow drying, see which inks show up most clearly.

LIQUID 1: _____

A large, empty square box with a light blue border, intended for drawing a picture or message for Liquid 1.

LIQUID 2: _____

A large, empty square box with a light blue border, intended for drawing a picture or message for Liquid 2.

LIQUID 3: _____

A large, empty square box with a light blue border, intended for drawing a picture or message for Liquid 3.

LIQUID 4: _____

A large, empty square box with a light blue border, intended for drawing a picture or message for Liquid 4.