

# Secret Message

Morse code, disappearing ink, cryptography, pig-latin. These are all ways people hide messages from one another. Discover how to use everyday items to write your own hidden message!

## TEKS:

K.5B Observe, record, and discuss how materials can be changed by heating or cooling.

1.5B Predict and identify changes in materials caused by heating and cooling such as ice melting, water freezing, and water evaporating.

2.5B Compare changes in materials caused by heating and cooling.

## How To

### Materials:

- Unlined white paper
- Watercolors or markers
- White crayon or candle

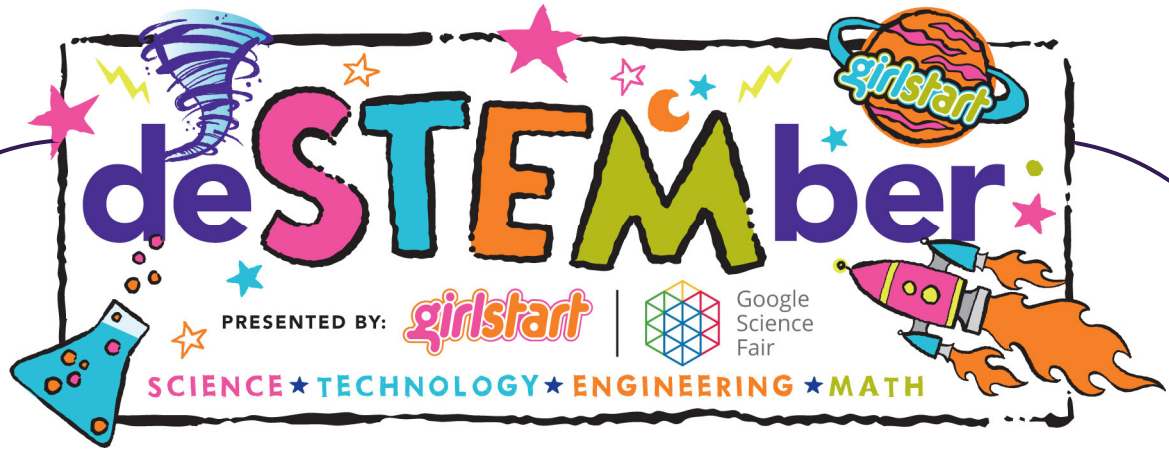
1. Write a message using your crayon/candle on the white paper.
2. Color over your writing using the watercolors/markers.
3. The message should appear!

## Why Does It Work?

Candles are made out of wax and wax is hydrophobic. Hydrophobic means that it repels water. When you go over the wax message with water based colors (like markers or water colors) the wax repels the color, leaving the white paper underneath unharmed.

31 Days of STEM FUN!

[www.deSTEMber.org](http://www.deSTEMber.org)



# Disappearing Ink

## TEKS:

K.5B Observe, record, and discuss how materials can be changed by heating or cooling.

1.5B Predict and identify changes in materials caused by heating and cooling such as ice melting, water freezing, and water evaporating.

2.5B Compare changes in materials caused by heating and cooling.

## How To

1. Soak 1 Q-tip in Windex
2. Using the Q-tip, write your message on the yellow paper. It turns bright red!
3. Use a Q-tip soaked in lemon juice to write over the red streaks. The paper changes back to yellow!
4. Next try using a Q-tip soaked in lemon juice to write on a piece of paper.
5. After the paper has dried, use a hair dryer to heat up the paper. Your lemon juice message should turn brown.

## Materials:

- Goldenrod paper
- Hair dryer
- Lemon juice
- Q-tips
- Windex

## Why Does It Work?

The goldenrod paper is created using a special dye that turns red when exposed to a base. Windex contains a cleaning agent called ammonia which is classified in chemistry as a base. The opposite of a base is an acid. So, by applying an acid like lemon juice to the secret message, it reverses the reaction!

Lemon juice is mildly acidic and acid weakens paper. The acid remains in the paper after the juice has dried. When the paper is heated with the hair dryer the acidic parts on the paper burn or turn brown before the rest of the paper does.

31 Days of STEM FUN!

[www.deSTEMber.org](http://www.deSTEMber.org)