



Research Experience Vitalizing Science — University Program

California State University of Bakersfield, Department of Chemistry

## Invisible ink with lemon juice



### Standards:

8<sup>th</sup> grade: 5 a, b, &c. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules.

### Introduction:

*Have you ever needed to get a message to someone but you didn't want anyone else to read it? You could use a code or you might try invisible ink. Invisible ink is easy to make and can make you feel like a secret agent. With the invisible ink you can keep notes that you don't want anyone else to see hidden or you can pass secret messages to your friends. This can be done with some simple household items.*

### Materials:

- 20 ml of lemon juice
- Graduated cylinder
- water
- bowl or cup
- cotton swab
- index card
- heating source (light bulb, lamp or hot plate)

### Safety:

- Always have an adult with you to help you during your experiment.
- Always use caution and the appropriate safety gear when handling hot items.

**Procedure:**

1. Step 1 measure out 20 ml of lemon juice
2. Step 2 add a few drops of water
3. Step 3 mix the lemon juice and water together in the bowl or cup
4. Step 4 dip your cotton swab into the lemon water solution then write your message on an index card.
5. Let the message to dry completely to become invisible.
6. When you or your friend that you are sending the message to are ready to read the message, heat the paper by holding it close to the heat source.

**Data and Observations:**

What did you see? Anything you were not expecting? Describe it here.

**Questions:**

How long did it take for the message to appear?

Would increasing the amount of heat decrease the time needed?

**References:**

1. Sciencekids.com  
<http://www.sciencekids.co.nz/experiments/invisibleink.html>  
(accessed July 23, 2012).