



Lesson Plan- Invisible Writing with Lemon Juice
Science Elementary/Middle School

Objective: Students will learn the property of lemon juice (acidity) and the effect it has on paper.

Related Standards: NS.k-4.2 Physical Science

Goal: Students will be able to identify the effect of an acidic substance on paper.

Materials:

- Lemon or Lemon Juice
- Sunlight or Heat Source (light bulb) or wax crayon
- Paper
- Paintbrush or Stick (Q-Tip makes a great small “paintbrush”)

Steps:

- a. Introduce the idea of lemon juice as an acid which weakens paper. When paper is heated, the remaining acid turns the writing brown before discoloring the paper.
- b. Squeeze lemons to obtain their juice or obtain bottled lemon juice.
- c. Use the juice as 'ink' by applying it to a stick or paintbrush and writing on paper.
- d. Allow the paper to dry.
- e. When you are ready to read your invisible message, do one of the following:
 - a. Hold the paper up to sunlight, a light bulb (recommended), or other heat source. The heat will cause the writing to darken to a pale brown, so your message can now be read.
 - b. Put salt on the drying 'ink'. After a minute, wipe the salt off and color over the paper with a wax crayon to reveal the message.

Assessment:

Have students write an invisible message and exchange papers with another student to reveal.

Extension:

- Experiment with other juices. White wine, orange juice, vinegar, and apple juice all work well, too.

Tips: The writing turns brown because the weakened paper burns before the rest of the paper. Be careful not to overdo your heating and ignite the paper!