

Stem the Stream
The Chemistry of Paper Lab Activity
Fifth Grade

Teacher's Guide

Lesson Science Standards:

1. Elements and their combinations account for all the varied types of matter in the world.
 - 1.b. Students know all matter is made of atoms, which may combine to form molecules.
 - 1.f. Students know differences in chemical and physical properties of substances are used to separate mixtures and identify compounds
- 3.b. Students know when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.

Materials:

- Recycled paper: binder paper, copy paper, newspaper, construction paper, and/or tissue paper. Shiny paper like what magazines are printed on doesn't work that well
- Tub
- Blender
- Warm Water
- Starch
- Graduated Cylinder
- Microscopes
- Microscope slides – pre-made paper samples
- Frames and Deckles
- Sponges
- Scrap material pieces (made from old t-shirts or towels cut into 9" by 12" pieces)

Set-up:

1. Do the bulk of this lab outside.
2. Set up three tables. One table with the microscopes. One table for the warm water, blenders, and tubs. One table for couching the paper.
3. Place the materials on the correct table.

Procedures:

1. Pass out lab sheets and have students read and discuss the background information. Have all students make a prediction
2. Have students work in groups of four. You may want to use table groups. Once you have students divided into groups of four, take them outside. Have students work on different parts of this lab. Some can start at the microscopes, others can tear paper, while others can begin the paper making process. Each group of four students make one piece of paper. The paper can be cut in fourths once it is dry.

3. Follow the eight steps on the lab sheet. Rotate student groups. You operate the blender.
4. You may want to view both videos <http://hubpages.com/hub/How-to-Make-Paper---An-Illustrated-Step-by-Step-Guide> before attempting this lab.
5. As student get done, have them help clean-up. When you're done making paper, pour all the left over pulp in one or two molds. Drain the water and place the pulp in a bag to save for the next lab. Do not pour the pulp down the drain.
6. Leave the paper in the sun. Once the paper is dry, cut and return it to the class.
7. Have students finish the questions and then discuss the answers. Collect papers, grade them, and return them to the teacher graded the next day.

Answers:

Did you make an element, compound, or mixture? *mixture*

How do you know? *Answers will vary, but students should know that mixtures can be separated. The water is separated from the pulp by couching and then by evaporation.*

Was your prediction right? *Answers will vary. Students should compare their prediction to the answer.*

How were the pulp and the water separated? *Students should know that the water evaporated from the pulp. Students can also say that the pulp dried out.*

After doing this lab activity, what have you learned about paper and recycling? *Answers will vary. Students should know that paper can easily be used over and over. They should understand that paper should be reused and not thrown in the garbage.*