

## Papermaking

### Materials:

Item	Amount per student	Amount for 24 students
assorted papers (>2 different kinds!)	1/2 sheet of each	12 sheets each
paper towels	~15	1-2 packs
vegetable oil	10 ml	1 bottle

### Equipment:

Item	Amount per student	Amount for 24 students
coffee cans	2	12-24
blender	1	4-6
window screening	2 8" x 12" pieces	48
sponge	1	24
molds of various shapes/sizes	??	???

Staff Notes:

### Safety:

No major safety issues here...?

### Procedure:

1. Set up a paper mold in the following manner: stack a coffee can with the bottom remaining on the bottom, add one piece of window screening (~8x12") in the middle, and top it off with a coffee can with the bottom removed. Several sections of newspaper underneath the whole set-up will soak up any spilled water.
2. Tear or cut a piece of paper of 7x7" area (about half of a normal 8.5x11" sheet) into 1 cm<sup>2</sup> size pieces. Put these pieces into the blender, and fill to the 1.5 cup line with distilled water.
3. Blend on "blend" setting for 30 seconds.
4. Immediately, divide the blended pulp by pouring it into two large beakers (400 ml or larger). Rinse all of the pulp from the blender into these beakers with a little more distilled water. Pour (dump) the two beakers simultaneously into the top can of the paper mold, so that the two streams mix during pouring. Wait for the water to drain into the bottom can.
5. Remove the top can by lifting it directly up and off the molded paper. If desired, use a spatula to reshape the paper. Lift the screen and paper off the bottom can and place on the benchtop. Put another piece of window screening on top of the paper, and press down on the

top screen with a dry sponge to remove as much water as possible. Then peel off the top screen.

6. Flip remaining screen and paper over, so the paper side is down, onto a bed of ~3 paper towels. Press this side with the sponge, so you remove water and get the paper to stick to the paper towels so you can use the screen again.
7. Peel off the window screen, and put more paper towels on top of the paper. Press with a flat item, such as a textbook. Periodically replace the paper towels to aid in drying your paper. Outside of lab, you may want to iron the paper to get it completely dry.
8. Explore the paper making process further by experimenting with other papers, different amounts of blending, or molding. Make a sheet of paper using at least one other source "pulp"; for example, plant leaves, paper towels, newsprint, or a nice quality resume paper. Bring with you any unusual items that you would like to use, since we will only have a few different papers to recycle! You may want to try mixing two or more types or colors of source paper into one sheet. You can also mold the paper around an object by placing the object inside the paper mold; grease the molding object with a light coat of vegetable oil so it will release the paper! Another idea is to embed various objects, such as leaves or flowers, into the sheet of paper. Once your paper is dry, try writing on it with various utensils.

### **Reflections:**

1. Evaluate your papermaking. What worked well in this procedure? What was difficult?
2. What characteristics of the source paper are evident in your recycled sheets?
3. Which writing utensils worked the best on your recycled papers? Propose a reason for this.