

Name \_\_\_\_\_

Date \_\_\_\_\_

## The Chemistry of Paper

Matter is anything that takes up space and has mass, so all the things that you can touch around you are matter. The science that studies matter and looks closely at how it is composed is called chemistry. Chemistry also looks at how a pure substance changes into different substances.

An **element** is pure matter if it cannot be broken down into other substances, and the smallest particle of an element is called an **atom**.

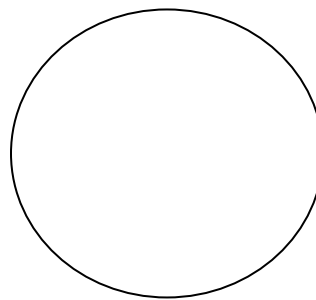
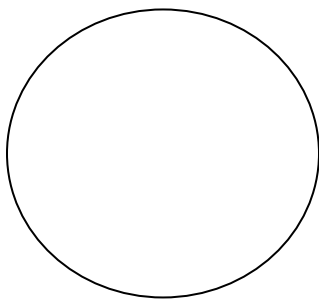
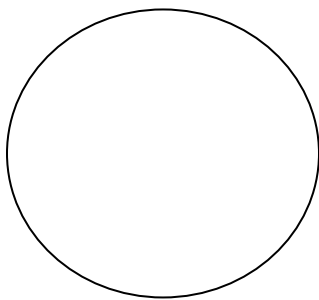
A **compound** is made up of two or more different elements, and the elements are chemically combined. A chemical reaction took place to form a compound. An example of a compound is distilled water because each molecule of water contains just two atoms of hydrogen and one atom of oxygen.

When different molecules or atoms are mixed together they form a **mixture**. Mixtures are different from compounds because no chemical reaction took place when a mixture was made, and the molecules or the mixture can be separated again. Tap water is an example of a mixture. Not only does the tap water contain molecules of  $H_2O$ , but a lot of other substances like salt as well as a lot of minerals. Boiling the tap water separates the molecules because the  $H_2O$  will turn to a vapor before the other compounds.

Examine a piece of paper. Predict below whether or not you think the paper is an element, compound, or mixture.

Prediction: \_\_\_\_\_

Now look at different kinds of paper under a microscope. Label and draw what you see in the space below.



\_\_\_\_\_

Paper can easily be recycled into new paper. Today, you'll reuse used paper to make new paper. Follow these steps:

1. From the recycling bin, choose paper to be recycled. Binder paper, copy paper, newspaper, tissue paper, and construction paper all work well. Shiny paper won't work, so avoid that.
2. Tear the paper into small pieces.

3. At the teacher's direction, place the paper into a blender until it is about half full. Fill the blender with warm water and blend for 30 to 40 seconds.
4. Place the blended pulp in a tub, and add two more blender loads of pulp. Fill the tub to about the half-way point with water. Add 15 milliliters of starch and stir.
5. The teacher will give you a frame and deckle and demonstrate how to use it. Sink your frame and deckle in the tub of pulp. Gently move it side to side until the pulp on the screen is uniformly flat.
6. Slowly remove the paper from the pulp and water. Let it drip over the tub until most of the water has drained. Check the thickness. If it's too thick, remove pulp. If it's too thin, add some pulp. Use your fingers to gently squeeze excess water, and then remove the deckle.
7. Now couch your paper (pronounced kooch) by placing the paper on a piece of material. Use a sponge on the inside of the mold to remove as much water as possible. This will allow your paper to transfer from the screen to the material which is called couching (pronounced kooching) the paper.
8. Let the paper dry in the sun. This will take one to three days depending on the weather. Once dry, the paper will peel off the fabric, and it's ready to use.

Did you make an element, compound, or mixture? \_\_\_\_\_

How do you know? \_\_\_\_\_

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Was your prediction right? \_\_\_\_\_

How were the pulp and the water separated? \_\_\_\_\_

After doing this lab activity, what have you learned about paper and recycling? \_\_\_\_\_

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