

Lab: Mixtures

Goal: To investigate mixtures and then to separate a mixture of salt and sand.

Supplies needed:

- 5 clean glasses
- Table salt (Note: most table salt in the stores contains additives that make it not clump. For the labs in this course, it is best to use pure salt which can also be found in most grocery stores. Sometimes it is labeled “canning and pickling salt.” When you purchase the salt just look at the ingredients to make sure “salt” or “sodium chloride” is the only ingredient.)
- Distilled water (For this lab you will need to use distilled water, which can be obtained at most grocery stores. Distilled water is made by boiling water, and condensing the steam back into water. Distilled water, therefore, is very pure and is absent of dissolved minerals found in tap water)
- Filter paper (Note: you can cut a circle out of a coffee filter or use a conical shaped coffee filter.)
- Funnel
- Small spoon to use for stirring
- Measuring spoons and cups
- Stove and small sauce pan

Guiding Question: How can mixtures be formed and separated? How do homogeneous and heterogeneous mixtures differ in appearance?

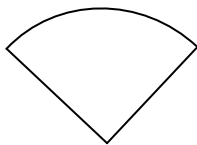
Procedure:

1. First, make the following 4 mixtures:
#1: In a clean glass, mix $\frac{1}{4}$ cup of distilled water with 1 tablespoon of cooking oil (you can use olive, canola, corn, or vegetable oil). Is the mixture homogeneous or heterogeneous?

#2: In a clean glass, mix $\frac{1}{4}$ cup of distilled water with 1 tablespoon of rubbing alcohol. Indicate whether the resulting mixture is homogeneous or heterogeneous.

#3: In a clean glass, mix 1 tablespoon of salt with $\frac{1}{4}$ cup of distilled water. Is the mixture homogeneous or heterogeneous?

#4: This is the same as Mix #3. Add 1 tablespoon of salt to $\frac{1}{4}$ cup of distilled water.
2. Put $\frac{1}{4}$ cup of distilled water into a small sauce pan. Heat the pan over the stove and boil the water until all the water has evaporated.
3. Place Mix #3 (salt water) into the same small sauce pan. Heat the pan and boil the water until all the water has evaporated. Observe the results. Look carefully and compare the sauce pan now with how it looked after step 2. After observing the sauce pan, wash and dry it for use later.
4. Note: a cone-shaped filter works best for this next step. If you have a basket coffee filter instead of a cone-shaped one, you can cut a circle and fold the circle in half. Fold it in half again. Now it should look like this:



You can now open one of the flaps so that you have a paper filter cone.

5. Now use Mix #4, which is also salt water. Pour all of the salt water through a coffee filter and catch the liquid that comes out in a separate clean glass. Depending on the size of your coffee filter, you may need to pour the liquid through in small doses, being careful not to overflow the filter.
6. Take the liquid that came through the filter and pour it into the clean sauce pan. Heat the liquid until it is dry.
 - a) What do you notice?

 - b) Did the filter paper remove the salt from the salt water? Use the evidence from this lab to justify your answer.

Questions

1. If you were lost at sea in the ocean on a boat you would get thirsty pretty quickly. Your friend who is with you on the boat suggests filtering the ocean water to remove the salt. What would you say?

2. Imagine that you have a mixture of sand and salt. Sand, of course, does not dissolve in water. Using what you learned from this lab, describe how you could separate the sand from the salt using water and a filter.