

The ability to separate mixtures on the basis of their *chemical and physical properties* is an important part of scientific research and industry. Most materials that chemists work with are not *pure substances* and require separation based on their *chemical and physical characteristics* in order to identify them.

Consider the following situation: You are a scientist working for Delaware Department of Natural Resources and Environmental Control (DNREC). A concerned citizen has approached you with a sample of polluted beach water that they obtained while on vacation in Rehoboth Beach. They want you to figure out what's in the water. To do that, you will have to perform a *physical mixture separation*.

After carefully examining the mixture, you see that it consists of water, sand, gravel, and some darker material that you can't identify. There is also a strong odor coming from the mixture. After some further analysis, you realize the mixture contains: salt water (salt and water), sand, gravel, iron filings (darker material in the mixture), and alcohol (causing the strange odor). How will you separate this mixture into its individual components?

NOTE: You will NOT be able to separate the alcohol out of the mixture in your group today. Instead, please draw a picture of how you imagine you would separate the alcohol.

Separating Mixtures

Name\_\_\_\_\_

Lab

Date\_\_\_\_\_Period\_\_\_\_\_

First decide, as a group, how you will do the separation. Write your ideas down.

1.

2.

3.

4.

5.

6.

Actually do the procedure:

Check with me for any other materials that you may need to complete the exercise.

**List the materials you will need:**

1.

2.

3.

## Separating Mixtures

Name\_\_\_\_\_

Lab

Date\_\_\_\_\_Period\_\_\_\_\_

4.

5.

6.

When you are completed you should give me four cups. Your group # should be on your cups.

Cup 1	salt
Cup 2	iron filings
Cup 3	sand
Cup 4	gravel

### Questions:

Answer is complete sentences

1. How did you actually get the sand out of the mixture?

2. How did you actually get the iron filings out of the mixture?

3. How did you get the gravel out of the mixture?

4. How did you actually get the salt out of the mixture?

Separating Mixtures

Name \_\_\_\_\_

Lab

Date \_\_\_\_\_ Period \_\_\_\_\_

5. How would you get the alcohol out of the mixture? (Draw a picture here).
  
  
  
  
  
  
  
  
  
  
6. Which substance was the easiest to remove from the mixture? Why?
  
  
  
  
  
  
  
  
  
  
7. Which substance was the hardest to remove from the mixture?  
Why?
  
  
  
  
  
  
  
  
  
  
8. If you were to do this experiment again, how would you change your original plan to make it easier?

Procedure I would change

Extra Materials Requested



## Separating Mixtures

Name \_\_\_\_\_

Lab

Date \_\_\_\_\_ Period \_\_\_\_\_

9. If this situation was real, and you need to figure out a way to clean up a contaminated beach with this type of mixture, how would you do it? Please write a full paragraph (4 to 5 complete sentences).