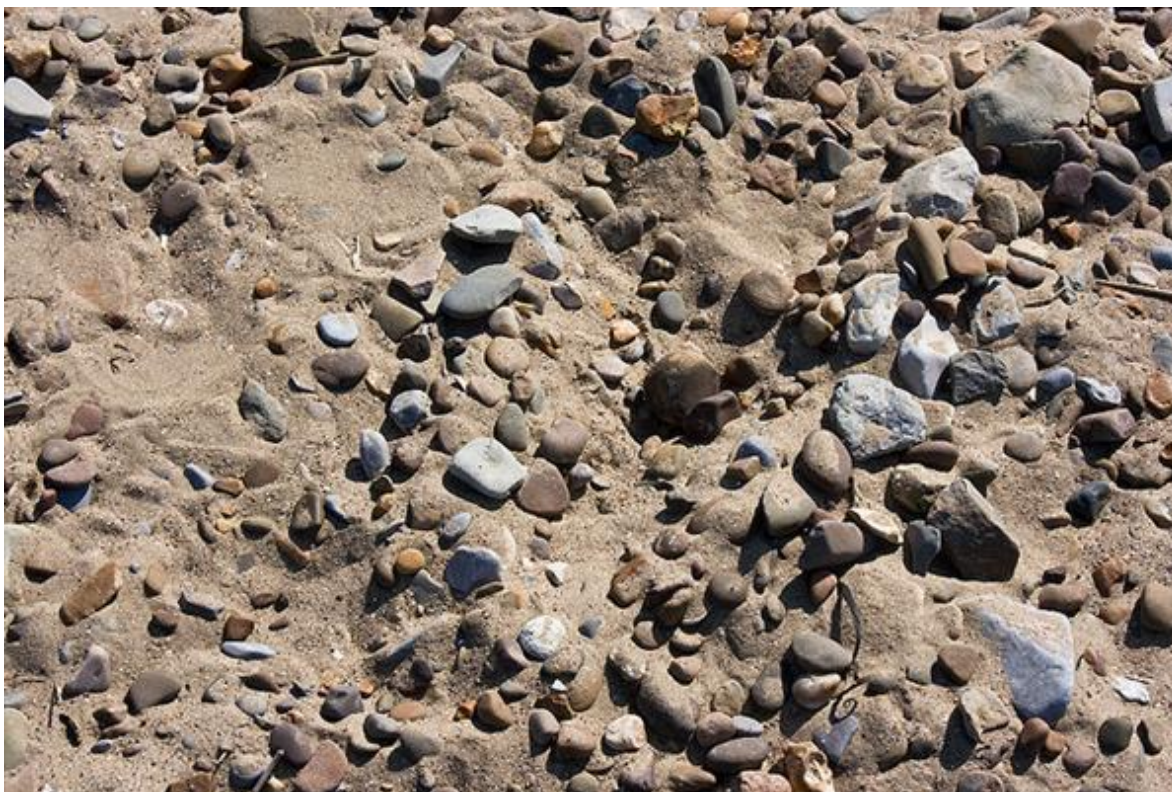


## Inquiry Question

How can I separate out the salt from a mixture of sand and salt?

Name: \_\_\_\_\_ Date: \_\_\_\_\_



Ocean beaches are a good example of a mechanical mixture. They consist mainly of rocks, sand, and salt. In general, mechanical mixtures are heterogeneous mixtures that have two or more particle types that are not mixed evenly and can be seen as different kinds of matter in the mixture. With these mixtures you can usually clearly see that there is more than one substance present. But what if you want just one of these components by itself?

Most pure substances were originally part of a mixture in nature and had to be separated. Separating substances from mixtures is an important part of chemistry and our modern industry. Have you considered where table salt comes from and how it had to be separated?

In the case of an ocean beach, it may seem easy enough to separate out the rocks from the sand and salt by visual inspection and possibly using a sieve. But what if the particle sizes are similar, such as with sand and salt? How can the salt be separated out from the sand? In this project you will separate a mixture of sand and salt using their differences in solubility.

### General Instructions

The goal of this project is to understand how mechanical mixtures can be separated using the property of solubility.

#### Materials you'll need:

- Salt (regular household salt is great)
- Sand (from the beach or hardware store)
- A kitchen strainer or coffee filter. A coffee filter isn't a necessary part of the experiment, but it does help when it comes time to strain the saltwater from the sand. In most cases, a kitchen strainer is easier to use.
- A pan and heating element WITH HOME FACILITATOR or TEACHER SUPERVISION. Heat speeds this experiment up, but treat it carefully. A second pan or plate is also recommended to catch the strained saltwater.

#### Ideas and Hints:

- Carefully measure out 10 grams of sand and add to a pan.
- Carefully measure out 10 grams of salt and add to the pan.
- Mix the sand and salt together (carefully shake pan or use toothpick)
- Add approximately 100ml of water.
- To dissolve the salt more quickly, you can heat the mixture carefully (at medium - do not boil). Heat until all of the salt is dissolved (should be done within 15 minutes or so).
- Once the salt is dissolved completely, it's time to separate the sand from the solution. This can be done by draining the mixture into a strainer. Make sure you strain it above a pot, plate, or pan in order to catch it. Straining into a pan is arguably best, as it will then be ready to boil. If you lack a strainer, you can scrape the sand aside with a spoon but this may take longer to accomplish.
- In order to separate the salt from the sand completely, you need to return the salt to its original state. This can be done by boiling off the water. Put the pan on a stovetop and let the water boil. Wait until the water has boiled away completely. Turn off the heat. From there, you should be able to see the salt remaining in your pan.
- Explain why this worked and how it could prove useful.

#### Project submission:

You can either submit photos/video of your project (along with an explanation and/or steps of construction) or if you can drop in to the school, you can present it to your teacher in-person. Be sure to carefully organize any data collected so that any other student or teacher could reproduce your experiment and achieve the same results.