

## Sand Castles

*Suggested Age: 5-7*

*Time: 15 minutes*



If you have ever played in a sandbox or gone to the beach, you have probably built a sand castle. Sand is a very interesting and unique material in that each grain is different. The size and shape of each grain varies. Even though sand is a very small grain, it can be seen with a magnifying glass that it has flat sides. This is one of the reasons that it stacks well. You may have also noticed that it sticks together better when you add water. This is another unique feature of sand.

### **In this activity we will:**

- Figure out how sand interacts with other substances in order to stick together.

### **Materials**

- Sand
- Water
- Hand or dish soap (liquid)
- 3 disposable bowls
- 3 Styrofoam plates
- 2 – 1 cup liquid measuring cups
- 1 cup dry measuring cup
- 2 plastic spoons
- Disposable cup
- Ruler

### **Safety**

Be sure to work in an area that can be easily swept. Sand is very difficult to get out of carpet, thus, a room with a smooth floor surface is an ideal location. Sand is an irritant if it gets into your eyes. Do not touch around or near your eyes while doing this activity and be sure to wash your hands thoroughly at the conclusion.

### **Preparation**

To prepare for this activity, you will need to measure out the “ingredients”:

1. In one of the measuring cups, measure out  $\frac{1}{2}$  cup of water.
2. Measure out  $\frac{1}{2}$  cup of soap in the other measuring cup.
3. Measure out 1 cup of sand for each of the three disposable bowls.

## Pre-Activity

Discuss with the children whether they believe the plain sand, the sand mixed with water, or the sand mixed with soap will make the best sand castle. Why do they think this?

## Activity

When you go to the beach, you probably build at least one sandcastle. In order to get the sand to stick together, you probably don't JUST build it using sand. You probably use sand mixed with water in order to get all of the grains to stick together in the way that you want them to. In this activity, we're going to look at how sand reacts when it is mixed with three different substances, air, water, and soap. You will then decide which mixture makes the best sandcastle.

- On the first Styrofoam plate, build a tower out of the cup of sand. Try to make this tower as high and as narrow as possible.
- Using your ruler, place it beside the sand tower and measure how high and wide (at the base of the tower) you were able to build it. Record this value in the table below.
- In the second bowl, mix the water with the sand using a spoon.
- Pour off any excess water into a waste container (i.e. disposable cup).
- Build a tower on another Styrofoam plate out of the wet sand, making it as tall and narrow as possible without it falling down.
- Measure the height and width at the base of the tower and record it in the table.
- In the third bowl, mix the sand with the soap using a spoon.



- Build a tower out of this sand mixture, making it as tall and narrow as possible.
- Measure the height and width and record it in the table.
- Compare the heights and widths of the sand towers. Which one ended up being the tallest? Which one was the most narrow? Was this what you expected? Why do you think this was?



**Extension**

1. Find

	Height (centimeters)	Width (centimeters)
Dry sand		
Sand with water		
Sand with soap		

**Activity**

another

granular media to use instead of sand! For example, craft stores sell small spherical beads. Is there a difference as to how high these can be piled as opposed to the sand? Why do you think this difference (if there is one) exists?

**References**

[http://science.nasa.gov/headlines/y2002/11jul\\_mgm.htm](http://science.nasa.gov/headlines/y2002/11jul_mgm.htm)  
<http://www.sandcastlecentral.com/>