

# SciGirls Activity 6

## Play with Sand!



**Icebreaker:**  
Shape a saturation  
investigation with this  
Sand Castle activity!



**You'll need:**

- dry playground sand, a 20 lb sack for every 10 girls
- several sixteen ounce plastic cups
- mixing bowl
- water
- 1/4 cup measuring cup
- ruler
- trays

### SciGirls Skill: Predicting

**Guide your girls as they:**

- 1) Fill a 16 oz cup with dry sand. Quickly turn the cup over onto a tray. Slowly lift the cup up off the tray, allowing the sand to tumble into a mound. Measure how high the mound is, and how wide at the base.
- 2) Collect the sand from the mound into a mixing bowl. Add 1/4 cup of water to the sand, and stir it around. Put the dampened sand back into the cup. Quickly turn the cup over again onto the tray. Slowly lift the cup, and measure the mound of sand again.
- 3) Repeat Step 2, adding another 1/4 cup of water to the sand, making it a little more damp each time.
- 4) As the sand gets wetter, you'll find at some point it maintains the shape of the cup after you lift the cup off. How much water does it take?



**SciGirls Suggestion:** The materials for this activity are simple enough that each girl can have her own cup, sand and water. Encourage girls to compare and contrast their results!



For more "beachy-keen" information about this activity, go to [pbskids.org/dragonflytv/show/sand\\_dunes.html](http://pbskids.org/dragonflytv/show/sand_dunes.html)

## Investigation:

### Sand Dunes

Find out how plants survive (and thrive) in your climate, and how mere inches can make all the difference in plant growth.

We're Victoria and Alejandra. It's an ocean of sand here at the Guadalupe-Nipomo Sand Dunes! Just like us, sand dunes come in different shapes and sizes. One of the coolest differences between sand dunes is the plants that grow on them. Our SciGirls question: **Why are some dunes full of plants and others bare?**



For each group of three girls, you'll need:

- 10-foot (3 meter) length of rope
- soil moisture indicator, such as the ECH2O™ Soil Moisture Probe (see <http://www.ech2o.com/>)\* You might find a similar device at a garden store.
- Access to sand dunes, or a sandy beach area. The DFTV girls observed dunes in the Guadalupe-Nipomo Dunes National Wildlife Refuge in Guadalupe, CA. Search the Internet for sand dunes in your area. Or just hit the beach or a gravel pit; both will work well.

\*In place of this tool, you can dry a sample of sand using a hair dryer, and weigh the sand before and after drying to determine moisture content indirectly.



Visit [pbskids.org/dragonflytv/show/sand\\_dunes.html](http://pbskids.org/dragonflytv/show/sand_dunes.html) to learn more about this sandy adventure. Then surf to [pbskids.org/dragonflytv/contact/index.html](http://pbskids.org/dragonflytv/contact/index.html) to tell us about your investigation!



Check out this investigation on Tape 1, Segment 6.



## SciGirls Want to Know: How does the amount of moisture in a sand dune relate to the number of plants growing there?

Guide your girls as they:

- 1) Choose two locations in your sandy area. Go to the first location. Lay the rope down in a randomly selected location of vegetation. Count the number and types of plants in contact with the rope. Collect the sand moisture content in the top 30 cm of the dune surface using the moisture meter. Take three readings in the area, and report the average.
- 2) Continue to the next location. Again, lay down the rope, count the plants touching it, and take a sand moisture reading. Make sure to write down your findings in individual or group notebooks.

If a sand moisture meter is unavailable, you can determine the sand moisture indirectly by the following method. Collect sand samples in plastic bags and bring them back to your club or meeting location. Weigh a sample of moist sand (about the size of a heaping spoonful) using a kitchen or lab scale. Dry the sand using a standard hair blow dryer, being careful not to lose any of the sand. Re-weigh the dried sand... it should weigh less than before.



### SciGirls Secret:

Research emphasizes girls' love of collaborative activity. Why not encourage your girls to put their new knowledge about plants to work in their own hometown? Have them research how they can contribute to a community gardening initiative, or encourage them to grow flowers to share with pediatric hospital patients or elderly folks. Get growing!

To calculate the moisture content, do the following:

$$\begin{aligned} &\text{weight of wet sand} \\ &\quad \text{minus (-)} \\ &\text{weight of dry sand} \\ &\quad \text{equals (=)} \\ &\text{weight of water in sand} \end{aligned}$$

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$$\begin{aligned} &\text{weight of water in sand} \\ &\quad \text{divided by (÷)} \\ &\text{weight of wet sand} \\ &\quad \text{times (x)} \\ &\quad \quad 100 \\ &\quad \text{equals (=)} \\ &\text{percent moisture content.} \end{aligned}$$




## SciGirls Synthesize: Data and Analysis

Victoria and Alejandra had the following results. You might want to use this table as a model as you analyze your data.

| Dune Type   | % moisture | # of plant types |
|-------------|------------|------------------|
| foredune    | 2.4%       | 6                |
| scrub dune  | 1.8%       | 14               |
| active dune | 1.1%       | 0                |

See Appendix A for a graphing example.

Victoria and Alejandra found that the foredune closest to the oceanside had the highest moisture content. The scrub dune had the greatest quantity of vegetation. The active dune had no vegetation and the lowest moisture content. Overall, the DFTV girls found that more moisture in the sand meant more plants. But they also decided that if the foredune had fewer plants, this could be due to other factors, such as high winds or salt content. Dunes with more plants are more stable, so moisture content is probably related to dune stability, too. What did you find out?

## Keep Exploring!

Investigate how soil moisture affects the rate at which seedlings sprout, or the rate at which plants grow, by planting some seeds in a simple pot. Make a window garden of different kinds of plants and see which ones need the most water.