

Hydrophobic Swimsuit

The big buzz at the 2008 Beijing Olympics was the Speedo LZR Racer® swimsuit, in which 23 world swimming records were broken. This new, high-end swimsuit, which was designed with the help of NASA, features a water-repellent polyurethane membrane to reduce drag and improve speed. Materials that repel water are called “hydrophobic” and have many interesting and useful properties. In this activity, you explore the behavior of Magic Sand, a common hydrophobic play material.



Stuff You'll Use: ▶ Magic Sand ▶ plastic spoon ▶ clear plastic cup filled with water ▶ paper towels

What to Do:

- 1 Feel the Magic Sand. Now pour a few spoonfuls of it into a cup of water and look at it from different directions. *What do you observe? Does the sand look like it's getting wet?*
- 2 Sprinkle a little more sand on the surface of the water so the sand floats. Slowly and carefully push the tip of your finger slightly down on the sand so that you can see your finger in the water. *What do you observe? Remove your finger. What does it feel like?*
- 3 Carefully pour most of the water out of the cup. Try not to lose too much of the sand. Watch the sand as you pour off the water, then feel the sand. *Did it get wet?*

How It Works:

From your experience at the seashore or in a sandbox, you probably have seen that regular sand becomes wet in water. Magic Sand remains dry in water because the surfaces of the grains are coated with a water-repellent substance much like Scotchgard™ or silicone spray. These coatings are hydrophobic (“hydro” means “water” and “phobic” means “fearing”) and therefore do not attract water. This hydrophobic coating also allows Magic Sand to form some unusual shapes and designs when poured into water. The coating keeps the Magic Sand dry even when it is totally submerged in water.

Unlike the Magic Sand, the LZR Racer suit is not coated with a hydrophobic material; rather the suit contains a new nylon microfiber/elastane fabric. Cold plasma technology is used to modify the chemical structure and topography of the fabric surface, making the suit water repellent. The treatments to this fabric reduce water absorption to only 2% of the fabric weight.

More Fun?

Want to make and investigate homemade Magic Sand and other water-repellent objects? Terrific Science Press (www.terrificscience.org/sciencestore) offers the following book that includes an activity on hydrophobic materials:

▶ [Teaching Chemistry with TOYS](#)

Want to buy Magic Sand? Visit the Terrific Science Toys, Etc. Store at www.terrificscience.org/sciencestore.

FYI...

Magic Sand can be reused. Dump the contents of the cup onto several layers of paper towel. Let the sand air dry. After drying, store the Magic Sand in its original container.

