Gravity Fail

Do small things behave differently?

Description

In this activity, kids try pouring water out of a regular cup and a miniature cup. It's harder than it sounds!

Suitable for kids ages 3 and up.

Materials

Regular-sized cup or glass

Miniature cup or glass
(with an opening less than ½ inch)

Container of water, large enough to hold the cups

Note: *Miniature cups can be found at dollhouse suppliers. One source is dollhousesandmore.com (#CB2719). An extra-small thimble or toothpaste cap might also work.*

Time

Preparation: 5 minutes
Activity: 5 minutes
Cleanup: 5 minutes

Safety

Use normal precautions when doing this activity.

Step 1

Fill the regular cup by dipping it in the water.

Try to pour the water back into the container. What happens?

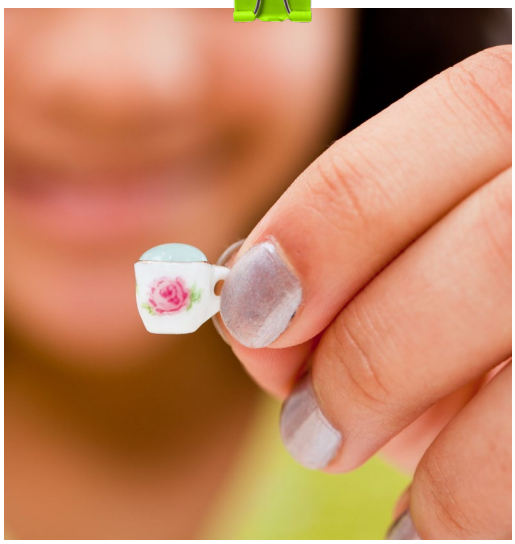
Step 2

Now fill the miniature cup. Can you pour the water back out?

What's going on?

It's easy to pour water out of a full-size cup, but not out of a miniature cup. The size of the cup determines which force is more important, gravity or surface tension. (Surface tension is the natural tendency of water molecules to stick together.)

With a regular-size cup, gravity is much stronger than surface tension, so the water falls out when you tip the cup. But in a miniature cup, there's a lot less water, so surface tension is strong enough to hold it in the cup.



How is this nano?

Different physical forces dominate when things get very, very small. For example, gravity is very obvious at human size, but it's hardly noticeable to nano-sized things like water molecules. Other forces (like surface tension) are much more important.

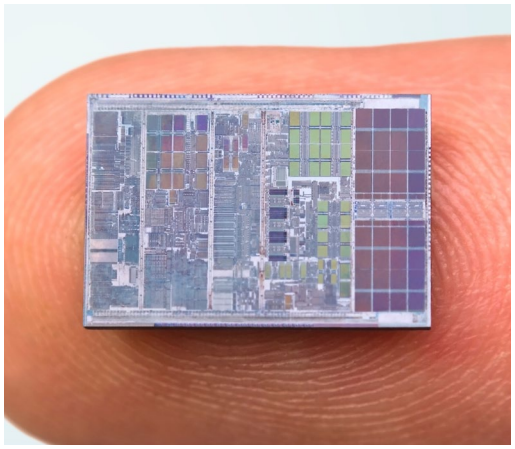
A force similar to surface tension, called van der Waals, lets geckos walk on walls!

Gecko

Nanotechnology

Researchers take advantage of the ways that nano-sized things behave differently to make new products and applications.

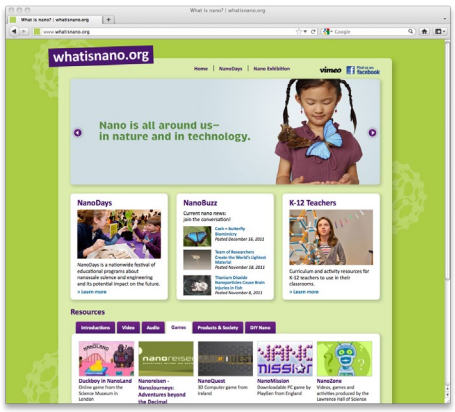
Nanotechnology allows scientists and engineers to make things like smaller, faster computer chips and new medicines to treat diseases like cancer.



Computer chip

Learn more

Learn more at:
www.whatisnano.org



Credits

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This activity was adapted from “Shrinking Cups: Changes in the Behavior of Materials at the Nanoscale,” in Nanoscale Science: Activities for Grades 6-12 by M. Gail Jones, Michael R. Falvo, Amy R. Taylor, and Bethany P. Broadwell. pp. 89-94. Arlington, VA: NSTA Press.
Activity Photographs, Gary Hodges Phototgraphy
Images of Gecko and computer chip on finger, www.istockphoto.com