Curiosity Guide #206
Liquid Forces

Accompanies Curious Crew, Season 2, Episode 6 (#206)

Cohesive Contest

Investigation #2

Description

Learn more about the principle of cohesion in this fun investigation.

Materials

- 2 baby food jars
- 2 clear straws
- 2 spoons
- Clay
- Rubbing alcohol
- Water
- Food coloring
- Basins or shallow tubs to catch the liquids

Procedure

1) Do this entire investigation over a basin or shallow tub.
2) Remove the lids from 2 baby food jars.
3) In the bottom center of each jar, place a marble-sized piece of clay.
4) Fill one jar half full of rubbing alcohol.
5) Fill the other jar half full of water.
6) Add a few drops of food coloring to each jar.
7) Stir with a spoon, being careful not to move the clay.
8) Carefully stand one straw up vertically into the clay in each jar.
9) Pick up each jar. Quickly rotate the jars upside down so that the liquids pour out.

10) Turn the jars right side up, and place them on the table.
11) Compare the liquid inside the straws, if any.

My Results

Explanation

When the jars are turned upside down, the force of gravity makes the liquids fall. However, the jar that had water in it will still have liquid remaining in the straw. The jar with rubbing alcohol will not. This is because the cohesive force, which is the attraction of the same kinds of molecules to one another, is stronger in water than in rubbing alcohol. The surface of the water has strong surface tension, as well as the side-to-side attraction to the straw. Combined with air pushing up on the straw when turned over, those forces are stronger than gravity's pull, so water remains in the straw. Because rubbing alcohol has a weak cohesive attraction, the droplets separate and flow out of the straw.

Liquids are a fluid form of matter that can flow and will take the shape of a container, just like the water in the jar. If we could magnify the little droplets in the liquid water, we would notice some interesting things. First, the droplets want to stick together, but they also want to stick to other things, like the inside of the jar. By paying attention to these liquid forces, you can see some pretty strange things, like a full jar not spilling out when turned upside down!

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