



Water Molecule Pockets

materials

Per group:

Food coloring
250 ml (1 cup) tap water
250 ml (1 cup) rubbing alcohol
1 clear jar
Marker
Metric ruler
Marshmallows and toothpicks

background

Water is made of molecules that when connected, form empty pockets of space. In this experiment, adding alcohol to water causes the volume to be less instead of more, demonstrating that the alcohol filled the spaces in the water. An easy model of a water molecule is to join 3 marshmallows (1 marshmallow as oxygen and 2 marshmallows as hydrogen) with 2 toothpicks as the molecular bonds.

activity time:
30 minutes



directions

1. Squeeze 3 drops or so of food coloring into the jar.
2. Pour 250 ml (or 1 cup) of tap water in the jar.
3. Mark the height of the water level with a marker. Be exact!
4. Add 250 ml (or 1 cup) of rubbing alcohol.
5. Measure the height of the liquid.



discussion

- How much liquid should there be in the jar?
- What happened to the level of the liquid? Why?
- Show the marshmallow model representing the water molecule.
- Where did the alcohol go in the marshmallow model of water? (In spaces that are represented by toothpicks)



extension

Try this same experiment with 2 tablespoons of salt instead of alcohol. Students can try other liquids or solids in water to see if they can get something in the “pockets” of a water molecule.



vocabulary

Liquid - a substance that flows whose shape can be changed but not its volume

Volume - the size of a three-dimensional space enclosed within or occupied by an object

Solvent - substance in which other substances are dissolved



related activities

“Salty Water”

“Water Expansion”

alignment to national science standards

Unifying Concepts and Processes, Standards A, B, D, E

alignment to kansas science standards

Science as Inquiry: K-2: 1.1.1, 1.1.3, 1.1.4, 1.1.5; 3-4: 1.1.1, 1.1.3, 1.1.4; 5-7: 1.1.1, 1.1.4, 1.3.1

Physical Science: K-2: 2.1.1; 3-4: 2.1.1, 2.1.3; 5-7: 2.1.1

Earth Science: 3-4: 4.1.1; 5-7: 4.1.1, 4.1.2

History and Nature of Science: K-2: 7.1.1; 3-4: 7.1.1