Water Experiments

Lesson Type: Demo / Experiment
Target: Elementary School
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Demo List:

Soap Boats
Milk with food coloring
Absorbing polymers from diapers
Hydrophobic sand
Paper clips and surface tension

Materials

- Milk
- Food coloring
- Tooth picks (4 per person)
- Plates/bowls with at least ½ inch rim (1 per person)
- Open topped plastic tub 1-2 gallons in volume (1 or 2 per class)
- Bread clips
- Paper and or thin cardboard
- Scissors
- Dish soap
- Absorbing polymers from diapers
- Hydrophobic sand (demo)
- Cups (1 inch in diameter, 1 per 4 people)
- Paper clips (1 per 4)
- Ziplock bags

Agenda

Introduction (5 min) -

- This week's lesson focuses on water's properties such as cohesion and adhesion as well as interactions between polar and non polar substances.
- Polar substances have charged regions due to an uneven distribution of electrons. They are attracted to oppositely charged regions
- Non polar substances have an even distribution of electrons and therefore have no charged regions
- Polar and non polar substances don't mix well.
- Cohesion is the property of molecules of the same kind sticking together.
- Adhesion is the property of molecules to cling to dissimilar molecules or surfaces.

Milk and Food Coloring (10 min)

- Give all of the students a paper plate and put about ¼ inch of milk in the plate.
- Allow the students to put a few drops of food dye in the milk.

- Then dip the toothpicks in soap and touch the drops of food coloring and watch how the color spreads out.

Soap Boats (20 min)

- First demonstrate how a soap boat works.
- Allow the students to build and test their own boats.
- To test the boats float them in the tub of water and touch a toothpick with dish soap behind the boats.
- Soap boats will work best when the force crated by the reduction in surface tension is effectively channeled in 1 direction.

Absorbing polymers from diapers (5 min)

- Use ziplock bags to separate cotton from polymer beads.
- Have the students touch they dry polymer
- Show the students how polymer beads in diapers swell up and absorb water.
- Now have them touch the polymer that has absorbed water.
- Ask your students if they can thing of other uses for similar materials.

Hydrophobic sand (5 min)

- Show your students how the sand does not get wet.
- Ask them why the think the the sand stays dry.
- Explain how the sand is hydrophobic.
- Let them experiment with the sand.

Paper clips and surface tension (5 min)

- Fill a cup with water.
- Balance a paper clip on the rim of the cup, it should balance due to water tension alone.

Hints/Things to Try

The best soap boats will have a notch to place the soap and direct the created force.

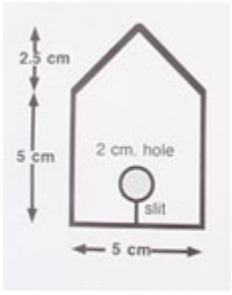

Figure 1


Figure 2


Figure 3


Figure 4

Background

References

http://www.essentiallearningproducts.com/all-washed-john-cowens