Polymer Activity from the: POLYMER AMBASSADORS

Atlanta NSTA "Make and Take" Activity: April 2004

Fortune Telling Fish

Grades: 2 - 6

Science Standards: Content Standard B: Physical Science

Materials:
Fortune Telling Fish in plastic wrapper (cellophane fish)
Container of water
Paper towels

Getting Ready: Fortune Telling Fish (#747) can be purchased from GTA at 800-328-1226, or from Terrific Science Books, Kits, & More in quantities of 30 (item#PR9906S) and 144 (item #PR9906L) at 513-727-3269

Procedure:

1. Remove the cellophane fish from its wrapper and lay it in the palm of your hand. Observe what happens. (The fish curls up and moves around.)
2. Put the wrapper on the table and place the fish on top of the wrapper. What happens? (The fish does not curl up or move around.)
3. Brainstorm reasons about what might be causing the movement of the fish. (Students may suggest moisture or heat from the hand could be causing the changes.)
4. Design an experiment to test one of the suggested factors.
   For example, if you place the plastic bag on the palm of your hand and the fish on top of the bag, you will observe that the fish does not curl up. The plastic provides a barrier to moisture from the hand but not

heat; therefore you can rule out heat alone as a cause. You can also slightly dampen a folded paper towel by dipping it in water and squeezing out as much of the excess water as you can. (Too much water may cause the fish to become waterlogged.) Lay the damp, folded towel on the table and place the fish on the moist paper towel. This time the fish will begin to curl.

Explanation:

The cellophane fish curls and twists primarily because it absorbs moisture from sweat glands in your hand and subsequently loses water due to evaporation. The fish is made from a cellophane polymer that is hygroscopic, ("Hygro" means water and "scopic" meaning to view or find.)

As water is absorbed into the cellophane fish, the water moves through small pores, or holes, in the cellophane by a process called capillary action. As the side of the fish toward the hand absorbs more moisture, the cellophane begins to swell causing the ends of the fish to curl up. The heat of your hand causes the water to evaporate. The lightness of the cellophane makes the fish very susceptible to air currents, which adds to the "dancing" effect. Because every person is different, the absorption/evaporation process happens at a different rate depending on the warmth of the hand and the amount of moisture on the palm.

When the fish is placed on a warm dry surface, it flattens out since the moisture evaporates and no new moisture is added. Placing the fish on the wet paper towel causes the fish to curl as it did in the hand because it once again absorbs water.

References:

Science Night: Family Fun from A to Z, Terrific Science Press, Center for Chemical Education, Miami University Middletown, 4200 East University Blvd., Middletown OH 45042 513-727-3269

Teaching Chemistry with Toys, McGraw-Hill Companies in collaboration with Terrific Science Press, Center for Chemical Education, Miami University Middletown, 4200 East University Blvd., Middletown OH 45042 513-727-3269

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Polymer Ambassador Web Site: www.polymerambassadors.org