Solution Solutions

Objectives:

Students will demonstrate how liquids diffuse.

Students will note the different speeds at which liquids diffuse.

Students will demonstrate that some liquids with different properties will not diffuse (for example, oil and water).

Materials:

Variety of liquids:

- vinegar
- water
- shampoo
- rubbing alcohol
- cooking oil
- soda pop
- corn syrup
- food coloring (water soluble)
- clear containers (beakers or clear plastic drinking cups) one per liquid, per group
- medicine droppers
- paper, both writing and art
- pencil, pen, colored markers
- watches with second measurement

Advance Preparation:

1. Label the various liquids.

2. Discuss safety procedures for keeping alcohol and soap out of the eyes by using the dropper in the proper manner.

3. Prepare a chart for recording observations.
4. Set a standard measurement of water for these experiments.

Exploration:

1. The teacher will put students into groups of two or three.

2. One of the students in the group gathers the materials.

3. The students will mix food coloring into each container of controlled substance.

4. Using droppers, have students drop four drops of the controlled substance into a container of still water.

Use one container of still water for each of the controlled substances at each group. Have students measure the time it takes for the liquids to spread a specified distance.

Seminar:

Suggested Questions:

Does the liquid spread out in the water?
How long does it take to spread out?
What color is the liquid?

Invention:

Diffusion is the gradual mixing of molecules of two substances from regions of high concentration of molecules to a region of low concentration of molecules. A solution is the mixture of two or more substances, one of which is dissolved in the other. Schlieren are regions of a transparent medium, such as flowing gas, that exhibit densities different from that of the bulk of the medium. (The “swirl” of color when food coloring is dropped into water or a tea bag is dunked in hot water demonstrates Schlieren.) Schlieren indicates that a solution is forming. Oxygen diffuses throughout the atmosphere enabling us to breath. Pollution is spread through diffusion.

Application:

Have students examine different liquids, using the procedure described in the above exploration, to see how variables such as temperature and movement affect the results.

Since oil and water will not mix to form a solution, what is the “solution” for an oil spill?