The Nature of Matter

This project funded by National Science Foundation
Density

Make a golf ball float!

Materials:
- golf ball
- water
- salt
- a tall, thin, transparent container slightly larger than the golf ball, for example a vase
- food coloring
- mixing container
- stirring spoon
- masking tape
- pen

To do and notice:
1. Fill the tall container half full with water and pour it into the mixing container.
2. Place the golf ball into the mixing container. Notice that it sinks. Stir salt into the water until the ball floats.
3. Take the golf ball out and put it into the tall container. Pour the salt solution into the tall container.
4. Add fresh water to the mixing container. (Add enough to fill the top half of the tall container.) Add 4 drops of food coloring.
5. Slowly add the colored fresh water to the tall container until it is full.
6. With a piece of masking tape and a pen, mark the height of the ball in the container.
   - Is the golf ball in the same place after several days?

A closer look:
The golf ball is not as dense as the saltwater. Therefore, the ball floats on top of the saltwater. The colored fresh water is not as dense as the golf ball, so the ball sinks in the colored water. Eventually, the saltwater and the colored fresh water mix. As the waters mix, the ball will sink.

Crystals

Grow your own garden!

Materials:
- small piece of porous brick or charcoal briquet
- 1 tablespoon liquid bluing (in the laundry section of a grocery store)
- 1 tablespoon ammonia
- 1 tablespoon salt
- 2 tablespoon water
- shallow dish
- magnifying glass (optional)

To do and notice:
1. Place the brick in the dish.
2. Mix the bluing, ammonia, salt and water until they are thoroughly combined.
3. Pour the water mixture over the brick.
4. Let the dish stand undisturbed for three or four days. Make daily observations.
   - What do you see?
   - When did crystals appear?
5. Observe the crystals with a magnifying glass.
   - What do the crystals look like?

A closer look:
The brick acts as a wick, soaking up the liquid in the dish. Crystals form as water evaporates from the surface of the brick, leaving the chemicals behind. The chemicals form crystal patterns.

Now try this with a different batch:
Add food coloring to the liquid mixture.
- Are the crystals colored?

Layered Liquids

Chemistry you can drink?

Materials:
- a tall, clear glass
- ice
- Sprite, 7-Up, or other clear soda
- chocolate syrup
- grenadine (optional)
- whipped cream
- maraschino cherry
- a straw

To do and notice:
1. Carefully add all the soda, syrup, grenadine and whipped cream to the glass. Let the glass stand a few moments.
   - Which layers rise to the top?
   - Which settle to the bottom?
2. Where do you think the cherry will float? Drop it in and see.
3. Draw a picture of the layers in the glass.
4. Stir the glass with the straw and let it stand for a few moments.
   - Do the layers mix?
   - Do they stay separate?
5. Drink your experiment!

A closer look:
Density describes how tightly packed a substance is. The more material that is packed in a space, the more dense it is. If there is a lot of space between molecules, the substance is not as dense. The molecules of a denser liquid, like chocolate syrup, are arranged more compactly than are the molecules of a liquid with less density, like 7-Up. This is why the chocolate syrup sinks to the bottom and the 7-Up rises to the top.

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