30 demos in 50 minutes
Demos by the UNC Secondary Science Methods Class at the NSTA Regional Denver Convention 2007

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Callender, Ashley M
Senior – Biology

Color of Osmosis

Materials Needed

One saucer, one clear cup, a rubber band, water, food coloring, and parchment paper.

Procedure:

Dissolve a teaspoon of salt into the cup of water that is completely full and cover it securely with the parchment paper and rubber band. Take the saucer and fill it up with water. Then place of few drops of food coloring in the saucer. Next place the cup with parchment paper in the saucer so that the cup is upside down. Wait to see the water in the cup change color.

Science Behind it:

The parchment paper is considered to be a permeable membrane. The colored water will flow through the membrane coloring the clear water in the glass.

Dowdy, Tandy M
Senior – Chemistry

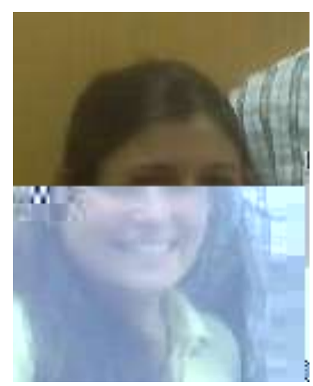
Dry Ice with Universal Indicator Demonstration

Topic: Acid/Base Chemistry and Neutralizations

Materials:
- Eye Protection
- Large Graduated Cylinder (2L)
- Tongs (for transferring dry ice)
- Heavy Gloves (for transferring dry ice)
- Dry Ice
- Household Ammonia
- Water
- Universal Indicator
- Long stirring rod

Safety Concerns: Wear eye protection and use gloves to handle the dry ice because it can cause severe frost burns.

Procedure: Fill the 2L graduated cylinder with water and add enough universal indicator to have an easily visible color. Then add a few mL of ammonia to make the solution alkaline. Stir with stirring rod to mix solution thoroughly. Add several chunks of dry ice to the solution. It will sink and will start to give of CO_2 gas. As the CO_2 is given off the solution will begin to change in color as the pH changes. The CO_2 reacts with the water in the solution to produce carbonic acid. The gradual change from a weak base to an acid will take the universal indicator through a range of colors.



beakers and release tubes. Colored water should flow out both ends. The smaller tube should fill less of its beaker than the large tube by about half. Ask students why this happens. Tell students that flow is inversely proportional to resistance so if resistance is greater (like in the smaller tubing) then flow will be less.

Follow up questions: After the demonstration ask the students:

What would happen to the heart of a person who has constricted vessels?

What other systems in the body would this effect?

Kipf, Rebecca
Senior – Earth sciences

False Lift

Materials: 1 latex balloon filled with helium, ballast (quarter and paperclip), yarn, 2 drinking straws

Procedure: Fill the balloon and attach the yarn to the balloon and then to the quarter using the paperclip. The balloon should be almost buoyant but unable to lift the quarter.
For the demonstration use the straws to blow on the upper area of the balloon. The wind you create should move over the top of the balloon and cause the balloon to lift.

Explanation:

the plane to fly. In hot-air ballooning this is referred to incorrectly as false lift because it is not lift created by the

Patton, John
Senior – Biology

Procedure:

1) Find someone that would like to win five dollars
2)
   just below the bottom of the bill.
3) Explain that if they anticipate the drop, they owe you five dollars.
4)

Hazards: Other than a possible splinter, there are no major safety concerns

Rewerts, Tamara
Graduate – Chemistry

The Dissolving Cup

Materials:
A pie plate
50 mL water in a 100 mL glass beaker
50 mL acetone in a 100 mL glass beaker(this can be replaced by fingernail polish, but 100% acetone is available at some stores) styrofoam cups

Procedure:
1. Hold one cup over a pie plate and pour water into the styrofoam cup (nothing happens).
2. Pour acetone into another of the styrofoam cups (the bottom will fall out) into the pie plate.
3. Finish by putting the cup into the pie plate and watching it disappear.

Alternative Procedure:
1. Start with two pie plates and put about 1/2 inch of acetone in the bottom of one and the same amount of water in the second one.
2. Have a race to see who can make the tallest tower of cups.
3. The cups in the acetone will slowly dissolve and shrink into the acetone, while the ones in the water will remain intact.

Two ways to discuss this demonstration in your classroom:

Safety - never drink anything in lab. This is a good example of this, two colorless liquids that appear to be water, yet one is not. The results show you why you should not assume that something in the lab that looks like water, is water! You may introduce this by pouring the water into the styrofoam cup and drinking it. Then pour the acetone into the other cup, pretend you are still thirsty and attempt to drink out of it. The results show you why no one should assume that something in the lab that looks like water, is water.

Like Dissolves Like - styrofoam is a polymer consisting of a long chain of monomers that are held together by non-polar bond interactions, thus styrofoam is non-polar. When acetone - a non-polar solvent - is poured into the cup, it dissolves because they are both non-polar. The cup did not dissolve in the water because water is polar and will not dissolve a non-polar substance. Make sure to clarify to your classroom that the cup is not melting in the acetone (the acetone is not hot!), it is dissolving because of their similiar polarities.

Safety: No particular cautions are needed

Disposal: The gooey solid can be disposed of into the trash can. You can leave the acetone in the pie plate and allow it to evaporate and then wash out the pie plate, or you can pour off the extra liquid down the drain.

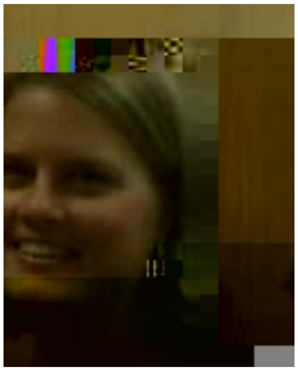
Source: Elmhurst College Demonstrations

The Vanilla Balloon

Materials:
1 balloon (medium to large sized)
Imitation Vanilla extract

Procedure:
1. Stretch the mouth of the balloon over the opening of the vanilla extract bottle and pour a little into the balloon, it just can be a quick inversion of the bottle.
2. Blow up the balloon and tie it off.
3. Pass the balloon around your classroom and ask yo yd 4e 5.22 27.53 Tm[(1)-5(.)-2(5)( )-2( )]TJETBT1 0 0 1 43.2TBT1 0 0

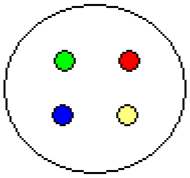
Riddle, Kate
Senior – Eath Sciences



Tie-Dyed Milk

Principles: This demonstration addresses the property of surface tension. Surface tension is the energy required to increase the surface area of a liquid by a unit amount. Liquids like water

demonstration will show how soap can reduce the surface tension in milk.



Materials: A shallow clear dish
Milk (whole or 2%) (room temperature)
Food coloring (four different colors)
Liquid dish soap

Procedure:
1. Pour a 1-2cm layer of milk into the dish
2. Put one drop of each of the four food colors onto the surface of the milk, separated from each other.
3. Drop one drop of dish soap onto the surface of the milk in the center of the dish. Do not drop the soap on top of the food coloring drops.
4. Observe what happens next!

Source: coolscience.org; Dr. David Anderson

Principles: This demonstration shows the process of metamorphism (changing form). It will show the transformation of a pre-existing rock type into a new rock type using a Snickers candy bar for the rock.

Materials: Snickers bar
Two pieces of wood

with ice water and the other filled with water that has been heated on the hot plate. Place the device into the cold water and watch the balloon sink into the can. Then place the can into the hot water and watch the balloon rise. Continue with a class discussion explaining how temperature, kinetic energy, and pressure are related.

Travis, Cheryl
Senior – Biology

Rainbow in a Jar

Materials: (1) Qt. **Glass Jar or** beaker
(1) Small bottle **White Karo Syrup** (approx. 16 oz.)
(2) **Polarized Plastic Sheets**
(1) **Overhead Projector** or comparable light source

Procedure: Place the overhead projector on a sturdy, flat surface and plug in. Pour Karo Syrup into glass jar until approximately 3-
projector. Turn on light source. Now place the jar filled with the karo syrup on top of this polarized sheet. Next, place the second polarized sheet on top of the glass jar rim.
Experiment by moving the top sheet in different directions to observe visual changes. Now try rotating the top sheet in a

Why this works: Glucose (Karo Syrup) is a very large sugar molecule. By allowing the light to pass through the polarized sheets, the wavelengths are broken as they pass through the syrup. The colors of the visible light spectrum can thus be observed.

Source:

True, Nickolas
Senior – Biology

I am going to do the dry ice plus liquid soap demostration where a piece of dry ice is placed in a cup, water is added followed by liquid soap. A very thick bubble column extends from the cup and will grow very tall with out falling, furthermore when the bubbles are touched by skin, the instantly evaporate.