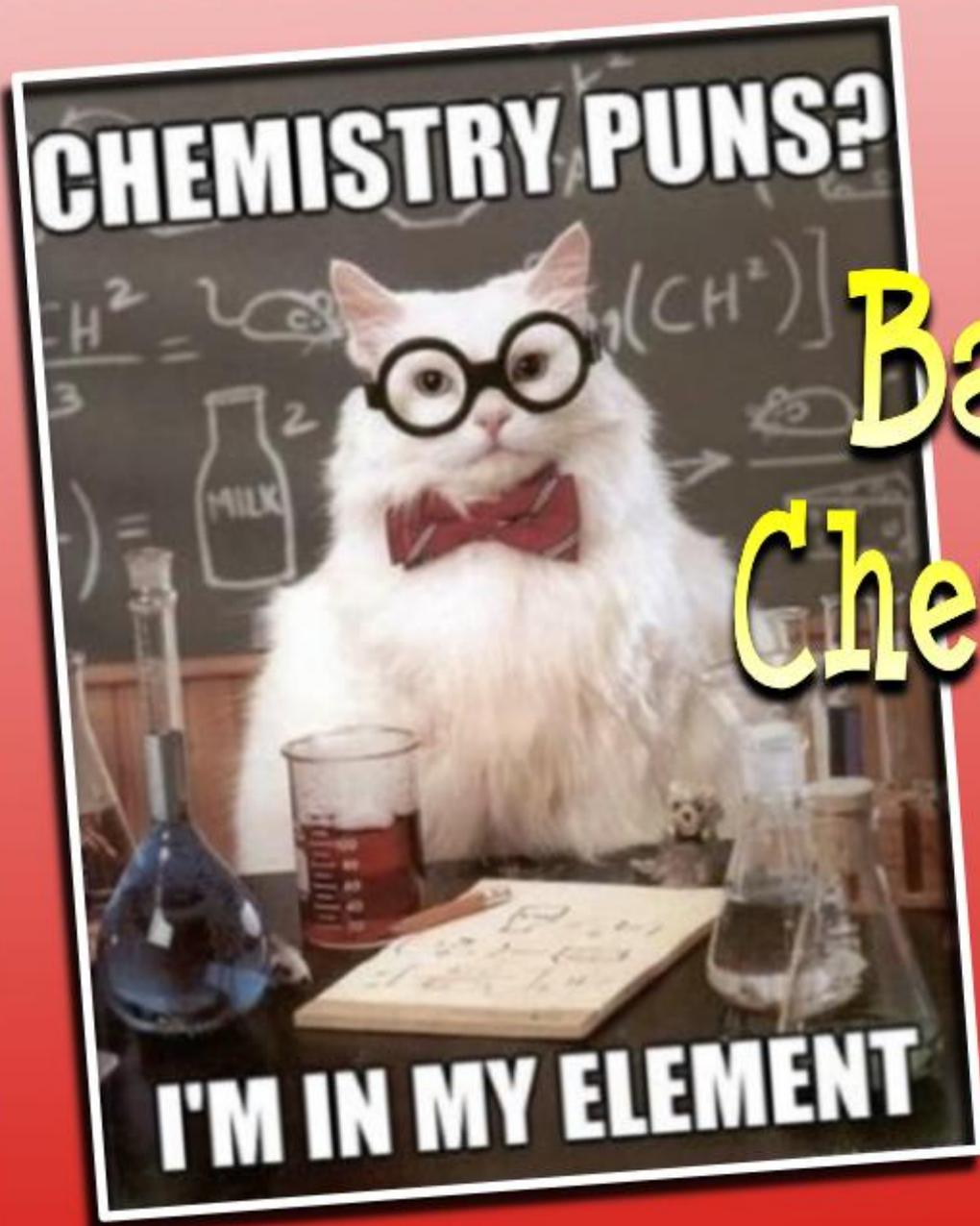


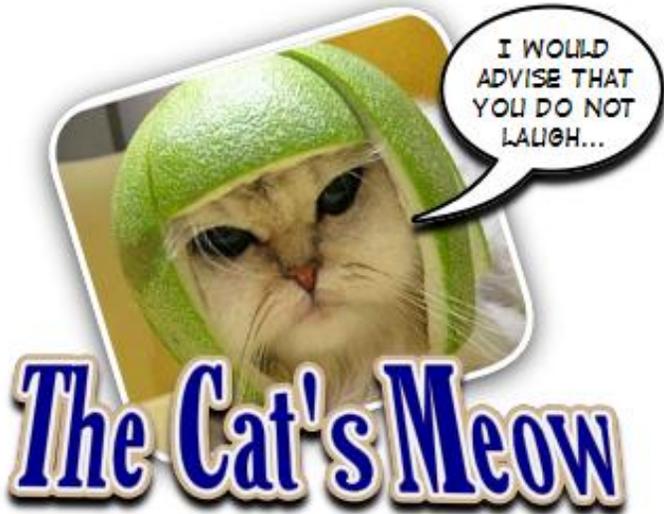
Southland Conference - Scott McQuerry

January 2015



Baggie
Chemistry





Children will model how fat can be digested by bile.

Materials:

Whole milk

Water

Shallow dish or pie pan

Food coloring

Liquid dish or hand soap

Cotton swabs

Activity:

- 1) Pour about $\frac{1}{2}$ inch of milk into the dish/pan.
- 2) Add a couple of drops of four different food colors at the edge of the container. Place the drops equal distances from each other. (If you can imagine the dish/pan as a clock, put the drops at 3, 6, 9 and 12 o'clock.)
- 3) Inform the child that they are going to dip the tip of the cotton swab into the soap and insert it in the center of the container of milk. They will need to hold the swab in place for a short period of time.
- 4) Ask the child to make a prediction as to what may happen.
- 5) Dip and hold the soap-coated cotton swab into the milk. You should notice after a few moments that the food coloring starts to swirl around inside the milk.



Explanation:

Your liver makes a chemical called bile which is used to break down the fat in your food. In this experiment, you are using a different chemical (soap) to break down the fat that is found inside the milk. Small particles of soap surround and attach to fats within the milk. This separates and breaks apart the large fat molecules into smaller pieces. This is why you use soap to wash your hands and clothes. Soap surrounds the "dirty" molecules, breaking them apart so that you clothes can be clean again! In this experiment, the fat is so spread out within the milk that the soap cannot easily surround it. Therefore, it swirls around in its attempt to surround the fat. This swirling motion causes the food coloring to move as well.

A Cool and Colorful Hotpack

Children will create a modified hot and cold pack.

Materials:

Ziplock baggie

2Tbs baking soda

2Tbs red cabbage juice (see recipe below)

1 gallon distilled water

1 head of red cabbage

2Tbs calcium chloride (Sold as de-icer in the auto section of stores; looks like white Dip n' Dots)

2Tbs vinegar

Activity worksheet (see attached)

Activity:

To make the red cabbage juice, chop one head of red cabbage and place into one gallon of boiling distilled water for about 15 minutes. The liquid should look like grape soda. Let the fluid cool and then strain the cabbage out of the solution. Pour the liquid back into the plastic jug. You can refrigerate or freeze the leftovers for use in the future (I would recommend it!)

- 1) Place the calcium chloride in the baggie. Seal it up and make observations on the worksheet.
- 2) Place the red cabbage juice into the baggie and seal it up. Gently shake until all of the solid particles are dissolved. Make observations on the worksheet.
- 3) Place the baking soda into the mixture. Seal the baggie and gently shake. Be prepared to open the baggie to release some of the gas that will be produced. Make observations on the worksheet.
- 4) Place the vinegar into the baggie and seal it up very well. You may need to reopen it once again to release any extra gas that is produced. Make observations on the worksheet.
- 5) When you are finished, the baggie can be thrown out with the trash.

Explanation:

Changes in color, temperature and volume are indications that a chemical reaction is taking place. This is different from a physical change in which no new molecules are being produced. Cabbage juice is a very good acid/base indicator. It will turn greenish blue for a base (like calcium chloride) and red for acids (like vinegar). This is why the dissolved solution turns from purple to blue after Step 2.

The temperature of the mixture increased while the calcium chloride was dissolving as this reaction is an exothermic reaction. The decrease in temperature after the addition of the baking soda is known as an endothermic reaction. This reaction requires energy in the form of heat (which it absorbs from the air, the baggie and your hand)! As heat is removed from your hand to keep the reaction continuing, the solution feels cool to the touch.

Step 3 involves the creation of an acid when the calcium chloride and baking soda dissolve in liquid. This new acid causes the color of the solution to turn back to purple. A gas, carbon dioxide (CO_2) is produced by the reaction during Step 4. The gas creates the bubbles you see and inflates the plastic bag.

A Cool and Colorful Hotpack

- Under The **COLOR** column you will write the color the substance in your bag turns after you add the material indicated.
- Under the **TEMPERATURE** column, circle the words **colder**, **warmer** or **same** to describe the temperature of the baggie after you add the material indicated.
- Under the **VOLUME** column, circle words **same**, **bigger** or **much bigger** to describe the volume of the baggie after you add the material indicated.
- Under the **BUBBLES** column, circle **yes** or **no** to indicate whether or not you observe bubbles.

Material	Color	Temperature	Volume	Bubbles
Calcium chloride		<i>No temperature change</i>	<i>No change in volume</i>	<i>None</i>
Red Cabbage Juice		Colder Warmer Same	Same Bigger Much Bigger	Yes No
Baking Soda		Colder Warmer Same	Same Bigger Much Bigger	Yes No
Vinegar		Colder Warmer Same	Same Bigger Much Bigger	Yes No

Post- lab questions:

- 1) Where did you observe any color changes?
- 2) When did you observe a temperature change?
- 3) When did you observe any volume changes?
- 4) Based on your observations, what properties would you look for to see if a chemical change has occurred?

Answer key:

1) Where did you observe any color changes?

Answers may vary; however, there should be color changes after the addition of baking soda and after the addition of vinegar. Students may also not a change in color of the red cabbage juice when it is added to the calcium chloride.

2) When did you observe a temperature change?

The baggie will get warmer after the red cabbage juice is added to the calcium chloride and it will get colder when the baking soda is added to the calcium chloride/indicator mixture. The baggie will also get colder when the vinegar is added to the baggie, but this is difficult to observe since the baggie is already pretty cold.

3) When did you observe any volume changes?

The volume will increase when the baking soda is added. There will also be an increase in volume when the vinegar is added.

4) Based on your observations, what properties would you look for to see if a chemical change has occurred?

Color, temperature and volume changes indicate a chemical change has occurred.

MOM and Cabbage Juice

Children will simulate how antacids affect your stomach pH.

Materials:

Red cabbage juice
Milk of Magnesia
Water
Large clear bowl
Spoon
Vinegar
Measuring cups/spoon

Activity:

- 1) Fill the measuring cup half-full with water.
- 2) Add $\frac{1}{4}$ cup red cabbage juice.
- 3) Add $\frac{1}{4}$ cup milk of magnesia.
- 4) Stir well to mix.
- 5) Add two tablespoons of vinegar.
- 6) Stir well and watch the color change. After the solution returns to its original color, add more vinegar and repeat.
- 7) The colors will continue to return until the amount of vinegar exceeds $\frac{1}{4}$ cup.

Explanation:

The red cabbage juice contains a molecule called flavin which turns red in acidic solutions, purple in neutral solutions and greenish-yellow in strong basic solutions. The addition of milk of magnesia in the water makes the solution slightly basic and will turn the solution a blue-green color. When vinegar is introduced, the color of the solution will turn from blue-green to purple and then to red. However, there is more milk of magnesia than acid in the solution at this time. Therefore, the solution will slowly revert back to a more basic solution and its color will change back to blue-green. This will continue until you add more vinegar than milk of magnesia. When there is no more milk of magnesia to neutralize the acid, the color change will stay red as the solution will remain acidic.

