Chemical and Physical Change-Post Visit Activities

Sugar/Salt Crystals

Key Words/Concepts:

- Physical change
- Phase change
- Crystal

Objectives:

- Students will observe and identify physical changes and see how a physical change can be reversed.

Materials:

- Clear jar or other clear containers
- Popsicle stick or other straight object, long enough to lay across the top of the clear jar/container
- Yarn or rough string
- Hot/warm water
- Sugar and/or Salt
- Teaspoon
- Cup
- Windowsill or other location that gets sunlight

Procedures:

1. Put warm or hot water (as hot as you can get if from the tap or you can boil it if you wish) into a clear container and add one teaspoonful of sugar or salt and stir until it has dissolved.
2. Continue to add teaspoonfuls, stirring in between, until solution is saturated (there will be a small layer of sugar or salt on the bottom of the container).
3. Tie a piece of yarn or rough string around the middle of the popsicle stick (these work well because they can't roll off the jar top. If you use a pencil or other round object, you may have to use tape or clay to anchor the pencil so it doesn't roll off). The piece of yarn should reach almost to the bottom of the

clear container (but not touching the bottom).

4. Place the Popsicle stick with string over the top of the clear container and place entire apparatus in a windowsill where it will get sunlight.
5. Check on the apparatus periodically through the next couple of weeks. What do you notice?

Possible Interactive Questions:
Why do you think we're putting the jar in the sun?
What do you think will happen when the sunlight heats the salt/sugar water?

What Happened/What's Going On:
There are two physical changes occurring. The first is the dissolution of the sugar or salt into the water. The second is then the evaporation of the water in the sunlight (a phase change), which separates our water and sugar or salt again, showing that physical changes are reversible.

Academic Content standards:
Science, Physical Sciences, 4.1, 6.3

CHECKING FOR STARCH

Key Words

- Starch test
- Conversion
- Chemical change
- Inference

Objectives

- Students will observe what happens to the iodine when it is applied to ripe and unripe apples.
- Students will infer that as fruit ripens, the starch which is present in unripe fruit changes to something else (sugar).

MATERIALS:

Per room:

- 1 potato for demonstration purposes
- Ripe apples – enough for each student to have a slice
- Unripe apples – enough for each student to have a slice

Per student:

- 1 plastic pipette
- 1 small artists brush
- 1 small paper plate
- 1 golf pencil

Per group:

- 1 bin or tote
- 1 bottle of iodine in non-spill bottle
- wet wipes

PROCEDURES:

1. Slice the unripe apple horizontally into enough slices so each participant has one slice. This can also be done ahead of time by the teacher. If you soak the slices in lemon-lime soda, they won't brown (yet another experiment for another time). Do the same with the ripe apples. Make sure to keep them

separated.

2. Have the students mark the left side of their plates with a "U" and the right side of their plates with an "R."
3. Distribute the slices so that each student has one slice of ripened apple and one slice of unripened apple. *Make sure that they keep track of which apple is which! (To help with this, you may want to hand out the unripened slices first then go onto step 3, then distribute the ripened slices before proceeding to step 4).*
4. Ask each participant to take a small bite of the unripe fruit (leaving about half of the slice for performing the experiment), then put the remaining piece of fruit on the left side of their paper plate.
5. Now, taste the ripe fruit (again, leaving about half of the slice). Put the remaining piece of ripe fruit on the right side of the paper plate.

Possible Interactive Questions:
Did the two slices taste the same? How did they differ? (Hopefully someone will say that the ripe fruit tasted sweeter.) What causes things to taste sweet? (Sugar) Which apple had more sugar in it? What do you think might be in the unripe apple instead of sugar?

6. Cut a fresh slice from the potato and paint with iodine. Iodine turns dark when it reacts with starch.
7. Ask the students to make predictions as to what will happen to each slice when they paint iodine on them.
8. Have each participant take small paint brush and paint iodine onto the remaining section of each slice of apple.
9. Make observations.

Possible Interactive Questions:
What happens to the iodine? Does the color remain the same? We know that when there is starch present, iodine will change to a deep purple. Did the iodine on anyone's slice of ripe apple change to purple? Did the iodine on anyone's unripe slice change to purple? What is present in the unripe fruit that isn't present in the ripe fruit? (starch) What did we taste in the ripe fruit that we didn't taste in the unripe fruit? (sugar). What change do you think takes place when fruit ripens? (the starch changes to sugarthis won't work with storage apples). Is this an observation or an inference?

What Happened/What's Going On:
As apples ripen, the starch turns into sugar, giving ripe apples a sweeter taste than unripe apples. The turning of starch into sugar is an example of chemical change. Also, in some freshly picked apples, you can see in the center of the apple there is no color change, because the starch there has been converted to sugar. However, along

the outer edges, where the starch has not been converted, the iodine will change color.

COMMENTS: Do not use the term "green" when talking about unripe apples. This could be confusing, especially to the younger participants, since some apples, such as Granny Smiths, are green in color even when they are ripe.

Academic Content standards:
Science, Physical Sciences, 4.2, 6.2, 6.4
Science, Scientific Inquiry, 6.3

Plaster of Paris

Key Words/Concepts:

- Chemical change
- Physical change
- Exothermic

Objective:

- Students will differentiate physical and chemical changes by doing an experiment.
- They will also learn what an exothermic reaction is.

Materials:

- Plaster of Paris
  WARNING: Do not inhale powder or to get any of it in your eyes.
- Styrofoam cup(s) for mixing
- Mixing utensil, such as a stir stick, popsicle stick or plastic spoon
- Water
- Object(s) to plaster, such as inflated balloons or boxes
- Newspaper cut into 2" strips
- Thermometers
- Worksheets

Procedures:

(Note: This activity can either be performed as a demonstration for the class or as a hands-on activity. You must be very careful handling the plaster of paris. Depending upon your class, you may want to demonstrate the first part in front of the class, mixing the plaster of paris (you can make several little batches), and then split the class into smaller groups and have each group work on plastering an object.)

1. Have the students make a hypothesis of what they think will happen when the water is mixed with the powder.
2. Measure the temperature of the water and the temperature of the powder and record them on the board.
3. Mix the water in with the plaster of paris (about 1c. of powder to ½ c. of water)

4. *WARNING: Do not touch plaster. (It will get hot!)*
5. Record the temperature every 5 minutes for 25 minutes. What is happening?
6. Then take newspaper strips and dip them in the plaster and cover the object(s) with them.
7. Let the object(s) dry overnight. What happened?

Possible Interactive Questions:
What do you think will happen when we mix the powder with the water? Do you think that the mixture of the powder with the water is a chemical or a physical change? Why? Is the temperature increasing or decreasing at a steady rate? What do you think this tells us?

What Happened/What's Going On:
When the water is mixed with the plaster, a new substance is formed with new properties, meaning that this is a chemical change. One piece of evidence of this chemical change is that heat is given off. When a reaction produces or gives off heat, it is called an *exothermic* reaction. When the newspaper strips are dipped in the plaster of paris, no new substance is formed (we still have newspaper strips that happen to be covered with the plaster), so this is a physical change.

Academic Content standards:
Science, Physical Sciences, 4.1, 4.2, 6.2, 6.3
Science, Scientific Inquiry, 4.1, 4.3, 5.1, 5.3, 6.2
Mathematics, Data Analysis and Probability Standard, 4.2, 6.2