



Chemical and Physical Change-Pre Visit Activities

Identify Chemical and Physical Change

Key Words/Concepts:

Chemical change

Physical change

Objectives:

Students will be able to identify physical and chemical changes.

Materials:

Worksheet

Academic Content standards:

Science, Physical Sciences, 4.1, 4.2, 6.2, 6.3, 6.4



Physical and Chemical Changes

Worksheet

Name: _____

Fill in the blanks using the word bank:

1. In a chemical change,
a new substance _____ formed.
2. A physical change _____ be reversed.

WORD BANK!!

Is

Is not

Can

Cannot

Put an "X" in the correct column to indicate whether the experiment demonstrates a physical change or a chemical change.

Chemical Change	Physical Change	Experiment
		Adding salt to warm water creates a saltwater solution.
		Ripping up a piece of paper produces little pieces.
		Adding oxygen to iron creates iron oxide (rust).
		Boiling water produces water vapor.
		Burning logs in a fireplace produces ashes.

Give two examples of a physical change:

Give two examples of a chemical change:



Chromatography

Key Words/Concepts:

- Physical Change
- Chromatography

Objectives:

- Students will learn that pens and markers of a seemingly single color can actually be made of multiple colors
- Students will observe a physical change.

Materials:

- Coffee filters or Chromatography papers
- A wide variety of water soluble/felt tipped black pens, markers
- Shallow containers or many paper towels
- Paper towels
- Water
- Rulers
- Scissors
- Dropper or Pipette (*if desired*)

Procedures:

1. Cut the coffee filters, if desired into strips (about 1-2")
2. Follow one of the two methods below:
 - a. Method A:
 - i. Using a felt tipped pen, make a thick circle on one of the strips about 1" from the bottom.
 - ii. Pour $\frac{1}{2}$ " of water into a glass.
 - iii. Dip the end of the strip with the circle on it into the glass, but make sure the water does not touch the circle.
 - iv. Watch the water creep up the strip until it reaches the top of the strip.

- v. Take the strip out of the water and place it on the paper towel.
- b. Method B:
 - i. Using a felt tipped pen, make a design (doesn't have to be anything fancy – could be a line or a shape or a doodle – spirals look fun) on one of the strips, leaving room at the top to write the name of the marker (don't do it yet).
 - ii. Put the strip into the glass or onto several sheets of paper towels.
 - iii. Taking the dropper or pipette, drop several drops of water onto the design.
 - iv. Observe what happens
3. Write the name of the pen, using the same pen, at the top of the filter.
4. Pick a couple of other pens and markers.
5. Make some predictions as to what you think will happen.
6. Repeat the experiment with the chosen pens and markers and record your results.

Possible Interactive Questions:

Were you surprised at your results? Why?

Do you think this is a physical or chemical change?

What Happened/What's Going On:

A "single color" ink pen or marker can be made up of a variety of other (surprising) colors. This demonstrates a physical change since no new material is made, we are simply separating the colors from one another. A component of it being a physical change is that it is reversible, and this process is reversible, but it would be a very complex process.

Further Exploration:

Try playing a game in which partners try to determine the correct pen used to write a message. Can you utilize chromatography to determine which pen your partner used to write the message?

Academic Content standards:

Science, Physical Sciences, 4.1, 6.3

Science, Scientific Inquiry, 5.3

Name: _____

WORKSHEET-Chromotography

Type of Pen/Marker	Prediction	Result



Edible Ink

Key Words/Concepts:

- Chemical change
- Steganography

Objectives:

- Students will write and reveal a secret message using edible ink.
- Students will observe a chemical change.
- Students will infer why heat and time reveal the message.

Materials Per Group:

- Small Containers
- Lemon, Orange or Grapefruit Juice, Milk, Baking Soda or Sugar Solution
 - To make the baking soda or sugar solution, add a pinch of baking soda or sugar to an ounce of warm water. Mix well. Add more baking soda or sugar a pinch at a time until the liquid is saturated.
- Cotton Swabs
- Paper
- Electric Iron, Hair Dryer or some other heat source (NOT an open flame)
- Cloth Towels
- Plastic Tray

Procedures:

1. Place a piece of white paper on your tray.
2. Dip a cotton swab into one of the edible inks and write a message on the paper. Your message will be nearly invisible when it dries.
3. Answer Possible Interactive Questions below
4. When the messages are dry, allow a few at a time to take their message to the

- teacher. The teacher will heat the paper using the iron, hair dryer or other heat source.
5. Watch the messages appear as the paper is heated.

Possible Interactive Questions:

How can we make your message easier to read? What do the edible inks have in common? *(They are all found in your kitchen, and can be used in baking).* What happens when you bake cookies for too long? *They burn turning brown or black.* We can “bake” or “cook” our edible ink messages, which will allow us to see our secret message. How can we “bake” our messages? *By heating the paper with an electric iron or hair dryer, we can make your message appear.* Predict how your message will look.

What Happened/What’s Going On:

Steganography is the science of concealing that you’re sending a secret message. A popular version of this is using invisible ink. It looks like you’re just sending a blank piece of paper (or you can write an innocuous note on it in regular ink and no one would be the wiser). What we’re seeing here is a chemical change. A chemical change occurs when a new substance (in this case the burnt revealed message) is formed and energy is either given off or absorbed.

Further Exploration:

Make hypotheses as to what will happen when you make secret messages with each of the other inks.

Academic Content standards:

Science, Physical Sciences, 4.2, 6.2, 6.4



Name: _____

WORKSHEET-Edible Ink

Liquid	Prediction	Result