

## Chemical Change Investigations

**OBJECTIVE:** Students distinguish physical or chemical changes in matter (TEKS 8A).

**PROBLEM:** Describe the evidence that indicates a chemical change in matter has occurred?

**WHAT DO YOU THINK?** Record your ideas in your science journal.

**MATERIALS:**

- Each investigation has a list of materials.

**PROCEDURES:**

Each investigation has directions for that particular investigation.

**OBSERVATIONS:**

Record observations during each investigation in your journal. Be sure to write as many details as possible to help you distinguish a chemical reaction has occurred. In addition, write a brief summary of your steps as you complete the investigation so you remember what you did. These investigations cannot be used as your final project piece.



## PART A PROCEDURES:

Read the procedures below. Write a brief summary in your journal of what you will be doing. Make a prediction of what will happen or what you might observe. Conduct the investigation below.

1. Use a small piece of aluminum foil to line the inside of the metal spoon. Do NOT line the bottom of the spoon.
2. Put a very **small** amount of sugar in the spoon on top of the aluminum foil. Use your finger to spread it out and make a thin layer.
3. Wearing protective eye goggles and apron, hold the spoon over the flame. One person should record observations as you watch changes occur. Continue to heat the spoon until you are sure the reaction is complete. Try not to burn your sugar but if your sugar starts to burn and flame, carefully place the spoon in the beaker of water to extinguish the flames. DO NOT DROP THE SPOON OR WAVE AROUND.
7. OBSERVE AND RECORD ANY EVIDENCE THAT WOULD INDICATE THAT A CHEMICAL REACTION HAD OCCURRED.
7. Dispose of the aluminum foil and black residue in the space provided. Wash the soot (dirt) off the spoon.



**PART B PROCEDURES:**

Read the procedures below. Write a brief summary of what you will be doing. Make a prediction of what will happen or what you might observe. Conduct the investigation below.

1. Place one small spoonful of baking soda in a test tube (it should be less than  $\frac{1}{4}$  full).
2. Add 20 drops of vinegar. Be sure to feel the bottom of the test tube. **OBSERVE AND RECORD IN YOUR JOURNAL ANY EVIDENCE THAT WOULD INDICATE THAT A CHEMICAL REACTION HAD OCCURRED.**
3. Clean out test tube and leave upside down in the test tube rack. Wipe up any mess that occurred and leave the area clean.



## PART C PROCEDURES:

**Read the procedures below. Write a brief summary of what you will be doing. Make a prediction of what will happen or what you might observe. Conduct the investigation below.**

1. Pour 20 drops of milk into a small test tube.
2. Add 20 drops of vinegar to the milk. Allow the mixture to set for 1-2 minutes.
3. OBSERVE AND RECORD ANY EVIDENCE IN YOUR JOURNAL THAT WOULD INDICATE THAT A CHEMICAL REACTION HAD OCCURRED.
4. Clean out the test tube and leave upside down in the test tube rack. Clean the area and leave it neat for the next group.



## PART D PROCEDURES:

**Read the procedures below. Write a brief summary of what you will be doing. Make a prediction of what will happen or what you might observe. Conduct the investigation below.**

1. Place a small piece of cracker on a paper towel.
2. Place 2 drops of iodine on the cracker.
3. OBSERVE AND RECORD ANY EVIDENCE IN YOUR JOURNAL THAT WOULD INDICATE THAT A CHEMICAL REACTION HAD OCCURRED.
4. Dispose of the cracker and paper towel.



## PART E PROCEDURES:

**Read the procedures below. Write a brief summary of what you will be doing. Make a prediction of what will happen or what you might observe. Conduct the investigation below.**

1. Place  $\frac{1}{2}$  spoonful of baking soda and  $\frac{1}{2}$  spoonful of citric acid into a ziploc bag.
2. Place 10 mL of water into a medicine cup. CAREFULLY place the cup of water into the bag with the solid without dumping the water. With the help of a partner, seal the bag while trying to remove as much of the excess air as possible. One person can press the sides of the bag together while the other presses the seal.
3. RECORD ANY OBSERVATIONS AT THIS TIME BEFORE DUMPING THE WATER INTO THE SOLID.
4. Turn the bag to the side dumping the water. You may need to hold the bag with your fingers and press together to mix the water and solid. DO NOT OPEN THE BAG. Feel the mixture and observe.
5. OBSERVE AND RECORD ANY EVIDENCE THAT WOULD INDICATE THAT A CHEMICAL REACTION HAD OCCURED.
6. Dispose of the bag without opening it up.



**ANALYSIS AND CONCLUSIONS**

1. In which of the experiments did you observe a chemical reaction? Support your answer with evidence.
2. In Part A, you burned sugar. Sugar is made up of carbon, hydrogen, and oxygen atoms that are bonded together. The heat from the flame broke apart the bonds and changed the hydrogen and oxygen into water vapor ( $\text{H}_2\text{O}$ ) that was bubbled away into the air. What kind of atoms formed the black residue that was left in the spoon?



3. In Part C, you added vinegar to milk and a precipitate formed. Based on your observations, what is the precipitate?
4. In Part E, what type of observations indicated a chemical reaction? The prefix ex- means to leave like the word exit. The prefix en- means to come in like the word enter. The suffix -gonic means energy. Using this information, which word would best describe this chemical reaction, endergonic or exergonic? Support your answer.
5. Create a list of observations you can use during any lab investigation to determine if a chemical reaction has occurred.

