Name _____ Date _____

Chemical Reactions Lab

Part One: Determining Whether a Chemical Reaction has taken Place

In this part of the lab, you will perform different activities and, based on your observations, determine whether a chemical reaction has taken place.

List five pieces of evidence that a chemical reaction has taken place:

1. _____
2. _____
3. _____
4. _____
5. _____

Activity 1: Yeast, Sugar, and Warm Water

- Heat 200 mL of water in a beaker on the hot plate until it reaches about 50^0C.
- Pour the water into an Erlenmeyer flask, using a plastic funnel.
- Pour the sugar from the sugar container into the Erlenmeyer flask.
- Swirl the flask to mix the solution.
- Open a packet of Rapid Rise Yeast and pour the contents into the sugar solution.
- Place the lips of a balloon over the top of the Erlenmeyer flask and set it aside.
- **Before you leave for the day, note your observations in your data table.**
- Leave the set-up, as is, until the next day.
- **On the following class day, note your observations on your data table.**

Activity 2: Lighting a Match

- Strike the match on the matchbox and let the match burn for several seconds.
- Blow out the match and throw it away.
- Observe what happened to the match head before and after the match was lit.
- **Note your observations on your data table.**

Activity 3: Burning a Candle

- Light another match to light the candle and observe what happens to the **wick** of the candle.
- Blow out the match and throw it away.
- **Note your observations on your data table.**

Activity 4: Melting Wax

- Notice what happens to the candle wax as the wick burns.
- **Note your observations on your data table.**

Activity 5: Toasting a Marshmallow

- Place a marshmallow on a toothpick and hold it over the candle flame.
- Notice the point when it only physically melts.
- Notice the point when it begins to chemically change.
- Blow out the candle.
- **Note your observations on your data table.**

Activity 6: Mixing Kool-Aid and Water

- Pour Kool-Aid powder into a plastic up filled with water from the water fountain.
- Use the spoon to stir the solution.
- **Note your observations on your data table.**

Activity 7: Mixing Baking Soda and Vinegar

- Use a teaspoon to place one teaspoon of baking soda into a small plastic cup.
- Use an eye dropper to transfer 10 drops of vinegar into the cup containing baking soda.
- **Note your observations on your data table.**

Activity 8: Mixing Corn Starch and Vinegar

- Use a teaspoon to place one teaspoon of cornstarch into a small cup.
- Use the same eye dropper to transfer 10 drops of vinegar into the cup containing cornstarch.
- **Note your observation on your data table.**

Activity 9: Mixing Baking Soda and Iodine

- Use a teaspoon to place one teaspoon of baking soda into a small cup.
- Place 10 drops of iodine into the cup containing baking soda.
- Use a clean toothpick to mix the mixture together.
- **Note your observations on your data table.**

Activity 10: Mixing Corn Starch and Iodine

- Use a teaspoon to place one teaspoon of cornstarch into a small cup.
- Place 10 drops of iodine into the cup containing cornstarch.
- Use a clean toothpick to mix the mixture together.
- **Note your observations on your data table.**

Part Two: Using a Catalyst to Speed up a Chemical Reaction

In this part of the lab, you will use a catalyst called Catalase, found in all living cells, to speed up the breakdown of Hydrogen Peroxide, H_2O_2 into H_2O and O_2 molecules.

- Use the plastic syringe to place 0.5 Oz. of water into a plastic cup.
- Pour liver solution into another cup to the same height as the water in the previous cup.
- Place both cups in the sink.
- Use the plastic syringe to place 0.5 Oz. of hydrogen peroxide into the plastic cup containing water and record your observations on the data table.
- Use the plastic syringe to place 0.5 Oz of hydrogen peroxide into the plastic cup containing the liver solution and record your observations on the data table.
- Use the plastic syringe to place another 0.5 Oz. of hydrogen peroxide into the plastic cup containing the liver solution and record your observations on the data table.

Data Table

Check all the boxes that apply to each specific activity.

Activity One	**Yeast, Sugar, and Warm Water (First Day)** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
	Yeast, Sugar, and Warm Water (Second Day) ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Two	**Lighting a Match** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Three	**Burning a Candle** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Four	**Melting Wax** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Five	**Roasting a Marshmallow (Melting)** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
	Roasting a Marshmallow (Burning) ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Six	**Mixing Kool-Aid and Water** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No

Activity Seven	**Mixing Baking Soda and Vinegar** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Eight	**Mixing Corn Starch and Vinegar** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced • Did a chemical reaction take place? ☐ Yes ☐ No
Activity Nine	**Mixing Baking Soda and Iodine** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced Did a chemical reaction take place? ☐ Yes ☐ No
Activity Ten	**Mixing Corn Starch and Iodine** ☐ Change in Color ☐ Change in Odor ☐ Change in Temperature ☐ Formation of a gas ☐ New Substance Produced Did a chemical reaction take place? ☐ Yes ☐ No

Using a Catalyst to Speed up a Chemical Reaction

Overtime, hydrogen peroxide, H_2O_2 breaks down naturally into water, H_2O, and oxygen, O_2, molecules as shown in the following chemical reaction:

$$H_2O_2 \rightarrow H_2O + O_2$$

Catalase is an enzyme protein found in all living cells, including liver cells, and acts as a catalyst speeding up the chemical reaction in which hydrogen peroxide, H_2O_2, is broken down into water, H_2O, and oxygen, O_2, molecules. As hydrogen peroxide breaks down, the oxygen molecules, O_2, generate bubbles or foam.

- Were bubbles of oxygen evident when the hydrogen peroxide was added to the water? _____
- Were bubbles of oxygen evident when the hydrogen peroxide was added to the liver? _____

Did the Catalase enzyme act as a catalyst and speed up the reaction? _____

As catalysts speed up chemical reactions, they are not changed by the chemical reaction and can be used repeatedly.

- Were bubbles of oxygen evident when more hydrogen peroxide was added to the liver? _____

Was the Catalase enzyme able to be used again? _____