**Physical Science – Matter**

**Catalyst Lab Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Per:\_\_\_**

**Background Information:**

Some chemical changes occur very slowly. To speed up reactions, chemists often use catalysts. A catalyst is a substance that increases the speed of a reaction without being changed itself. Because it is not changed during a reaction, a catalyst can be used over and over.

Catalysts play an important role in many industrial processes. Without the nickel catalyst, it would take years to make margarine from soybean oil, for example. Gasoline and fuel oil, fertilizers, antifreeze, drugs, plastics, and synthetic fibers are other products made with catalysts.

In living things, catalysts are referred to as enzymes. Enzymes aid in digestion, muscle movement, energy storage, and other vital processes. An enzyme in your blood, for example, called catalase, speeds up the rate at which oxygen is released when you put hydrogen peroxide on a cut. The oxygen acts as an antiseptic, destroying bacteria and preventing infection.

In this investigation you will determine which substances act as catalysts in the breakdown of hydrogen peroxide.

**2 H2O2 🡪 2 H2O + O2**

**Materials:**

* 4 test tubes
* test tube rack
* small spatula or spoon
* test-tube holder
* 3 % hydrogen peroxide solution (H2O2)
* sodium chloride (NaCl)
* Manganese dioxide (MnO2)
* Fresh liver
* 10 mL graduated cylinder
* splints
* matches

**Procedure:**

1. Put on safety goggles
2. Put 5 mL of hydrogen peroxide in each of the four test tubes. Place the test tubes in a rack. DO NOT POUR ANYTHING BACK INTO THE ORIGINAL CONTAINER!
3. Using a test-tube holder, hold the first test tube up to the overhead lights. Record your observations in the space allotted below.
4. Use the tip of a spatula or spoon to add a small amount of manganese dioxide to the second test tube. If bubbles appear, test for the presence of oxygen with a glowing splint. (Using a test tube holder, remove the test tube from the rack. Light the splint, blow out the flame, and lower the splint into the test tube.) **SAFETY NOTE:** *If the splint relights, blow out the flame quickly.* Replace the test tube in the rack and record your observations.
5. Add a pinch of sodium chloride to the third test tube and a small piece of fresh liver to the fourth test tube. If bubbles appear, test for oxygen. Record your observations.
6. Add another 5 mL of hydrogen peroxide to each of the test tubes. Record your observations.

**Observations: (4 pts)**

|  |  |  |
| --- | --- | --- |
|  | **First 5 mL of hydrogen peroxide** | **Second 5 mL of hydrogen peroxide** |
| **Nothing added** |  |  |
| **Manganese Dioxide added** |  |  |
| **Sodium chloride added** |  |  |
| **Liver added** |  |  |

**Analysis and Conclusions:**

1. Which substances would you identify as catalysts? (2 pts)
2. What was the purpose of the test tube containing only hydrogen peroxide (with nothing added)? (1 pt)
3. What happened when you added the hydrogen peroxide the second time? (2 pts)
4. Describe the characteristics of a catalyst and explain how you were able to identify which substances in the investigation were catalysts. (4 pts)
5. What are catalysts in living things called? (1 pt)
6. What is the name of the catalyst found in blood? (1 pt)