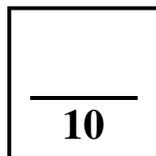


## Science 9-Chemistry

### Activity 4F – Investigating Catalysts



Name _____	
Due Date _____	
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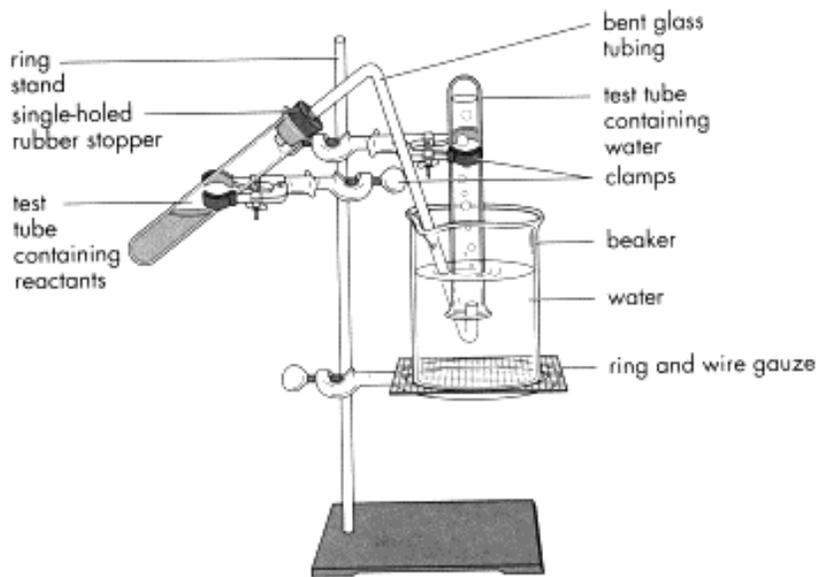
#### **Purpose:**

To examine the effects of manganese dioxide ( $\text{MnO}_2$ ) and raw and cooked liver on the decomposition of hydrogen peroxide ( $\text{H}_2\text{O}_2$ )

#### **Part 1 – Using Manganese (IV) Oxide as a Catalyst**

#### **Procedure:**

- Get a 400-600 mL beaker and fill it about 2/3 full of water. Get a test tube and fill it with water. Put your thumb on it, invert it and place it in the beaker of water so it is ready to collect gas.
- Set up the apparatus similar to the following diagram:



3. Remove the stopper from the test tube on the **left** and add 5.0 mL of 3% Hydrogen Peroxide ( $\text{H}_2\text{O}_2$ ) to the test tube. Add a pinch of Manganese (IV) Oxide (a black powder) to the test tube and quickly put the stopper on again.  
**Record your observations in the data table below.**
4. When there is no more bubbling in the test tubes, get a glowing splint ready and remove the test tube on the right. Quickly test the gas with the glowing splint. **Record the observations in the data table below.**

### Observations for Part 1—Using Manganese (IV) Oxide as a Catalyst

#### Procedure 3

When the  $\text{MnO}_2$  (**black**) powder is added to the hydrogen peroxide

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#### Procedure 4

When the **glowing splint** is put into the test-tube of gas it \_\_\_\_\_

What gas is produced in this reaction? \_\_\_\_\_

### Part 2-Using Raw Liver as a Catalyst

#### Procedure:

1. Refill the test tube on the right with water and invert it in the beaker of water so it is ready to collect gas.
2. Remove the test tube on the left and clean it out.  
Add 5.0 mL of 3% Hydrogen Peroxide ( $\text{H}_2\text{O}_2$ ) to it.
3. Obtain a small piece of **raw liver**, drop it in the test tube on the left and quickly put the stopper on again. **Record the results in the data table on the next page. Then come back and do Procedure 4!**
4. When there is no more bubbling in the test tubes, get a glowing splint ready and remove the test tube on the right. Quickly test the gas with the glowing splint. Record the observations in the data table on the next page.

### Observations for Part 2—Using Raw Liver as a Catalyst

#### Procedure 3

When the **raw liver** is added to the hydrogen peroxide

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#### Procedure 4

When the **glowing splint** is put into the test-tube of gas it \_\_\_\_\_

What gas is produced in this reaction? \_\_\_\_\_

### Part 3-Adding Cooked Liver to Hydrogen Peroxide

#### Procedure:

1. Refill the test tube on the right with water and invert it in the beaker of water so it is ready to collect gas.
2. Remove the test tube on the left and clean it out.  
Add 5.0 mL of 3% Hydrogen Peroxide ( $\text{H}_2\text{O}_2$ ) to it.
3. Obtain a small piece of raw liver and **cook it** over a bunsen burner flame until it is cooked well. (No need to add barbeque sauce!)
4. Drop the piece of cooked liver in the test tube on the left and quickly put the stopper on again. **Record the results in the data table below.**
5. When there is no more bubbling in the test tubes, take the equipment apart and clean everything out thoroughly.

### Observations for Part 3—Adding Cooked Liver to Hydrogen Peroxide

#### Procedure 4

When the **cooked liver** is added to the hydrogen peroxide

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Did the **cooked liver** speed up the reaction as much as the raw liver? \_\_\_\_\_

**Questions:**

1. The **gas** that is produced when hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) decomposes is \_\_\_\_\_ gas.
2. When hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) decomposes, it produces **the gas in question 1** and it also produces **liquid water**. There is only **one reactant** and that is hydrogen peroxide ( $\text{H}_2\text{O}_2$ ). *The catalyst ( $\text{MnO}_2$  or raw liver) is NOT included in the word equation for this reaction.* Write the **word equation** for the decomposition of hydrogen peroxide:  
\_\_\_\_\_  
\_\_\_\_\_
3. Define a **catalyst** (see page 71 of SP)-  
\_\_\_\_\_
4. Which was the **most effective** catalyst for this reaction:  $\text{MnO}_2$ , raw liver or cooked liver?  
\_\_\_\_\_
5. Which substance had the **least effect** on this reaction:  $\text{MnO}_2$ , raw liver or cooked liver?  
\_\_\_\_\_
6. Define an **enzyme** (see page 72 of SP)-  
\_\_\_\_\_
7. **Raw liver** contains a catalyst called an \_\_\_\_\_.
8. What can happen to the effectiveness of enzymes when you **heat** them a lot (as in cooking)?  
\_\_\_\_\_
9. Suggest what possible functions (jobs) the **enzymes** in our liver might perform for our body.  
\_\_\_\_\_  
\_\_\_\_\_

