

Name _____

SCH4U- 2-4: Organic Chemistry Reaction Lab

This lab comprises two separate experiments. You should read through the instructions here first before going on to perform the lab. Even though this lab takes place in a virtual environment, it is always important to consider the proper lab safety procedures so that you will be prepared when you enter a live laboratory.

Experiment #1:Saturated or Unsaturated**Equipment:**

- safety goggles
- lab coat
- protective gloves
- eyedropper
- test tubes (3)

Materials:

- unknown organic sample #1
- unknown organic sample #2
- bromine solution

General Overview: This lab involves adding bromine solution to two unknown samples and observing any chemical reactions that take place. Based on your observations, you should be able to determine your unknown sample contains a saturated or unsaturated organic compound.

Procedure:

1. Put on lab coat, goggles and gloves
2. Label 3 test tubes: water, unknown #1 and unknown #2
3. Under the fumehood, add 10 mL of water, unknown #1 and unknown #2 to their own test tubes
4. Add 4 drops of bromine water solution to each test tube.
5. Observe each tube over time for any changes, record your observations in the table below

Name _____

Observations:

1. Colour of bromine water solution: _____

	Colour of sample before adding bromine	Colour of sample after adding bromine
Water	clear	
Unknown #1		
Unknown #2		

Other observations:

Analysis:

1. Based on your observations and knowledge of chemical reactions involving organic compounds which of your samples contained a saturated compound and which contained an unsaturated compound?

2. If you were told that the unknown samples were cyclohexane and cyclohexene, which would be sample #1 and which would be sample #2?

Sample #1: _____

Sample #2: _____

3. Complete the reaction equation below for sample #1 and sample #2 based on the information in question #2 above

Sample #1:



Sample #2:



Name _____

Experiment #2: Oxidation Reactions of Alcohols**Equipment**

- labcoat
- gloves
- safety goggles
- eyedroppers (3)
- beakers (3)
- test tubes (3)
- test tube rack

Materials

- unknown sample #1
- unknown sample #2
- unknown sample #3
- potassium permanganate solution (KMnO_4)

General Overview:

This lab involves mixing an oxidizing agent with different alcohols and observing any chemical reactions that occur. Based on these reactions you should be able to classify the different alcohols

Prodecure:

1. Put on lab coat, goggles and gloves
2. Place 3 test tubes in the test tube rack and label them #1, #2 and #3. Place the labeled test tubes under the fumehood
3. Put 4 drops of each unknown into their respective test tubes
4. Using the eye dropper, add 20 drops of potassium permanganate (KMnO_4) solution to each test tubestube
5. Observe each test tube for any changes over the course of 5 minutes
6. Record your observations below

Name _____

Observations:1. Colour of KMnO_4 : _____

2. Qualitative observations:

	Colour of sample before adding KMnO_4	Colour of sample 5 seconds after adding KMnO_4	Colour of sample 90 seconds after adding KMnO_4	Colour of sample 5 minutes after adding KMnO_4
Unknown #1				
Unknown #2				
Unknown #3				

3. Describe in your own words how the samples behaved differently in the presence of KMnO_4 :

Analysis:

1. The unknown samples were made up of 3 different isomers of butanol ($\text{C}_4\text{H}_{10}\text{O}$): 1-butanol, 2-butanol and 2-methyl-2-propanol. Draw structural diagrams for each and label them as primary, secondary and tertiary.

2. Based on their structures, and classification as primary, secondary or tertiary, predict which of the unknown samples corresponds to each isomer of butanol:

1-butanol = sample # _____

2-butanol = sample # _____

2-methyl-2-propanol = sample # _____

3. Explain your reasoning for the answer above. (hint: think about reactivity, your observations, and the structure of each isomer)