

Lab Skills & Chemistry

Station 1: Lab Equipment

1. Using the equipment provided on the table, match the equipment with the names below. Write a description of what it is used for.

Name	Description
C Beaker	Used for measuring approximate volumes of liquids (accurate to ± 10 mL)
H M Hot plate	Used for heating solutions
E Erlenmeyer flask	Used for storing liquids. The shape helps prevent losses due to splashing
M H Bunsen burner	Produces a single open flame for heating
J Eyedropper	Used for suctioning up small amounts of liquids
F Graduated cylinder	Used for measuring volumes of liquids (accurate to ± 0.5 mL)
B Funnel	Used for transferring liquids from one container to another
L Scoopula	Used for scooping dry chemicals
D Weigh boat	Used for weighing dry chemicals
I Thermometer	Used for measuring temperatures of liquids
G Striker	Used for lighting a Bunsen burner
N Test tube holder	Used to hold test tubes
A Digital Scale	Used for measuring mass
K Safety glasses	Used to protect your eyes from chemicals
H Test tube brush	Used for cleaning test tubes and other glassware
P Test tube	Used for holding small amounts of liquids

Station 2: Making Observations

Define and give an example for each of the following:

- Qualitative observation: Qualitative observations describe the quality of something (uses 5 senses)
 - Example: Texture, colour, smell, etc.
- Quantitative observation: Quantitative observations describe the quantity of something (includes a number/measurement)
 - Example: Weight, mass, volume, etc.
 - Instruments we can use: Scale (for mass), Graduated cylinder (for volume), Ruler (for length), etc.

Identify the following as a qualitative or quantitative observation:

- 5 cm high Quantitative
- Moves 5 km/hr Quantitative
- Colourless Qualitative
- Green and blue Qualitative
- Feels slippery Qualitative
- Tastes salty Qualitative

At the table there are three objects. Make 2 qualitative observations and 2 quantitative observations for each of the objects. Complete the chart.

OBJECT	Qualitative observation	Quantitative observation
A Water	1. Is colourless 2. Is liquid	1. 150 mL 2. 17-18 degrees
B Rock	1. Is solid 2. Has a rough texture	1. ~23.00-26.00g 2. 3 cm x 2 cm
C Metal rod	1. Has a smooth texture 2. Is shiny	1. ~8.00-9.00g 2. 12.5 cm x 1.5 cm

Station 3: Models

Complete the chart below using the pre-built models at the tables.

White – Hydrogen

Black – Carbon

Blue – Nitrogen

Green – Fluorine

Name	Formula	Bohr Diagram	Ionic or Covalent
Carbon tetrahydride	CH ₄		Covalent
Nitrogen trifluoride	NF ₃		Covalent
Sodium chloride	NaCl		Ionic
Potassium Oxide	K ₂ O		Ionic

Station 4: Summary Questions

1. List the 6 steps of the scientific method.
 - i. Question
 - ii. Research
 - iii. Hypothesis
 - iv. Experiment
 - v. Analysis
 - vi. Conclusion

2. You plant two apple trees in your backyard. They get the same amount of rain and sunlight. You give special fertilizer to only one of the apple trees to see if it helps it grow faster.
 - What is the independent variable?
Use of fertilizer

 - What is the dependent variable?
Height of the apple tree

 - What are two controls in this experiment?
Amount of rain and sunlight

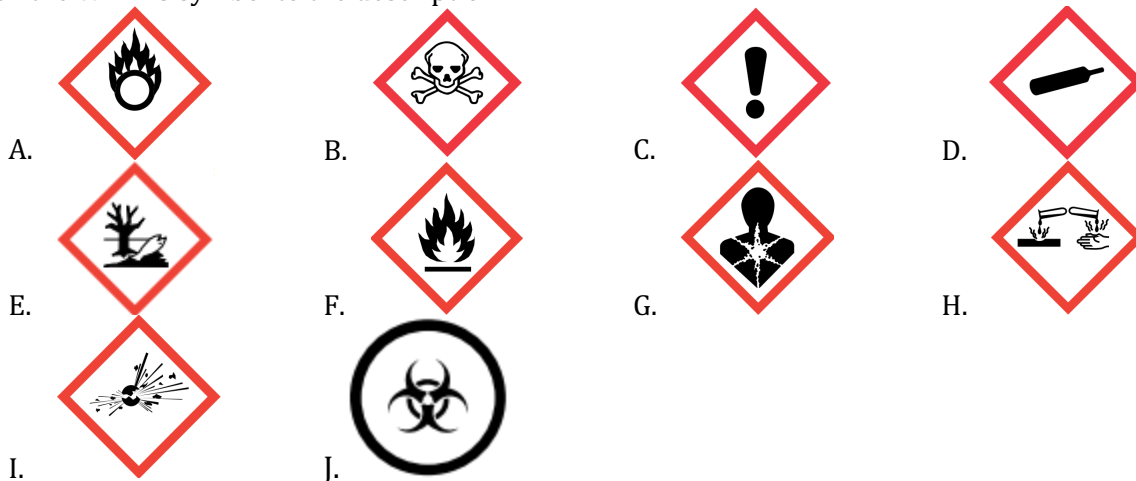
 - Write a hypothesis for this experiment

If... I give the fertilizer to my apple tree

Then ... it will grow taller

3. Identify the following as true or false.
 - F You may eat and drink during a lab as long as you keep the food clean.
 - T Goggles must be kept in place until *everybody* has finished the lab.
 - F The teacher appreciates your imaginative additions to the lab; feel free to improvise.
 - F If a chemical gets in your eye, you must rinse your eye under the *faucet in the sink*.
 - T Most people will not be calm enough to remember to stop, drop and roll if their clothing is on fire.
 - F Always cut toward *yourself* when using a knife or razor blade.
 - T Your hands *cannot* be wet if you are handling electrical cords.

4. Match the WHMIS symbol to the description.



- D** Gas under pressure
- F** Fire hazard that may burst into flames in air or water
- A** React chemically to oxidize combustible materials
- B** If inhaled, contacts the skin, or swallowed may be fatal, toxic or harmful
- G** May cause or suspected to cause serious health effects after acute or repeated exposure to the substance
- C** May cause acute toxicity, skin corrosion, serious eye damage/irritations, respiratory or skin sensitization, or target specific organ toxicity
- H** For corrosive damage to metals, eyes, skin
- I** For explosive or reactive hazards
- J** For organisms or toxins that can cause disease in people or animals.
- E** May cause damage to the aquatic environment.

5. Classify the following as an element, compound, heterogeneous mixture, or homogeneous mixture

- a. Granola **Heterogeneous mixture**
- b. Coffee **Homogeneous mixture**
- c. Sodium chloride **Compound**
- d. Steel **Homogeneous mixture**
- e. $C_{12}O_{22}H_{11}$ **Compound**
- f. Silver **Element**
- g. Water **Compound**
- h. Zinc **Element**

6. Classify the following as a physical or a chemical change

- a. Crushing a can: **Physical change**
- b. Burning a log: **Chemical change**
- c. Mixing cake batter: **Physical change**
- d. Baking a cake: **Chemical change**

7. Complete the following table:

Element Name	Element Symbol (charge)	Number of Protons	Number of Electrons	Number of Neutrons
Potassium ion	K^+	19	18	20
Sulfur ion	S^{2-}	16	18	16
Xenon atom	Xe	54	54	77
Magnesium ion	Mg^{2+}	12	10	12
Barium ion	Ba^{2+}	56	54	81
Fluorine ion	F^-	9	10	10

8. Write the names of these compounds. Indicate if it is ionic or covalent (I or C).

- a. $CsBr$ Cesium bromide (Ionic)
- b. $CuCl_2$ Copper (II) chloride (Ionic)
- c. $Cr_2(CO_3)_3$ Chromium (III) carbonate (Ionic)
- d. P_4Cl_7 Tetraphosphorus heptachloride (Covalent)
- e. $FeCl_3$ Iron (III) chloride (~~Covalent~~) (Ionic)

9. Write the formulas of these compounds. Indicate if it is ionic or covalent (I or C).

- a. Aluminum fluoride AlF_3 (Ionic)
- b. Chromium (IV) oxide CrO_2 (Ionic)
- c. Triphosphorus monobromide P_3Br (Covalent)
- d. Sulfur tetraiodide SI_4 (Covalent)
- e. Lead (IV) hydroxide $Pb(OH)_4$ (Ionic)