

Science 10

## Introductory UNIT (Review)

### Lesson 1 – Science Process Skills

What is Scientific Inquiry?

The diverse ways in which scientists study the natural world. They gather evidence

How do we prove an explanation? How do we get evidence to answer a question?

#### A Making Observations

There are two major types of Observations in Science:

- a) Qualitative observations → use senses
- b) Quantitative observation → numbers

Here is a scenario: The rain has stopped and the Sun is out. You notice that a puddle has disappeared from the sidewalk. What happened to that puddle of water? You likely know the answer, but HOW WOULD PROVE IT? You would need to make observations and record data.

Qualitative observations involve 5 senses. Ex Sight: puddle disappeared after a few hours. Touch puddle to feel less amount.

Quantitative observations involve Numbers. Ex It took 6 hours for the puddle to disappear. 2 Litres of water disappeared

## B Stating a Hypothesis

A hypothesis is a statement about an idea that you can Test based on your observation. It involves an "if"...."then" statement.

Eg. If the sun shines brightly on a puddle outside, then the puddle will evaporate faster than an equally sized puddle that is in the shade.

## c Identifying Variables in your Experiment

Sometimes in an experiment you must think about all the potential "factors" that influence your test - these are called variables

You need to control your variables. This means you only change one variable at a time - the variable that you change is called the independent variable aka manipulated variable. In the puddle example, the Independent variable is the amount of thermal energy added to the puddle. The responding variable or dependent variable is what's measured (time it takes puddle to evaporate)

A third type of variable are referred to as Control variables - these are factors that must be kept the same in order to keep your experiment fair.  
See the diagram below :



Independent Variable: amount of fertilizer

Dependent Variable: measure growth / # of tomatoes

Controlled Variables: Same water, Same Sunlight, Same pot size

After an inquiry has been tested, and data is collected and analyzed, there must be a Conclusion drawn to state whether the hypothesis is valid or not. In other words, do your results support or do not support your hypothesis. Eventually after a hypothesis has been thoroughly tested (repeat trials), and nearly all the scientists agree that the results support the hypothesis, it becomes a **THEORY**.

## A Process for Scientific Inquiry

## Lab Safety

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Science 10 – Safety in the Chemical Laboratory

#### Emergency Equipment

##### In Case of Fire

If a fire does occur, the first step is always to back out of harm's way and evaluate the situation at hand. You need to immediately let the teacher know and warn other students. When evaluating the situation, decide whether this is a controlled fire or an uncontrolled fire.

Controlled Fire: a fire which is contained to certain area and cannot spread

Uncontrolled Fire: a fire that threatens to destroy life or property

If it is a **controlled fire**, it can often be put out by placing a watch glass or inverted beaker over the top of the container. This will prevent oxygen from feeding the fire, and it will burn out on its own. Be careful not to spill the contents. If you are unsure what to do, or if you do not think you can do so without spilling the contents, ask the teacher for help. immediately! If it is a contained fire, it will likely burn out on its own.

If it is an **uncontrolled fire**, everyone must immediately evacuate the room, except for any individuals using a fire extinguisher. As students are filing out, the gas supply in the room should be shut off, and all doors should be shut while exiting the room. Additionally, a fire alarm should be pulled to begin the evacuation of the entire building.

What safety equipment can you use in case of a fire?

fire blanket, sand bucket, extinguisher

## Lab Safety

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### In Case of a Chemical Spill

If a chemical spill occurs, there are a few steps you need to take. First, if the chemical spills onto your hands, you need to immediately begin to Wash/rinse your hands. If it spills into your eyes, you need to immediately move to the eye wash station and begin rinse your eyes. If you spill the chemical all over your clothes, you need to move to the emergency shower and begin rinsing your clothes and yourself.

If a chemical spill occurs, but is contained to the tabletop, you need to step back and call the teacher over. Wait for instructions from the teacher on how to clean up. If glass is broken, additional care is needed.

### In Case of Broken Glass

If you break any of the glassware we are using, you must let the teacher know, and begin clean-up. If the glassware was empty, you may begin clean-up using a broom to sweep up all of the glass into a dust pan. The contents can then be placed in a glass waste container. If there were any chemicals or other contents involved, you must ask your teacher what to do before beginning to clean up.

### Disposal of Chemicals

#### Disposal of Unused Chemicals

You must never put unused chemicals back into their original containers. If you have taken too much of a chemical, you may ask your peers if they need some, or ask your teacher for disposal instructions. This is because the chemical may be contaminated by using glassware that was not perfectly clean and dry, or it may be placed in an incorrect container by accident – which may lead to a reaction occurring, or changing the composition of the contents of the container.

## Lab Safety

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Disposal of Used Chemicals

You will be given instructions as to how to dispose of chemicals used in each experiment. Some chemicals may be safe to drain down the sink while others may not be.

### Protective Equipment

#### Safety Goggles

Safety goggles MUST be worn whenever chemicals or glassware are being used. Goggles must be on BEFORE handling chemicals or glassware, and cannot be removed until you have disposed and put away all chemicals and glassware. In our lab, we will wear our goggles the entire duration that we are in there unless the teacher says otherwise.

#### Fume Hoods

##### **What is a fume hood?**

A fume hood is similar to the range that is used when cooking. It is used to dispose of the gases and odd odors that are produced when chemical reactions occur. Any time that toxic gases are produced, we will use the fume hood.

##### **How do you use a fume hood?**

A fume hood needs to be turned on before you start your experiment. When performing your experiment, the glass window should be lowered enough that you can perform your experiment safely. When you are not working in the fume hood, you may pull the glass window down. This is because the fume hood creates a vacuum that is strong enough to ventilate all odors and gases even with the glass windows open. If your reaction begins to spatter uncontrollably, however, you may wish to pull the glass down and wait for the reaction to settle.

**Lab Safety**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Laboratory Hazards**

Hazard	Nature Of Hazard	How to Deal with Hazard
Spilled Chemicals	another student touching it	Notify teacher for chemical cleanup instruction, "close" the area off while waiting.
Broken Glass	-cuts -chemical contamination	Notify the teacher for chemical instructions if chemicals are mixed with the glass. If no chemicals are involved, clean up glass with dust pan and broom and place in glass disposal.
Burning Chemicals in a container	gases get burnt spatter	Step back and notify class. Deal with fire as described by "In case of fire" protocol above.
Chemicals on hands	burn could be fatal allergic reaction	Wash off immediately under fast-running water. Use a neutralizing solution if the chemicals are acidic or basic in nature – or if the chemical properties are unknown.
Being asked to smell chemical vapours	knock out nauseous burn	Holding the container in front of you, <b>waft</b> the odour to you. Never smell directly. If you have an allergic reaction, immediately let the teacher know.
Bunsen Burners	-fire	Tie long hair back when using Bunsen burner. Do not keep the burner gas on if your burner won't start, this will prevent the room from being filled with flammable gas.
Loose hair or clothing/accessories	-fire -chemicals -tripping	Tie long hair back, remove or tuck-in any jewelry and ties. Remove baggy clothing, and ensure closed-toe shoes are worn during laboratory experiments.

**Lab Safety**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Hazard Symbols**



**WHMIS Symbols**

What does WHMIS stand for?

---

---

What is WHMIS?

WHMIS symbol	Descriptor	Type of Hazards
		
		
		
		
		
		
		
		
		



### Other Safety Symbols

More Safety symbols include the ones listed below. These are symbols commonly found on household products.

Symbol	Meaning	Symbol	Meaning
