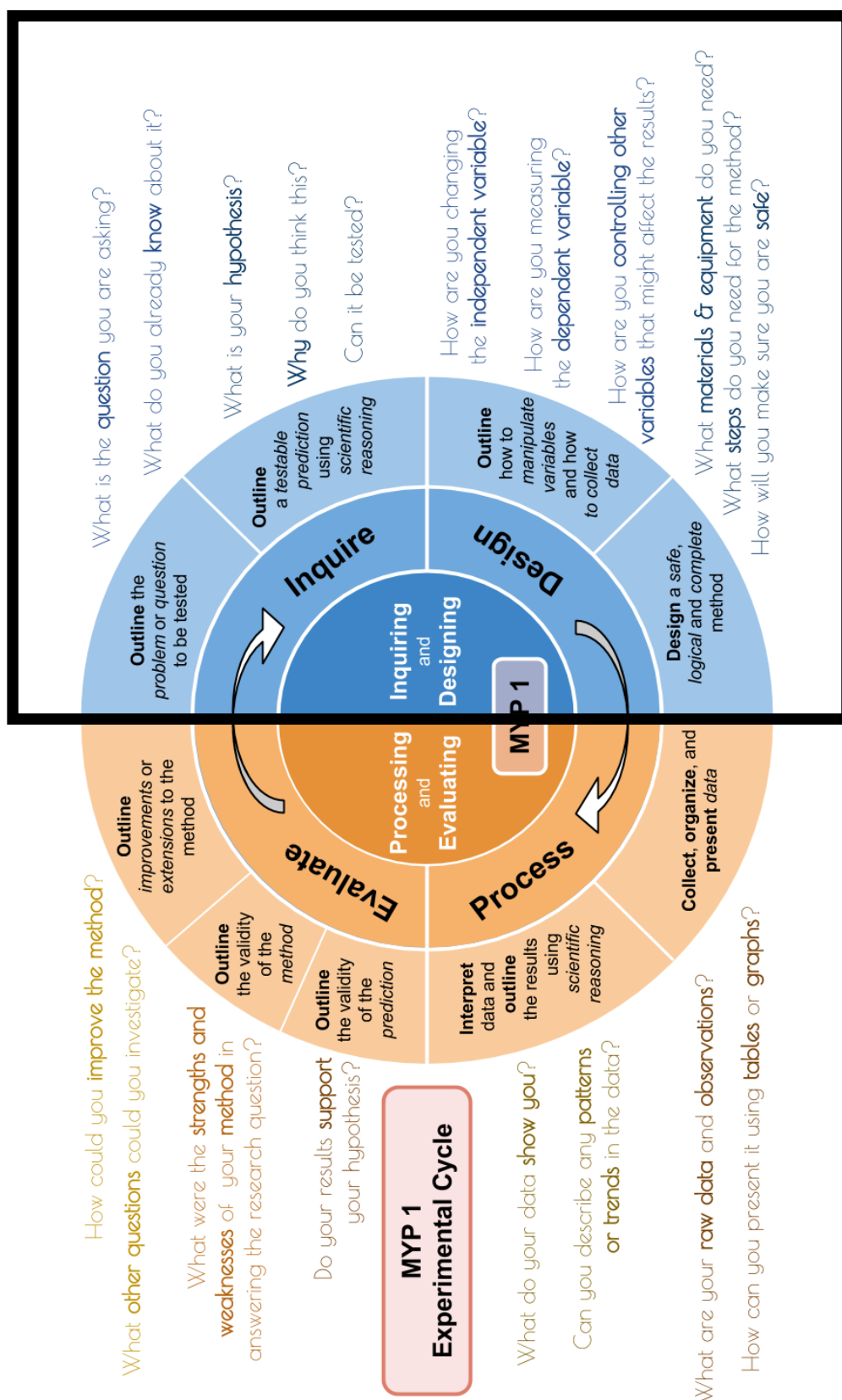


We use the **experimental cycle** to help us plan, carry out and write about scientific investigations.

In your notebook, use these sentence starters to begin to plan a lab on _____.
You will later write up your final lab plan for your summative assessment.



Use these sentence starters to plan your lab. Make sure your lab report has all four major sections.

Research Question: Explain the problem or question to be tested

- ☐ I want to investigate....
- ☐ This is because I have observed that...

OR

- ☐ I will test the effect of ... on
- ☐ This is because I have observed that...

I have given a detailed account of a **problem** I want to investigate using scientific facts and sources, and how it is connected to the topic we are studying. I have stated the problem as a research question that includes my **variables**.

Variables: Explain how to *manipulate variables* and how to *collect data*

- ☐ The **independent variable** is the variable I am changing.
 - ☐ My independent variable is...
 - ☐ I will change the independent variable by increasing / decreasing from ... to ...
 - ☐ I will change the independent variable in increments of ...
- ☐ The **dependent variable** is the variable I will measure.
 - ☐ My dependent variable is...
 - ☐ I will measure the dependent variable by...
 - ☐ I will repeat my measurements ... times to be more reliable.
- ☐ The **controlled variables** are variables that I will **keep the same** to make my test more reliable. Identify at least 3-5.
 - ☐ I will control ... by ... because ...

I have given a detailed account of how to manipulate the independent **variable**, how to measure the dependent **variable** to collect sufficient relevant data, and how to manipulate all the controlled **variables**.

Hypothesis: Formulate a *testable hypothesis* using *scientific reasoning*

- ☐ I predict that if I increase / decrease ... then ... will ...
 - ☐ This is because...
 - ☐ Other sources that supports my hypothesis are....
- ☐ My prediction is / is not testable. I know this because

My **hypothesis** is testable and I provide details about my **variables** using words like 'increase, decrease, no change', and I have supported it clearly using correct scientific reasoning in my 'because' statement.

Method & Materials: Design a *safe, logical and complete* method

- ☐ There are some / no risks in this investigation because...
- ☐ I will **stay safe** by ...
- ☐ I will **keep others safe** by ...
- ☐ I need to use these **materials** and **equipment** in my investigation...
- ☐ I need to **carry out these steps** in my investigation...
- ☐ This is a photo / diagram of my investigation

My **procedures** are safe, complete, and logical. Someone else would have no problem with my lab because I describe how to work with the variables and collect data.

I have selected every material I will need, including quantities, and I won't need to ask for anything on the day of the lab.

Commonly-confused words. Make sure **you** use them correctly.

Facts

are *simple truths* that we use when we describe the universe. Often we can measure them.

Hypothesis

is a *testable prediction* that we make, with a logical *reason*.

A **scientific problem** is a **question** that we are trying to solve by making a **hypothesis** and **testing** it with an **experiment**.



Criterion B: Inquiring & Designing

- i. explain a problem or question to be tested by a scientific investigation
- ii. formulate a testable hypothesis and explain it using scientific reasoning
- iii. explain how to manipulate the variables, and explain how data will be collected
- iv. design scientific investigations

Level	The student is able to:
1-2	<ul style="list-style-type: none"> i. state a problem or question to be tested by a scientific investigation ii. outline a testable hypothesis iii. outline the variables iv. design a method, with limited success
3-4	<ul style="list-style-type: none"> i. outline a problem or question to be tested by a scientific investigation ii. formulate a testable hypothesis using scientific reasoning iii. outline how to manipulate the variables, and outline how relevant data will be collected iv. design a safe method in which he or she selects materials and equipment
5-6	<ul style="list-style-type: none"> i. describe a problem or question to be tested by a scientific investigation ii. formulate and explain a testable hypothesis using scientific reasoning iii. describe how to manipulate the variables, and describe how sufficient, relevant data will be collected iv. design a complete and safe method in which he or she selects appropriate materials and equipment
7-8	<ul style="list-style-type: none"> i. explain a problem or question to be tested by a scientific investigation ii. formulate and explain a testable hypothesis using correct scientific reasoning iii. explain how to manipulate the variables, and explain how sufficient, relevant data will be collected iv. design a logical, complete and safe method in which he or she selects appropriate materials and equipment

Self Reflection Rubric

B	i. explain a problem or question to be tested by a scientific investigation	ii. formulate a testable hypothesis and explain it using scientific reasoning	iii. explain how to manipulate the variables, and explain how data will be collected	iv. design scientific investigations
1-2	I have <u>stated</u> a problem as a research question that connects with our topic.	My hypothesis is <u>testable</u> .	I have <u>given brief details</u> on the variables .	I have a procedure written down for my lab.
3-4	I have <u>given brief details</u> on how my problem is connected to the topic we are studying. I have stated the problem as a research question.	My hypothesis is testable, and <u>includes</u> my variables .	I have <u>given brief details</u> on how to manipulate the independent variable , how to measure the dependent variable to collect <u>relevant</u> data, and how to manipulate the controlled variables .	My procedures are <u>safe</u> . I have <u>selected</u> the materials I will need.
5-6	I have <u>provided details</u> on a problem I want to investigate, and how it is connected to the topic we are studying. I have stated the problem as a research question that includes my variables .	My hypothesis is testable and I <u>provided details</u> about my variables using words like 'increase, decrease, no change', and I have supported it clearly using scientific reasoning in my 'because' statement.	I have <u>provided details</u> on how to manipulate the independent variable , how to measure the dependent variable to collect <u>sufficient</u> relevant data, and how to manipulate all the controlled variables .	My procedures are safe and <u>complete</u> . Someone else could probably do my lab because I describe how to collect data. I have selected the materials I will need, <u>including</u> quantities.
7-8	I have <u>given a detailed account</u> of a problem I want to investigate using scientific facts and sources, and how it is connected to the topic we are studying. I have stated the problem as a research question that includes my variables .	My hypothesis is testable and I <u>provide details</u> about my variables using words like 'increase, decrease, no change', and I have supported it clearly using <u>correct</u> scientific reasoning in my 'because' statement.	I have <u>given a detailed account</u> of how to manipulate the independent variable , how to measure the dependent variable to collect sufficient relevant data, and how to manipulate all the controlled variables .	My procedures are safe, complete, and <u>logical</u> . Someone else would have no problem with my lab because I describe how to work with the variables and collect data. I have selected <u>every</u> material I will need, including quantities, and I won't need to ask for anything on the day of the lab.