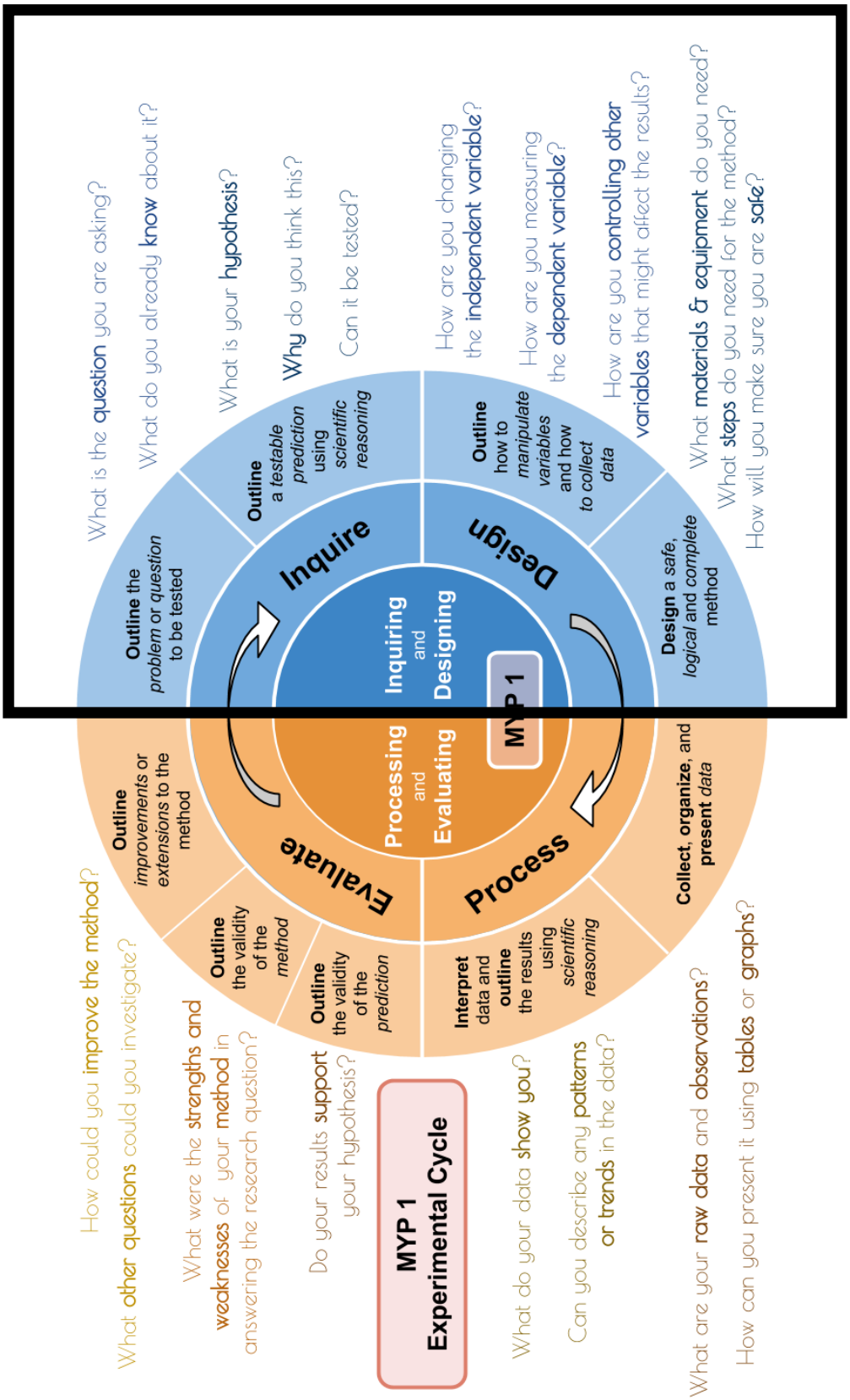
*We use the **experimental cycle** to help us plan, carry out and write about scientific investigations.*

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: **Describe** 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 provided details 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.**

Variables: **Describe** 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.
  - ❏ I will control … by … because …

I have provided details on 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: **Outline** a *testable prediction* using *scientific reasoning*

- ❏ I predict that if I increase / decrease ... then … will …
  - ❏ This is because...
  - ❏ Other information that supports my hypothesis is....
- ❏ 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. describe a problem or question to be tested by a scientific investigation
ii. outline a testable hypothesis and explain it using scientific reasoning
iii. describe how to manipulate the variables, and describe how data will be collected
iv. design scientific investigations

Level	*The student is able to:*
1-2	i. **state** a problem or question to be tested by a scientific investigation, with **limited success** ii. **state** a testable hypothesis iii. **state** the variables iv. design a **method, with limited success**
3-4	i. **state** a problem or question to be tested by a scientific investigation ii. **outline** a testable hypothesis **using scientific reasoning** iii. **outline** how to manipulate the variables, and **state** how **relevant data** will be collected iv. design a **safe method** in which he or she **selects materials and equipment**
5-6	i. **outline** a problem or question to be tested by a scientific investigation ii. **outline and explain** a testable hypothesis **using scientific reasoning** iii. **outline** how to manipulate the variables, and **outline** 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	i. **describe** a problem or question to be tested by a scientific investigation ii. **outline and explain** a testable hypothesis **using correct scientific reasoning** iii. **describe** how to manipulate the variables, and **describe** 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.*** *describe a problem or question to be tested by a scientific investigation*	***ii.*** *outline a testable hypothesis and explain it using scientific reasoning*	***iii.*** *describe how to manipulate the variables, and describe how data will be collected*	***iv.*** *design scientific investigations*
1-2	I have stated a **problem** as a research question.	My **hypothesis** is testable.	I have stated the **variables**.	I have a **procedure** written down for my lab.
3-4	I have stated a **problem** as a research question that connects with our topic.	My **hypothesis** is testable, and includes my **variables**.	I have given brief details on how to manipulate the independent **variable**, and stated how to measure the dependent **variable** to collect relevant data.	My **procedures** are safe. I have selected the **materials** I will need.
5-6	I have given brief details 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 I provided details 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 given brief details on how to manipulate the independent **variable**, how to measure the dependent **variable** to collect relevant data, and how to manipulate the controlled **variables**.	My **procedures** are safe and complete. Someone else could probably do my lab because I describe how to collect data. I have selected the **materials** I will need, including quantities.
7-8	I have provided details 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 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.	I have provided details on 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 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.