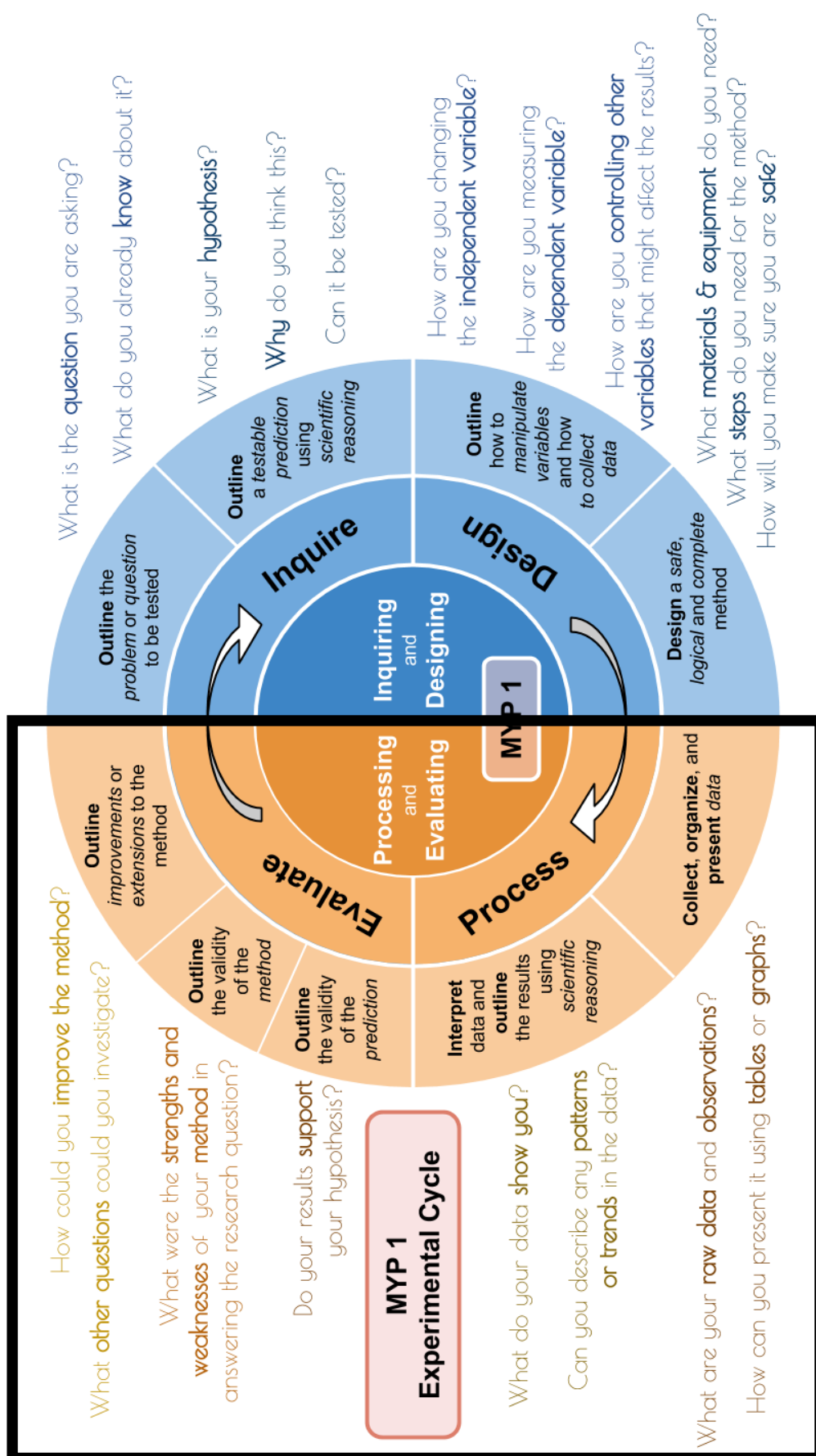


We use the **experimental cycle** to help us plan, carry out and write about scientific investigations.



Use these sentence starters to guide the conclusion section of your lab report.

Data: Collect, transform and present data

- ☐ This table shows my measurements.
- ☐ This graph shows my final results.
- ☐ I made these **observations** while carrying out my experiment...
- ☐ I think my data were / were not reliable because...

I have correctly organized the data I collected in my experiment using **tables** that include units in the proper place. I have **processed** my **data** using proper methods and showed examples. My **graph** is correct, including titles, axis labels, and I have used lines of best fit.

Patterns: Interpret data and explain the results using *scientific reasoning*

- ☐ My data show that
- ☐ My data suggest that ...
- ☐ This might be because ...
- ☐ Another source that supports this reason is... which says...
- ☐ I conclude that this experiment has / has not helped me solve my original problem. This is because...

I have correctly used knowledge and understanding of science to recognize **patterns** and draw conclusions from the data. I have correctly given a detailed account of how and why the variables are related.

Validity of Hypothesis: Discuss the *validity* of the *hypothesis*

- ☐ I predicted that ...
- ☐ My data support / do not support / partially support my prediction.
- ☐ I think this because...

I have **evaluated** my **hypothesis** by weighing up the strengths and limitations of the data I collected, and have used the data to clearly state if I my hypothesis has been supported or not. I use scientific reasons and sources to help explain my reasons.

Validity of Method: Evaluate the *validity* of the *method*

- ☐ The method I followed did allow / did not allow / partially allowed me to answer the research question.
 - ☐ I think this because...
- ☐ Some *strengths* in the method were...
- ☐ Some *weaknesses* in the method I was given were...
- ☐ Something I found *difficult* in carrying out the method was...
- ☐ If I wanted to test the same problem again, I would / would not use the same method. This is because...

I have **evaluated** my **method** by weighing up the strengths and limitations of my procedures and lab work. I have specifically discussed the validity and reliability of my methods in the table and addressed its significance.

Improvements: Explain improvements or extensions to the method

- ☐ I could improve the method by
- ☐ I would make these improvements because...
- ☐ This investigation has made me think of a new question, which is...
- ☐ I could test this by...
- ☐ I would like to find out more about ... because...

I have given a detailed account of how I **suggest improvements** to specific limitations in my procedures. These suggestions are realistic and based on scientific reasoning and research.

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*.

Good scientists

are not trying to 'prove' themselves '*right*'.

Good scientists want to **test their ideas** in case they are not supported. This gives them more interesting questions to ask next

'Banned words'

- "Proves"
- "Correct"
- "Right"
- "Wrong"

*These are not **scientific**.*

Instead we talk about how the evidence we collect (our data) do or do not support our hypothesis.

Criterion C: Processing & Evaluating

- i. present collected and transformed data
- ii. interpret data and explain results using scientific reasoning
- iii. evaluate the validity of a hypothesis based on the outcome of the scientific investigation
- iv. evaluate the validity of the method
- v. explain improvements or extensions to the method

Level	The student is able to:
1-2	<ul style="list-style-type: none"> i. collect and present data in numerical and/or visual forms ii. accurately interpret data iii. state the validity of a hypothesis based on the outcome of a scientific investigation iv. state the validity of the method based on the outcome of a scientific investigation v. state improvements or extensions to the method
3-4	<ul style="list-style-type: none"> i. correctly collect and present data in numerical and/or visual forms ii. accurately interpret data and explain results iii. outline the validity of a hypothesis based on the outcome of a scientific investigation iv. outline the validity of the method based on the outcome of a scientific investigation v. outline improvements or extensions to the method that would benefit the scientific investigation
5-6	<ul style="list-style-type: none"> i. correctly collect, organize and present data in numerical and/or visual forms ii. accurately interpret data and explain results using scientific reasoning iii. discuss the validity of a hypothesis based on the outcome of a scientific investigation iv. discuss the validity of the method based on the outcome of a scientific investigation v. describe improvements or extensions to the method that would benefit the scientific investigation
7-8	<ul style="list-style-type: none"> i. correctly collect, organize, transform and present data in numerical and/or visual forms ii. accurately interpret data and explain results using correct scientific reasoning iii. evaluate the validity of a hypothesis based on the outcome of a scientific investigation iv. evaluate the validity of the method based on the outcome of a scientific investigation v. explain improvements or extensions to the method that would benefit the scientific investigation

Self Reflection Rubric

C	i. present collected and transformed data	ii. interpret data and explain results using scientific reasoning	iii. evaluate the validity of a hypothesis based on the outcome of an investigation	iv. evaluate the validity of the method	v. explain improvements or extensions to the method
1-2	I have presented the data I collected in my experiment using tables or graphs .	I have used knowledge and understanding of science to recognize patterns and draw conclusions from the data.	I have evaluated my hypothesis by stating if it has been supported or not, based on my data.	I have evaluated my method by listing errors in my procedures and lab work.	I have stated how I suggest improvement to limitations in my procedures.
3-4	I have presented the data I collected in my experiment by using the correct type of graph , including titles, axis labels.	I have used knowledge and understanding of science to recognize patterns and draw conclusions from the data. I have given an account of how and why the variables are related.	I have evaluated my hypothesis by briefly mentioning the data to state if I my hypothesis has been supported or not, based on my data.	I have evaluated my method by briefly considering my procedures and lab work.	I have given brief details of how I suggest improvement to limitations in my procedures.
5-6	I have organized the data I collected in my experiment using tables that include units in the proper place. My graph is the correct type, including titles, axis labels, and I have used lines of best fit.	I have correctly used knowledge and understanding of science to recognize patterns and draw conclusions from the data. I have given a detailed account of how and why the variables are related.	I have evaluated my hypothesis by considering many possibilities. I have used the data to clearly state if I my hypothesis has been supported or not. I use scientific reasons and sources to help explain my reasons.	I have evaluated my method by considering the strengths and limitations of my procedures and lab work. I have discussed the validity and reliability of my methods, and addressed its significance.	I have provided details of how I suggest improvement to limitations in my procedures. These suggestions are realistic and based on scientific reasoning and research.
7-8	I have correctly organized the data I collected in my experiment using tables that include units in the proper place. I have processed my data using proper methods and showed examples. My graph is correct, including titles, axis labels, and I have used lines of best fit.	I have correctly used knowledge and understanding of science to recognize patterns and draw conclusions from the data. I have correctly given a detailed account of how and why the variables are related.	I have evaluated my hypothesis by weighing up the strengths and limitations of the data I collected, and have used the data to clearly state if I my hypothesis has been supported or not. I use scientific reasons and sources to help explain my reasons.	I have evaluated my method by weighing up the strengths and limitations of my procedures and lab work. I have specifically discussed the validity and reliability of my methods in the table and addressed its significance.	I have given a detailed account of how I suggest improvements to specific limitations in my procedures. These suggestions are realistic and based on scientific reasoning and research.