

Experiment/Lab Report

Name: _____

Period: _____

Title – Communicates what your experiment is about. Is specific!

The Effect of _____ on _____.
(State the I.V.) (State the D.V.)

Purpose/Question – Write the question for the investigation. Write this in either question form or a purpose. It should have the following components: (1) It should be specific, covering only one general thought, and (2) it should be able to be investigated.

Good example – The purpose of this investigation is to determine how the temperature of a stream affects the amount of oxygen dissolved in that stream.

Bad example – How does temperature affect oxygen?

Hypothesis – Develop a claim or prediction about what you think is going to happen.

- Expresses cause and effect
- Is testable
- Is based on prior knowledge (i.e. not a wild guess)

If I _____ the _____, then
(increase or decrease) (State the I.V.)
the _____ will _____.
(State the D.V.) (increase, decrease or stay the same)

Experimental Design Components:

- Independent Variable (I.V.) – Also called the **Manipulated Variable**. The variable you change or manipulate and determine how it affects the variable you measure (D.V.). **Always on the x axis.**
- Dependent Variable (D.V.) – The variable that responds. Also called the **Responding Variable**. The variable you measure during the experiment. Will be the EFFECT of the action you took. **Always on the y axis.**
- Constants - All the other variables that **remain the same** for all the trials. Must be quantified (Include numbers)
- Control or control group – A level that does NOT contain the independent variable. The NO TREATMENT. A standard against which your measured data can be compared. This may be one of the trials in your experiment, or it may be a group in which the no treatment is applied.

Materials List (Be descriptive: such as, 500 mL Pyrex beaker)

Procedure - Write a detailed and precise procedure that includes both the correct sequence of steps to be taken and the materials/equipment needed. The procedure should be detailed enough so that another scientist could duplicate the experiment without having to ask you any questions! Most steps should include a number of some kind. (Ex water in mL)

- If a written lab was used and the procedure was written out for you, summarize briefly what was done or say see procedure. Your summary should be concise and accurate.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Data – Record all of the evidence that has been collected.

- Include tables, graphs, calculations (or 1 sample calculation), and drawings

Table 1 (Simple Table Ex)

Table 2 (Complex table showing multiple trials)

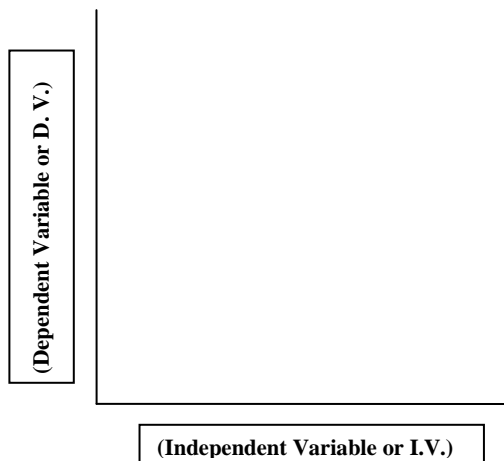
_____ vs. _____

_____ vs. _____

Independent Variable (Unit)	Dependent Variable (Unit)

Independent Variable (Unit)	Dependent Variable (Unit)				
	1	2	3	4	AVE

Graph (Ex) _____ vs. _____

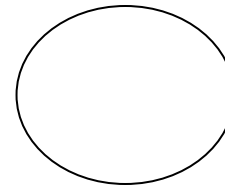


Calculations (Ex)

$$V = L \times W \times H$$

$$V = 2 \text{ cm} \times 4 \text{ cm} \times 3 \text{ cm} = 24 \text{ cm}^3$$

Drawing (Ex)

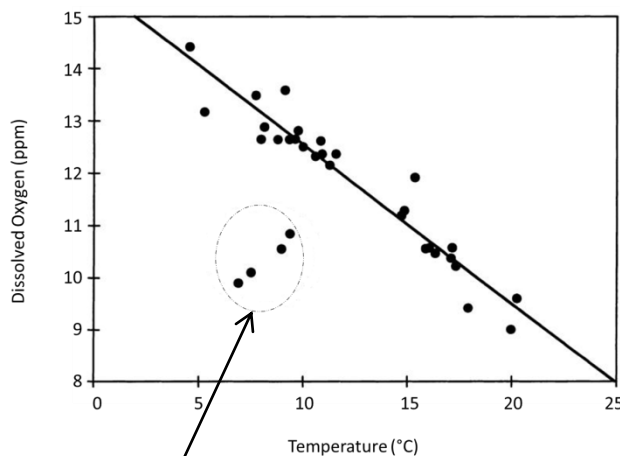


400 X

Results – The results section is a section of text (paragraph form) that describes the data and any patterns or trends to the reader in an unbiased way.

- Refer to the graph or table and describe what it shows (ex: “... *Figure 1 shows the effects of string length on the period of the pendulum...*”)
- Describe without interpretation. (do not explain why)
- Summarize what our graph visually shows (ex: “...*Figure 3 shows that as the height of the ramp increased the speed of the ball decreased...*”)
- Use appropriate terms to describe any trends: Directly proportional, inversely proportional, linear, nonlinear, direct relationship, inverse relationship. (ex: “*Figure 2 shows that the time and population growth are directly related and the data are nonlinear..*”)
- Describe the accuracy of your data. Explain to the reader how accurate your data is based on the “spread” of the data and any outliers that may be present. (see examples below)

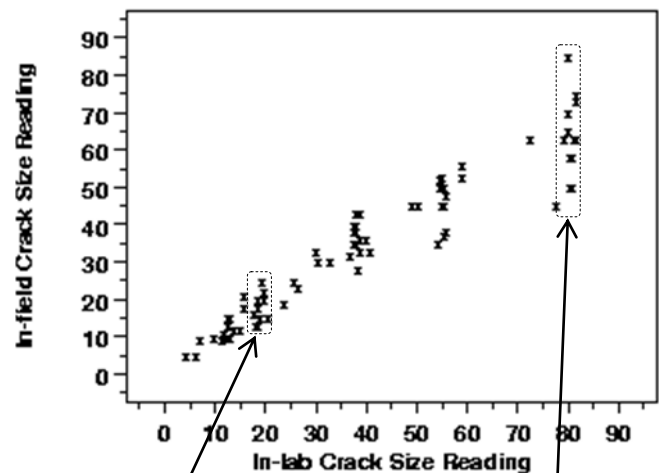
Outlier Data



Data points are examples of outliers

Ex: “...several points on the graph fall well below the trend line. These outliers were ignored...”

“Spread”



Less spread (tight cluster) – indicates more accurate data.

More spread – indicates less accurate data.

Ex: “...the spread of data points in the graph suggests that there is more error when measuring larger crack sizes..”

Conclusion/Analysis Paragraph – Develop a conclusion for your investigation. The conclusion should contain clear thoughts and proper vocabulary. This section focuses on the answer to your question. It usually contains a description of the purpose of the experiment, a discussion/explanation of your major findings, and recommendations for further study. It should support or not support the hypothesis by using logical reasoning and evidence from the data. This should be in **paragraph form**.

Suggested Outline:

Paragraph 1

- Restate the purpose of the experiment. (Mention both I.V. and D.V.)
- Restate the hypothesis, THEN, state whether the data supports or does not support the hypothesis. Do Not just say yes or no. Instead, use a complete sentence to answer such as: The data supports or does not support the hypothesis.
- Describe specific data examples or trends that show why you support or do not support your hypothesis.
- Discuss possible (scientific) explanations for your experimental results/data trends. (interpret and summarize all observations, data, and calculations)
 - In other words, explain WHY one variable affected the other or why the trend occurred/did not occur.
- Use vocabulary or concepts from your textbook or other logical ideas (but not guesses).

Paragraph 2

- Describe/explain any sources of error in the experiment and how it affected your results (or whether or not the errors were significant).
- Describe recommendations for improving this experiment (or reducing the amount of error). Be specific – do not say, “*we should have timed ore measured better.*”
- Describe recommendations for further study.
 - In other words, what further/other investigations could be done.