

Unit 1: Scientific Process

Content Outline: Inquiry (1.2)- Part 2

- I. **Questioning** - arises out of observations and inferences about the natural world.
 - A. Questions for inquiry must be *testable*.
 - B. Scientific questions contain **variables** (factors that can change):
 1. **Independent variable** – a factor that you change on purpose to get a result. Sometimes called the “manipulated” variable.
****you can only have one independent variable per inquiry****
 2. **Dependent variable** – a factor that changes as a result of the change in the independent variable. Sometimes called the “responding” variable.
**** you can have more than one dependent variable per inquiry****
 - Ex.: How will **increasing the drop height of a ball** in 2 m increments affect the **height of the ball's bounce** after it hits the ground?
- II. **Hypothesis** - a *possible answer (prediction)* to the inquiry question based on *prior knowledge*, logic, reasoning, and research.
 - A. A proper hypothesis restates the inquiry question in an If . . . , then . . . , because (justify) . . . format.
 - Ex.: If we **increase the drop height of a ball** by 2 m increments, then the ball will have a greater **bounce height** after hitting the ground after each increase in drop height because the ball has more force the higher off the ground it is.
- III. **Experimentation** - designed around the *independent and dependent variables* in the question. Data collected during the experiment will confirm or disprove the hypothesis.
 - A. **Control** – variable(s) are kept *constant* during the experiment. Controlling variables other than the independent variable helps ensure you are getting correct data.
 - B. **Data** – observations and measurements made *during* experimentation.
 1. **Qualitative data** - observations (using senses) written in note form.
 2. **Quantitative data** – measurements and calculations. **SI units** must be included on all measurements.
- IV. **Analyzing Data** –*relationships* between the independent and dependent variable in the experiment. Graphing data can help present the relationships between the tested variables.
 - A. Types of graphs:
 1. **Line** – two sets of numbers that can make (x,y) coordinates.
 - a. **X axis** – independent variable data.
 - b. **Y axis** – dependent variable data.
 2. **Bar** – a set of numbers and objects.

3. **Pie** – percentages of things out of a whole.

4. **Histogram** – range of possibilities within a specified range.

V. **Communication** – sharing/reporting your results in a written form.

A. Restate the question - ***We investigated how***

B. Restate your “If/then” portion of your hypothesis - ***In my hypothesis I said that if***

C. State what happened to your independent and dependent variables (increase, decrease, stays the same) & give three data sets from chart in sentence form - ***My data showed that as the***

D. State whether the data supports or does not support your hypothesis – ***The results of the data _____ my hypothesis and is supported or not supported by this scientific justification.***