

In order to conduct fair scientific investigations, students must grow comfortable with the following vocabulary, tools, processes, and concepts:

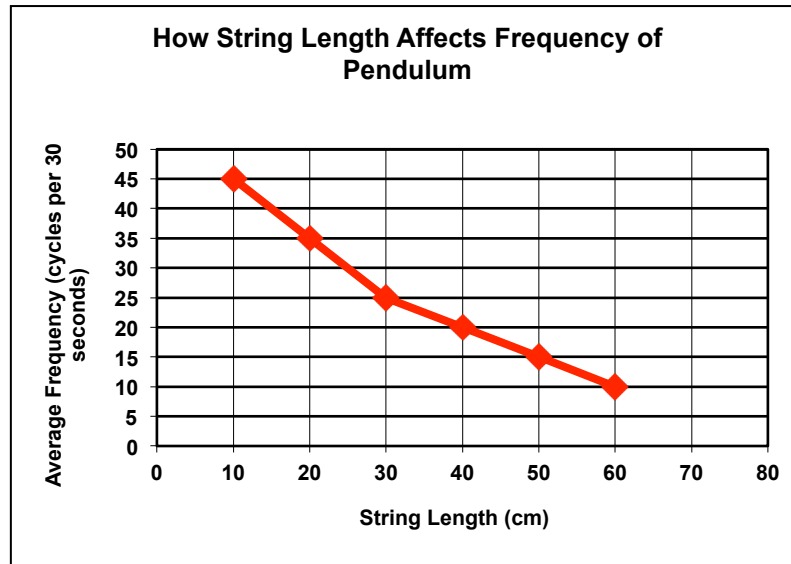
- A. **testable question:** question we can answer by conducting a classroom activity (i.e. Which variable affects a pendulum frequency the most?); **not** question we cannot experiment with in class (i.e. What happens if two black holes collide); **not** an opinion (i.e. **Should** we....).
- B. **variable:** something changed in experiment (**only one at a time!**) [with our pendulums we change length of string, weight, and angle released or “amplitude”] If two or more variables are changed at the same time, one does not know which variable caused any change in the outcome.
- C. **prediction:** thoughtful, educated guess about what one expects in an experiment based on observation, logic, or past experience—acts like a self-test. (i.e. I predict **one** magnet will pick up 10 g, and **two** will pick up 20 g.)
- D. **hypothesis:** Statement explaining underlying causes of effects; gives reasons for predictions; set up as “If ...then...because”. (**If** you add magnets together, **then** their strength increases **because** each magnet’s strength adds to the others’.) Goes further/more complete than prediction.
- E. **data table:** organized place to record data; variable that is changed usually in left column

How Different Variables Affect the Average Frequency of Pendulums

Table 1			Frequency (cycles per 30 seconds)			
STRING LENGTH (CM)	MASS (BOB) # OF WASHERS	AMPLITUDE Angle of Release (DEGREES)	Trial 1 (30 SEC)	Trial 2 (30 SEC)	Trial 3 (30 SEC)	AVERAGE
10	2	45°	46	44	45	44
20	2	45°	33	33	32	33
30	2	45°	25	26	26	26

F. **graph**: a visual way of displaying data from a table

Sample:



Skills regarding creating and reading graphs:

- Find title (top of graph)
- Recognize x axis (horizontal axis) and proper labels
- Recognize y axis (vertical axis) and proper labels
- Correctly plot data points (and read such points)
- Identify variable on graph (generally found on horizontal axis).

G. **conclusion**: a statement explaining the results of an experiment; **based on evidence and data.**