**Physics Graphing Guidelines**

Being able to create a meaningful graph that is easy to use and interpret is an important science skill.  You are expected to produce excellent graphs as outlined in the following guidelines.  Note that these guidelines apply whether making the graph by hand or by computer program.

        **Graph Paper** – There must be a grid composed of horizontal and vertical lines

        **Title** – At the top of the page place a title of the form “*y* versus *x*” often followed by a descriptive phrase.  For example, a graph that shows on the *y*-axis the distance a car travels and on the *x*-axis the elapsed time might be titled:  Distance versus Time for a Car on a Roadway.

        **Independent Variable** – Unless there is a good reason to do otherwise, put the independent variable on the *x*-axis.  The independent variable has a value that is not influenced by (or is independent of) the dependent variable and is often (but not always) under the control of the experimenter. In the ***Motion Unit***  time will ***always***  be the independent variable.

        **Dependent Variable** – Unless there is a good reason to do otherwise, put the dependent variable on the *y*-axis.  The value of the dependent variable is influenced by (or is dependent upon) the value of the independent variable.  Typically the experimenter varies the value of the independent variable to see what effect this has on the dependent variable.

        **Scales** – Choosing an appropriate scale is important to make the graph as precise and meaningful as possible and yet easy to read and interpret.  For these reasons choose for each axis a scale where each square equals 1, 2, or a number where the data covers as large a span of the page as possible.  In other words, choose a scale that will make the data cover most of the page but which is also convenient and easy to use and read

        **Label the Axis’** – On each axis label the name of the variable and next to this, ***in parentheses, the units***.

        **Data Points** – Plot data using an appropriate symbol including a “point protector”.  For example, use a small dot surrounded by a circle.  The small dot shows the data point and the circle “protects” it from being overlooked or overwritten and obliterated by a line on the graph. .

        **Line or Curve of Best Fit** – Do not connect the dots by placing line segments between each successive data point.  Instead, construct a line or curve of best fit that that shows the most likely actual relation between the *x* and *y* variables allowing for random error in the data points.  This means that the best fit will go “through the middle” of the data points with roughly equal numbers of points above and below.  The best fit will pass as close as possible to as many data points as possible but it may or may not actually “hit” data points.  This line or curve can be found by a variety of techniques that are presented in class during the year.

**Science 10: Graphing Standards**

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| --- | --- | --- | --- | --- |
|  | **Beginning** | **Developing** | **Accomplished** | **Exemplary** |
| **Graph** | * The x axis and y axis are not labeled or correct * Scale increments intervals unequal /incorrect * Many data points missing/incorrect * No line or curve * No title | * The x axis and y axis are correct but nor labeled * A few errors in uniformity of scale increments * A few data points are unclear/ incorrect * Line/curve not best fit * Title does not follow “Y vs X” | * The x axis and y axis are correctly placed and labeled, but with no units * Uniform scale that does includes origin but does not use space effectively * Data clearly and correctly plotted but no legend included when plotting 2 or more sets of data * Ruler Line/curve of best fit extends past plots * Title follows “Y vs X”, but no units are included | * The x axis and y axis are correctly placed and labeled, with correct units * Uniform scale that includes origin and uses space effectively * Data clearly and correctly plotted (use a legend if plotting two sets of data on the same graph. * Line/curve of best fit represent data plots * Title follows “Y vs X”, includes units |

**Checklist:**

* Label x-axis (independent variable – usually time) and y-axis (dependent variable) – include correct units
* Uniform scale – go up by 2’s, 5’s 10’s etc.
* Plot all points – clearly and correctly.
* If two or more sets of data on the same graph (use different symbols and include a legend).
* Line/curve of best fit – don’t just connect the dots
* Title: y vs. x – include units