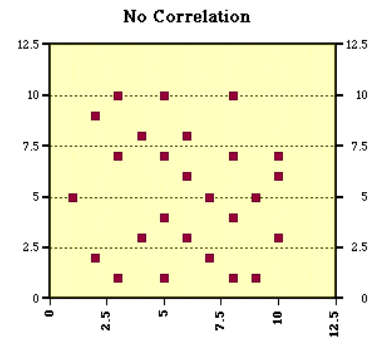
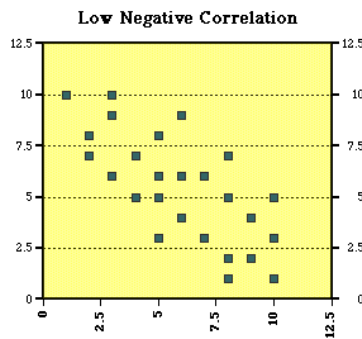
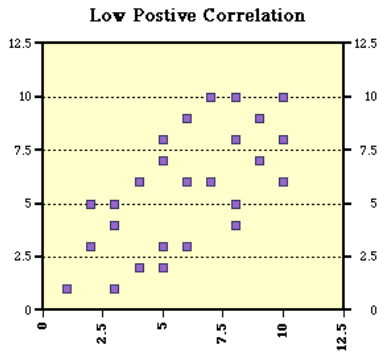
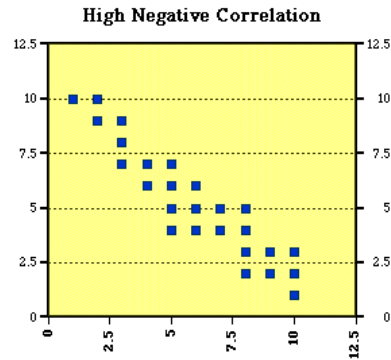
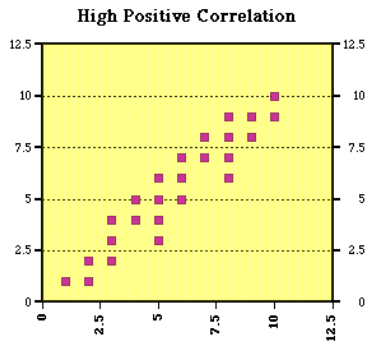
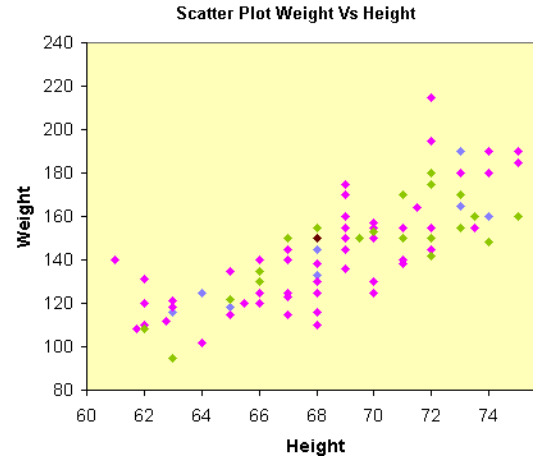


# AP Biology Graphs

1. **Scatter Plot Graph**: With one mark for every data point a visual distribution of the data can be seen. Scatter plots show how much one variable another affects. The relationship between two variables is called their **correlation**. Scatter plots usually consist of a large body of data. The closer the data points come when plotted to making a straight line, the higher the correlation between the two variables, or the stronger the relationship.  
<http://www.ncsu.edu/labwrite/res/gh/gh-linegraph.html#scatterplot>;  
[courses.statistics.com](http://courses.statistics.com)



If there is absolutely no correlation present then  $R^2 = 0$

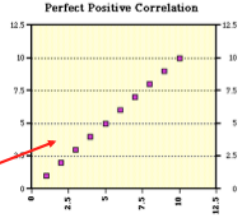
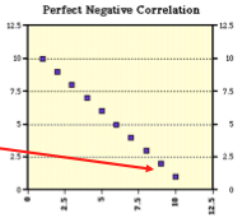
The closer  $R^2$  is to 1 or -1, the stronger the correlation, or the stronger the relationship between the variables

The closer  $R^2$  is to 0, the weaker the correlation

<http://phsgirard.org/AcademicBiology.html>

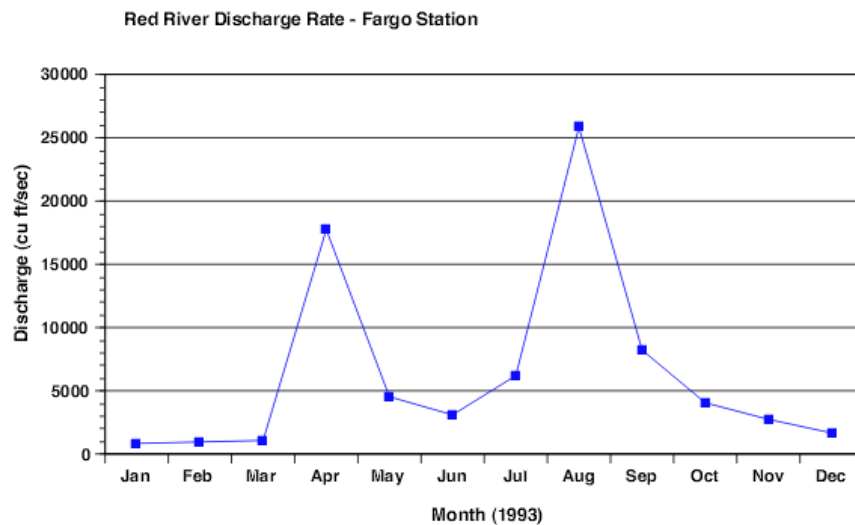
### Scatter plot graphs

- A perfect positive correlation is given the value of 1
- A perfect negative correlation is given the value of -1

2. **Line Graph:** Line graphs are like scatter plots in that they record individual data values as marks on the graph. The difference is that a line is created connecting each data point together. An overall trend and the local change between any two pairs of points can be seen.

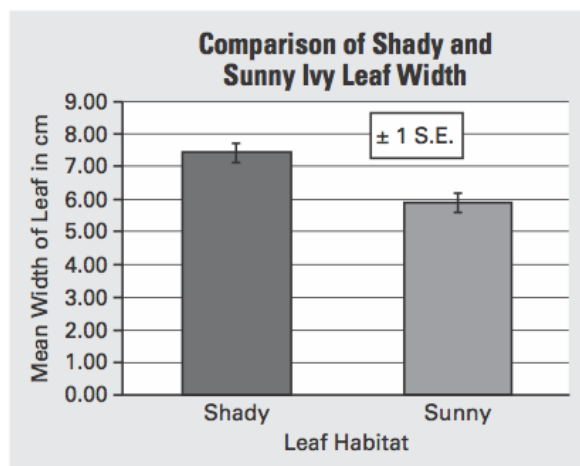
<http://www.ncsu.edu/labwrite/res/gh/gh-linegraph.html#linegraph>



<http://www.ncsu.edu/labwrite/res/gh/gh-linegraph.html#linegraph>

3. **Bar Graph:** “Best suited for a qualitative independent variable. Though you can extract trends between bars (e.g., they are gradually getting longer or shorter), you cannot calculate a slope from the heights of the bars.”

<http://www.ncsu.edu/labwrite/res/gh/gh-bargraph.html#histogram>

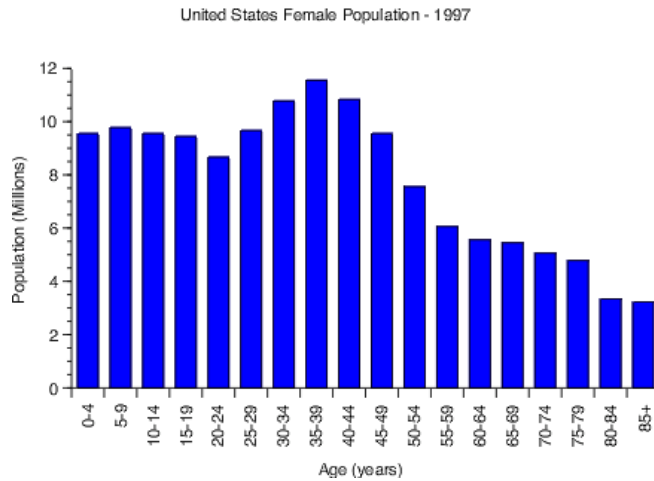


You could theoretically reposition the bars.

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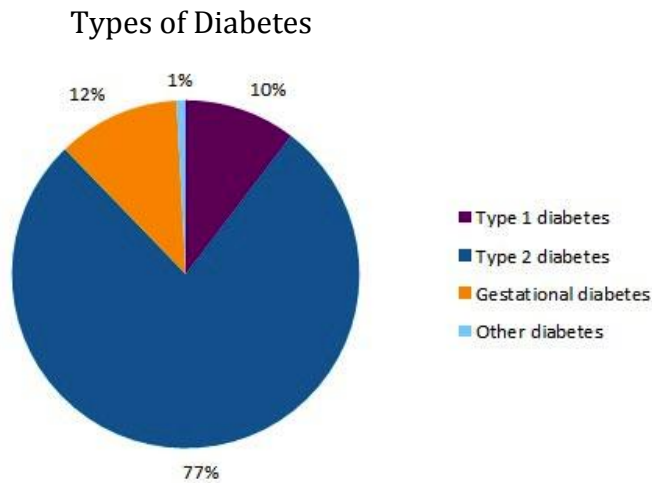
4. **Histogram:** “Similar to simple bar graphs except that each bar represents a range of independent variable values rather than just a single value. What makes this different from a regular bar graph is that each bar represents a summary of data rather than an independent value. In the example below, the sample is all the females in the U.S. The independent variable is age, which as been grouped into ranges of 5 years each. You should try and keep the ranges for each bar uniform (5 years in this case), with the exception possibly being the first and/or last range.”

<http://www.ncsu.edu/labwrite/res/gh/gh-bargraph.html#histogram>



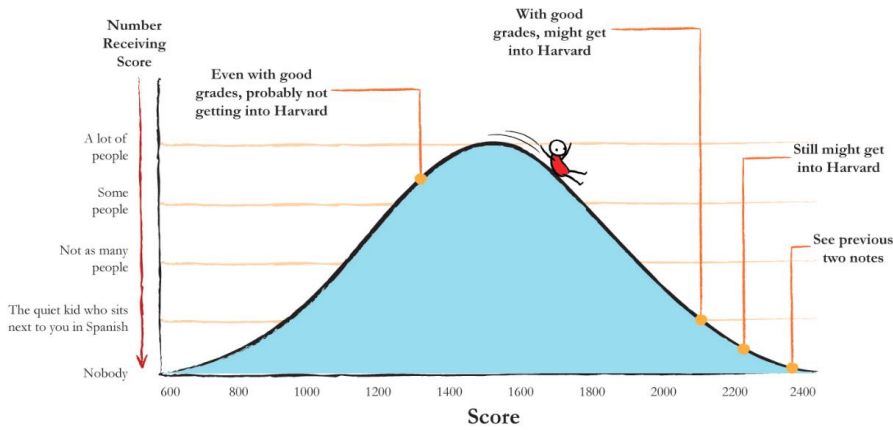
You CANNOT reposition the bars.

5. **Pie Chart:** “Circular graphs used to show the relationship of a part to a whole. A pie chart displays its data in **sectors**, which are parts of the circle and are proportional to the other parts displayed in the graph. Pie chart values are **represented by percentages**, with each chart representing 100%.”



[www.aihw.gov.au](http://www.aihw.gov.au)

6. **Bell-shaped Curve:** associated with random samples and normal distributions



[www.bellcurves.com](http://www.bellcurves.com)

7. **Sine-wave-like Curve:** associated with biological rhythm

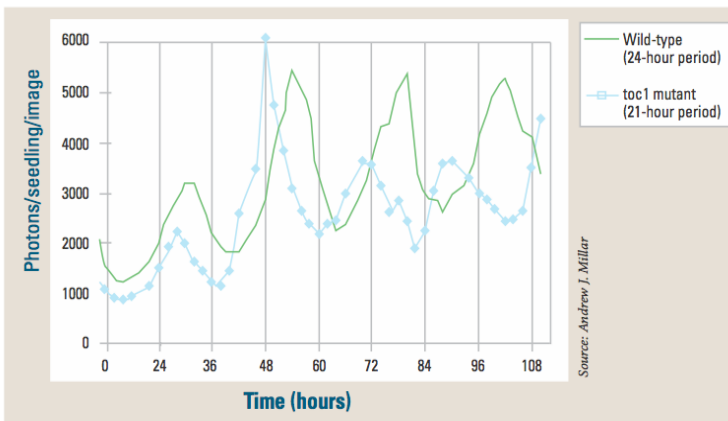
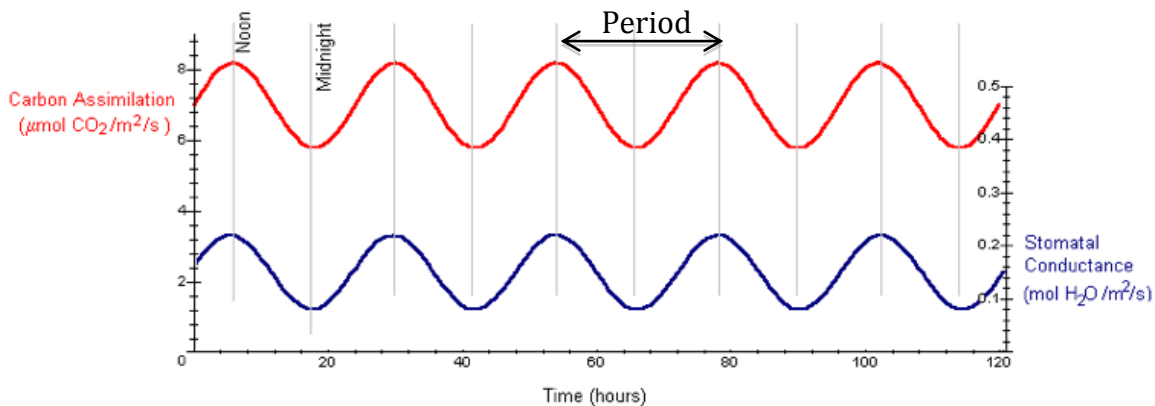


Figure 4. A graph of circadian rhythms in Arabidopsis (Note the sinusoidal behavior over time.)

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8. **Circadian Rhythms:** “Circadian rhythms are the daily repeating patterns of many organisms, such as the closing of flowers at night or opening of stomata during the day. An interesting property of circadian rhythms is that many are endogenous, arising from an internal biological clock.”  
**Period** is defined as the time to complete one cycle.



Under normal 24 hour day-night cycle or under constant moderate light and constant intercellular CO<sub>2</sub>

<http://www.tiem.utk.edu/~gross/bioed/webmodules/circadianrhythm.html>