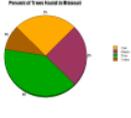
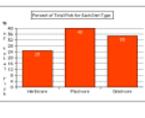
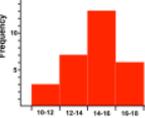
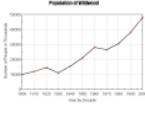
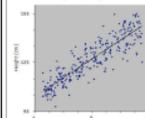


# Graphing Skill #1: What Type of Graph is it?

There are several types of graphs that scientists often use to display data. They include:

Pie Graphs	Bar Graphs	Histograms	Line Graphs	Scatter Plots
				
<ul style="list-style-type: none"> <li>Dependent variable is NOT continuous</li> <li>Usually presents data as a "part of a whole" or as percentages</li> </ul>	<ul style="list-style-type: none"> <li>Dependent variable is NOT continuous</li> <li>There is no order to the categories on the X-axis</li> <li>Bars typically don't touch</li> <li>Y-axis is usually a percentage or a frequency (count)</li> </ul>	<ul style="list-style-type: none"> <li>A specific type of bar graph</li> <li>Dependent variable must have a natural order that can be grouped into defined "chunks"</li> <li>Bars must always touch</li> <li>Y-axis is usually a percentage or a frequency (count)</li> </ul>	<ul style="list-style-type: none"> <li>Dependent variable IS continuous</li> <li>Points are plotted using X- and y-components</li> <li>The points are connected because the observations are NOT independent (the next value depends on the previous value)</li> </ul>	<ul style="list-style-type: none"> <li>Dependent variable IS continuous</li> <li>Points are plotted using x- and y-components</li> <li>The points are NOT connected because the observations are independent (the next value does NOT depend on the previous value)</li> <li>Uses a best-fit line or curve to show relationship</li> </ul>

Based on these definitions, and the descriptions of the experiments below, please put an "X" in the box for the type of graph that would be *most* appropriate (some descriptions may have several graph types that would be appropriate; you only need to select one).

#	Description	Pie	Bar	Histo.	Line	Scatter
Ex	A graph showing the number of 5 <sup>th</sup> graders who prefer Coke or Pepsi		X			
1	A graph showing how a newborn baby's weight changes over time					
2	A graph showing the percentage of the class earning As, Bs, and Cs.					
3	A graph showing the distribution of trees of different size groups (e.g. 0-10cm, 10-20cm, etc...) in a forest					
4	A graph showing the relationship between height and arm length					
5	A graph showing the percentage of an allowance spent on different categories (e.g. food, movies, etc)					
6	A graph showing the amount of rainfall, by month over a 12 month period					
7	A graph showing the number of ice cream cones purchased as a function of the day's temperature					
8	A graph showing the number of pushups done each day during a 2-week training program					

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Graphing Skill #2: Labeling Axes

**When labeling your axes, keep 3 things in mind:**

- The independent (manipulated) variable is written along the horizontal axis (X axis)
- Dependent (responding) variable is written along the vertical axis (Y axis)
- Units on any variables should be included in parentheses ( ) following the axis title

### Practice Problems

For each experiment described below, write the independent and dependent variable on the appropriate axis. Be sure to include units when appropriate.

**SAMPLE:** A farmer wants to know if there is a relationship between the amount of fertilizer (in kilograms) she uses and how tall her corn grows (in centimeters).

**Graph 1:** A ball is dropped from several distances above the floor (in meters) and the height it bounces is then measured (in centimeters).

**Graph 2:** A candle was burned under glass jars of different volumes (in mL) to see if the volume of the jar affects the length of time (in seconds) the candle burns.

**Graph 3:** A fisherman used fishing lines of several different gauges (test pounds) and recorded the number of fish caught on each gauge.

**Graph 4:** Geologists wanted to know if there was a relationship between the density (in g/cm<sup>3</sup>) of a rock and how many meters down it was collected from.

## Graphing Skill #3: Scaling Axes

**There are a few important steps involved in correctly scaling an axis:**

- STEP 1: Find the range for the variable
  - Range = Largest Value - Smallest Value
- STEP 2: Divide the range by the number of intervals you want (not too many or too few). We don't want all of the data smooshed in only part of the graph; spread it out.
  - After dividing, we may need to round up to get a number that is easy to count by. (It is easier to count by 2s instead of 1.9s)
- STEP 3: Use the rounded number to mark off intervals along the axis.
  - The interval must be the same amount each time (count up by the same number).

**STEP 1: What is the range of my data? Find the range of the data for each column below.**

Mass (g)	Students	Distance (cm)	Time (s)
5	100	3	0.22
11	99	5	0.51
14	88	6	0.78
19	70	7	1.01
26	72	9	1.23
30	64	10	1.60
40	55	12	1.74
Largest #: <u>40</u>	Largest #: _____	Largest #: _____	Largest #: _____
Smallest #: <u>5</u>	Smallest #: _____	Smallest #: _____	Smallest #: _____
Range: <u>35-5 = 35</u>	Range: _____	Range: _____	Range: _____

**STEP 2: What number do I count by? Assume that our graph has 10 intervals (places to put numbers). If needed, round up to get to a good counting number.**

A) Range = <u>35</u>	A) Range = _____	B) Range = _____	C) Range = _____
# of intervals = <u>10</u>	# of intervals = _____	# of intervals = _____	# of intervals = _____
$\frac{\text{Range}}{\text{Intervals}} = \frac{35}{10} = 3.5$			
Round to Count = 4			

Name: \_\_\_\_\_

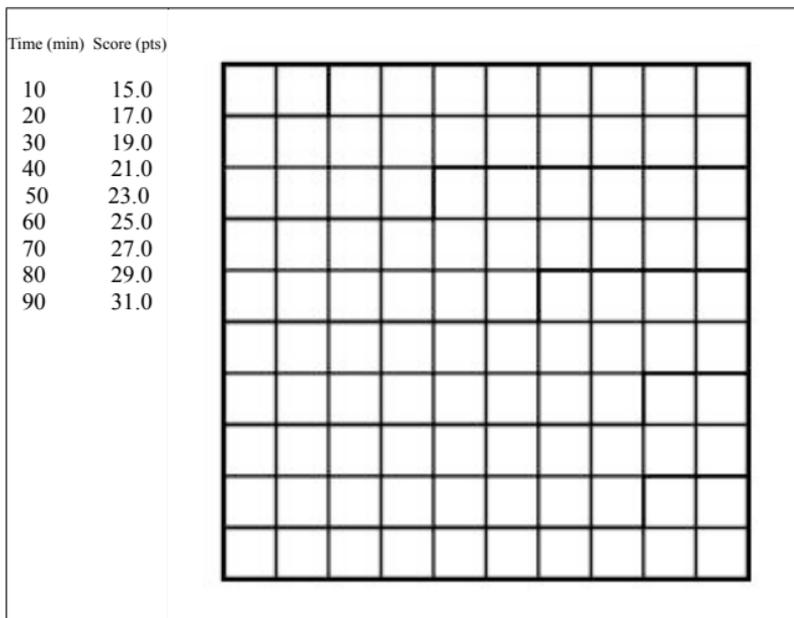
Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Graphing Skill #4: Plotting Points

- STEP 1: Determine your X and Y axis by choosing an Independent and Dependent Variable.
- STEP 2: Label each axis using the proper variable and units. Title the graph too.
- STEP 3: Use the range of numbers for each axis to determine the intervals for each axis.
- STEP 4: Plot the points and connect the dots.

Scenario: Teachers wanted to see if the amount of time spent studying had an effect on student test scores. The results of the experiment are listed below.

\* This graph is 10 x 10



Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

Jimmy wanted to know how the length of a pendulum effected the frequency that the pendulum swings with. The results are listed below.

\* This graph is 12 x 12

Length (cm)	Frequency (Hz)
10	25
20	23
30	22
40	21.5
50	20.5
60	20
70	19.5
80	19
90	16
100	15
110	14.5
120	13
130	12.5
140	12
150	11

