Name:_____Period:____

CP Biology- Graphing

Graphing is often used in biology as a visual way of representing information collected in a data table. It is used to show a relationship between 2 different factors. The most common graphs are line graphs and bar graphs

A. Line graphs

Always follow the following rules

1. The two axes should be labeled- indicate the units used on both axes in parentheses if needed (for instance if one axis is labeled "Time", indicate minutes or hours).
Use **a pencil and a ruler** to draw the axes.

2. The x-axis is used for the manipulated (or independent variable). **There are always numbers on the x-axis** in a line graph. The data here is "continuous" over a range, which is why we can connect the points with a line.

3. The scales on both axes should be chosen in such a way that all points can easily be shown on your graph. Choose your scales so that at least 75% of the paper used for the graph is used. Look at the highest x and y values you will have to plot. Count the number of squares available and pick a good spacing for your units. **You do NOT have to start at Zero.**

4. Be very **careful about spacing**. If you make measurements at 0, 5, 10, and 20 minutes, the spacing between 0 and 5 should be equal to the spacing between 5 and 10 and half of the spacing between 10 and 20.

5. Give a **scientific** title and description to your graph. The title should refer to both the independent and dependent variables.

6.Plot your data carefully. Use a ruler to join the points. BE CAREFUL: sometimes, the starting point is not (0 ,0)

7. A **key** will be needed if more than one set of data is plotted. Use different colors for different sets of data. You can also use different symbols for the data points, and different styles for the lines.

8. If you have 2 or more lines on your graph in different colors and some parts are identical, draw the lines as close to each other as possible- do not superimpose them.

Two sets of data are given. For each of them, draw the graph you would draw.
Find a good title, label and mark the axes.

1. A biology student wants to find out which of 2 species of unicellular organisms A or B survives better when both are placed in the same environment. The student puts 10 A and 10 B organisms in one test tube and records the population of each species over a number of days

Day	Population	
	Species A	Species B
1	10	10
2	16	16
3	32	32
4	48	12
5	60	4

2. The rate of respiration of a freshwater sunfish was determined at different temperatures. It was determined by counting the number of times the gill covers of the fish opened and closed during one minute at the various temperatures.
Here is the data collected:

Temperature Degree Celsius	Gill Cover Opening and Closing in one Minute
10	15
15	25
18	30
20	38
23	60
25	57
27	25

B. Bar graph

A bar graph also contains an x-axis and a y-axis. It uses a series of columns to display data. The independent variables are discrete which means that they are not continuous or directly connected to each-other.

Always follow the following rules

1. The two axes should be labeled.

2. The scales on y-axes should be chosen in such a way that all points can easily be shown on your graph.

3. Be very **careful about spacing** on the y-axis.

5. Give a **scientific** title and description to your graph.

6. A **key** may be needed depending on you data.

Two sets of data are given. For each of them, draw the graph you would draw. Find a good title, label and mark the axes.

3. An investigator is interested in finding out if the length of the tail of male barn swallows influences the number of offspring it has. She sets up four groups of birds with different tail length:

1. Unaltered tails
2. Tails shortened by cutting
3. Tails extended by gluing
4. Cut and glued tails of normal length

Data

Bird tail treatment	average # of offspring
Unaltered tails	5
Shortened	3
Extended	8
Cut and reattached	5

4. People around the world use different amounts of resources on a daily basis. Our standard of living is related to the amount of resources that we need. We can compare standards of living indirectly, by looking out the resources required per person. Many people refer to this as an "Ecological Footprint". The table below shows the acres of land required to support an individual (average person) at the standard of living for a population.

Country	Acres required per individual
Brazil	6.4
Germany	15.6
India	2.6
Indonesia	3.7
Nigeria	3.2
United States	30.2