Graphing

Graphing is an important procedure used by scientists to display the data that is collected during a controlled experiment.

A graph contains 5 major components:

1. A descriptive title that answers the question (what is this data?) and includes the IV and the DV.
2. The independent variable (IV) on X axis labeled with units [ex: Time (days)]
3. The dependent variable (DV) on Y axis labeled with units [ex: Height (cm)]
4. Graph paper, ruler, full page size: neatness and clarity count!
5. A legend/key when appropriate: This a short description placed under the graph to describe what is being shown. Without this, someone who is just looking at a graph will not know what the graph is representing.

There are 2 main types of graphs used in Biology: a line graph and a bar graph.

➢ Line graphs compare two variables. They are usually used to show how something changes over time.

➢ Bar graphs are used to compare things between different groups. Bar graphs are best when the changes are larger.

PART 1

Directions: You will create a graph of human population growth and use it to predict future growth. You will identify factors that affect population growth.

Statistics on Human Population

Year	Number of People (in billions)
1650	.50
1750	.70
1850	1.0
1925	2.0
1956	2.5
1966	3.3
1970	3.6
1974	3.9
1976	4.0
1980	4.4
1991	5.5
2000	6.0
2004	6.4

Instructions for creating your graph:

1. Place time on the horizontal access. Values should range from 1650 to 2020 in consistent intervals.

2. Place number of people on the vertical access. Values should range from 0 to 20 billion in consistent intervals.

(Make sure that your graph is a full page in size and you include all major components of a graph—see our graphing rules guidelines sheet!)

Analysis:

1. It took 1649 years from the world population to double, going from .25 billion people to .50 billion people. How long did it take for the population to double once again? _____

2. How long did it take for the population to double a second time? _____ A third time? _____

3. Based on your graph, in what year will the population reach 8 billion? _____

4. Based on your graph, how many years will it take for the population of 2004 to double? _____

Part 2   You will now use this same data and construct the proper graph on a computer. Use the following directions to help you construct your graph. Make sure to include the 5 components of a graph.

Directions to make a graph on Microsoft Excel 2010 version:

1. Go to Excel and open a new spreadsheet.
2. In Column A Row 1, type Year.
3. In Column A Row 2-14, type in the years.
4. In Column B Row 1 Type Number of People.
5. In Column B Row 2-14, type the corresponding numbers.
6. Select an empty cell on the spread sheet.
7. Click the insert tab on the tool bar, under charts pick line graph with markers (If you drag your mouse over the different types, it tells you the name of the graph).
8. Right click on the graph and click select data.
9. Click Add.
10. Clear the series value box so it is blank. With the cursor in this empty box, highlight cells B2-B14. Click OK.
11. Under horizontal (category) axis labels click edit.
12. Highlight cells A2-A14. This will put the years on the X axis. Click OK.
13. Click OK to exit the select data box.
14. Under chart tools at the top tool bar, click layout.
15. Click chart title, click above chart, and then name the chart.
16. Click axis titles, primary horizontal axis title, title below axis, name the axis. Be sure to include units. For example: Time (seconds) or Distance (meters).
17. Click axis titles, primary vertical axis title, rotated title, enter title name. Be sure to include units.
18. Click an empty area within the graph to select the displayed data. A box appears around the data. Drag the corner of the graph to make it slightly smaller to allow for space to type your graph description.
19. Under the layout tab, click text box and insert a text box below the graph. Here is where you put your short description of what this graph is showing.
20. To print your graph, click on a white portion of the graph to select the entire graph, file, print.

Graph Comparison Analysis:

➢ Compare your Excel printout graph and your hand drawn graph. What differences do you see? Do those differences impact the way the data is interpreted/understood?

➢ Describe the importance of appropriate axis intervals.