ESSENTIAL BIOLOGY 01: STATISTICAL ANALYSIS
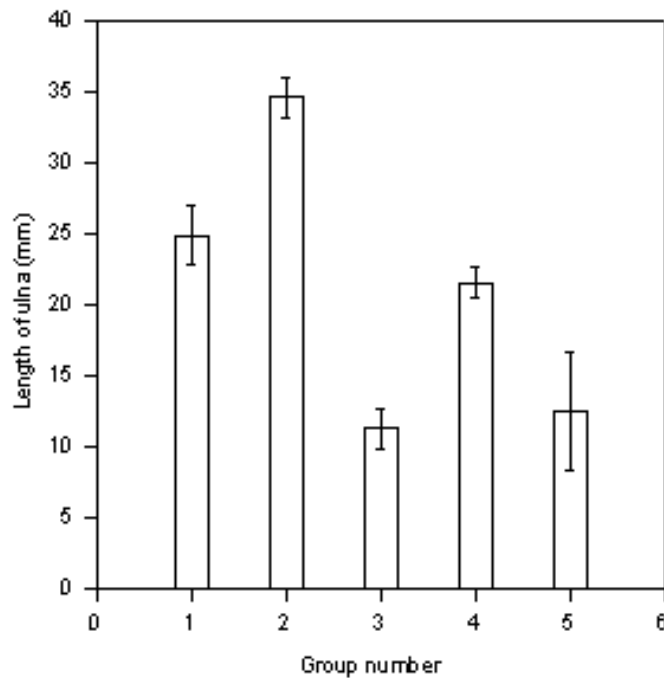
1. What is meant by the following terms?

   a. Mean

   b. Standard deviation

   c. Range/ variability

Graph taken from http://www.csupomona.edu/~jcclark/classes/bio542l/essays/graphtypes.html

2. Error bars can be used to show variability in data (either range of data or standard deviation)

In which two pairs of groups below can we see an overlap in the standard deviation of the data?

   a. _____ and _____

   b. _____ and _____

c. In which group is the mean NOT likely to be significantly different to the mean of group 3?

ESSENTIAL BIOLOGY 01: STATISTICAL ANALYSIS

3. On the axes below, plot the following three curves (all have a normal distribution):

   a. Has the highest mean and a high standard deviation.

   b. Has the lowest mean, but the highest frequency at that mean.

   c. Has a mean between (a) and (b) and has the smallest standard deviation.
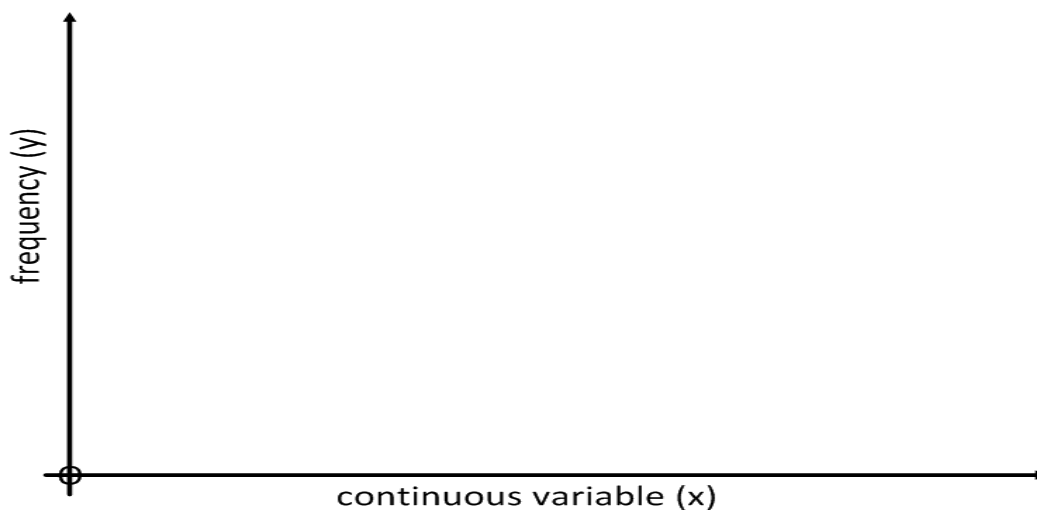
4. ± 1σ (standard deviation) from the mean represents _____ % of all the data points.

   In data with a high standard deviation, data are clustered <u>closer to/ further from</u> the mean.

   In data with a low standard deviation, data are clustered <u>closer to/ further from</u> the mean.

   Overlapping standard deviations suggest two datasets <u>are/are not</u> significantly different.

   ___ % of all data fall within 2 standard deviations of the mean.

	Group A	Group B
	24	24
	25	29
	26	25
	23	23
	25	29
	25	32
	26	34
	27	31
	23	32
	23	29
Mean		
Stdev		
P=	0.004	(T-Test)

6. Calculate the means and standard deviations of these two groups of data (to one decimal place)

Show your working here.

7. In a t-test comparing Group A and Group B, the P value was calculated as 0.004.

What does this P value tell us about these two sets of data?

Explain your answer.

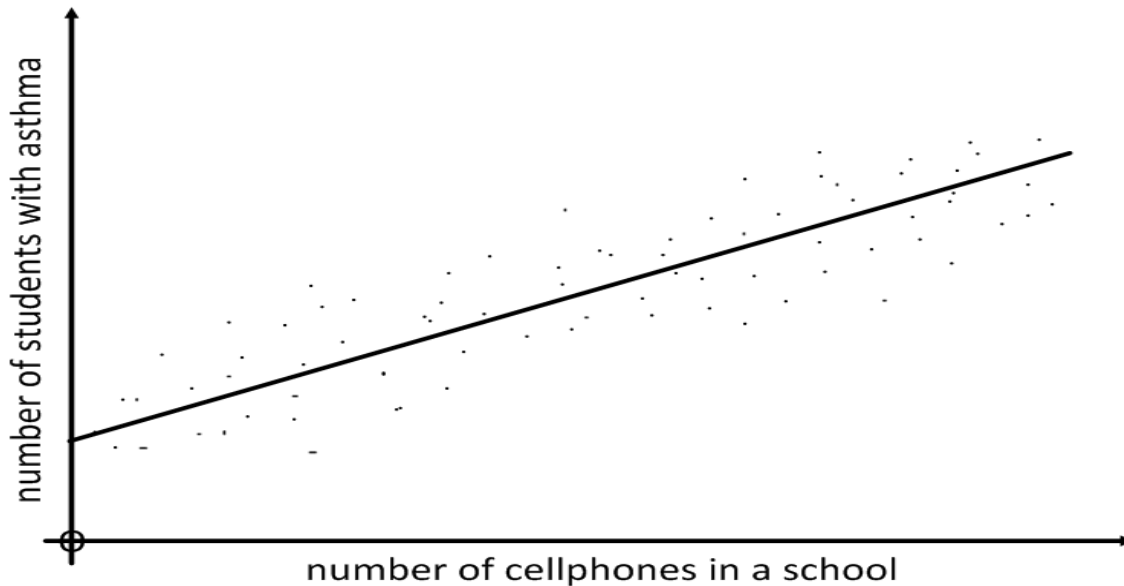8. Why does the scientific community place so much importance on significance tests such as the t-test?

SKILLS CHECK   I can calculate mean and standard deviation using:

a. A graphical display or scientific calculator

b. Microsoft Excel 2007

9. Look at the graph below:

Which of the following statements are true?

a. There is no correlation between number of cellphones and number of students with asthma.

b. There is a positive correlation between number of cellphones and asthma cases.

c. There is a negative correlation between number of cellphones and asthma cases

d. Increased numbers of cellphones cause an increase in numbers of students with asthma.

e. Increased numbers of asthmatic cause increased numbers of cellphones in a school.

f. There is no evidence of causality in this graph.

10. Suggest two comparisons in which a causal relationship is likely
    (e.g. temperature and rate of reaction).