IB 153L

GENERAL PRINCIPLES OF SAMPLING

1) What is a sample?

A subset of a population is called a *sample* of that population.

2) Why sample?

a) Limitations of time and money make it unrealistic to observe all elements of many populations.
b) If measurements are destructive (e.g. performance of flash bulbs, sampling with benthic trawl nets), the entire population would be destroyed.
c) Infinite populations (e.g. all high temperature values at some location) cannot be observed in their entirety.

3) What is the object of sampling?

To make statistical inferences about population characteristics.

4) What is a random sample?

A sample of *n* elements is *randomly* drawn if the sample is selected by any procedure that gives every sample of n population elements an equal and independent chance of being selected. "Independence" means that the selection of any elements has no influence on the chances of selecting any other elements.

5) Why randomly sample?

There is always a possibility of drawing erroneous inferences from any sample. Only with random sampling can we validly apply the rules of probability to calculate the chances of such errors. Knowing the error rates is essential if a meaningful "degree of confidence" is to be attached to a statistical inference. We would like to obtain the most *representative* sample of the population. Not knowing which population elements might be representative forces us to rely on randomization. Randomization does not guarantee a representative sample. Instead, randomization gives the same chance of selection to every sample – the non-representative ones as well as the representative ones. Therefore, *on average*, random samples will be representative. Randomization also helps minimize conscious and unconscious sampling biases introduced by the observer or sampler.