Week 2 Practical

# Practical 8.1

Grand Mean: 6.52 grams of Carbon per kilogram soil

Grand Minimum: 0.600 grams of Carbon per kilogram soil

Grand Maximum: 16.2 grams of Carbon per kilogram soil

Topsoil Mean: 9.75 grams of Carbon per kilogram soil

Topsoil Minimum: 4.00 grams of Carbon per kilogram soil

Topsoil Maximum: 16.2 grams of Carbon per kilogram soil

Next, do the same for the mean, minimum, and maximum subsoil values.

Subsoil Mean: 2.43 grams of Carbon per kilogram soil

Subsoil Minimum: 0.600 grams of Carbon per kilogram soil

Topsoil Maximum: 4.60 grams of Carbon per kilogram soil

(note you, could have also written ‘g C / kg soil’ for the units)

**Based on these samples in the dataset, can we really say for certain that the population mean of topsoil is higher than the population mean of subsoil? Think about this, then write a sentence below about how confident we can be about concluding that topsoil organic carbon is greater than subsoil organic carbon.**

The sample means themselves don’t tell us whether the population mean of topsoil will be bigger or smaller than that of subsoil, just that the *sample* means are different. We can use the data to calculate a standard error associated with the mean, which will give an indication of the level of confidence that is appropriate.

**What would make you more (or less) confident that topsoil and subsoil population means are different? Think about this, then write another sentence below that answers the question.**

The larger the sample size, the more confidence we could have that the mean was close to the population mean; also the narrower the spread of data the more confidence we could have that the sample mean was close to the population mean.

# Practical 8.2

Grand Mean length: 1.59 cm

Grand Mean height: 1.46 cm

Grand Mean width: 1.57 cm

Missing width row: Row 62

Missing height row: Row 22

Grand Mean length (mm): 15.9 mm

Grand Mean height (mm): 14.6 mm

Grand Mean width (mm): 15.7 mm

**Compare these means to the means calculated above in cm. Do the differences between means in cm and the means in mm make sense?**

Note that means in ‘mm’ are ten times the value of the means in ‘cm’, as expected.

# Practical 8.3

**In this case, how might assuming that figs are perfectly spherical affect the accuracy of our estimated fig volume? Write a sentence of reflection on this question below, drawing from what you have learned this week about accuracy and precision of measurements.**

As figs are not perfectly spherical, the estimation will be inaccurate. It could be systematically inaccurate, i.e., it would likely consistently over- or under-estimate the true volume of the figs, but could also be randomly inaccurate as each fig will differ in shape a little so the approximation to a sphere will be differently wrong for each fig. Note, that the measuring equipment used (which, in fact, was a ruler in this case) will also limit the precision of the estimates.

Mean: 2150 mm^3

Minimum: 697 mm^3

Maximum: 4847 mm^3

Check the option for ‘Histogram’ and see the new histogram plotted in the window to the right. Draw a rough sketch of the histogram in the area below.

