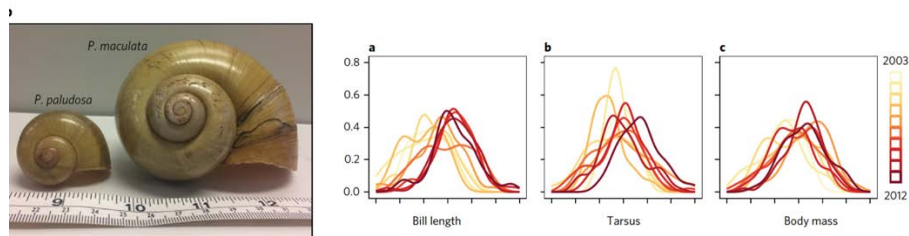**Example biological question:**

We would first ask about the pictures – what are these organisms and how do they interact? This is a Snail Kite from South America, which eats snails with its long beak (we don't expect you to know this, just to speculate about it). The larger snail is an invasive species which has recently become abundant (I would tell you this, but we might go on to discuss invasive species).

Next, we will look at the graphs – what can you see? These show the distribution of the size of kites in a population through time. There is a consistent increase in the bill length of birds through time, but little evidence for change in other measures of body size (the data is quite noisy – it may not be immediately obvious!).

What is happening in the population? Why do we measure body mass as well as bill size? The answer is that larger snails lead to natural selection for larger bill size in the predator. Body size acts as a control here – the change is not due to the birds getting larger, just their bills, which allows the birds to deal with bigger snails.

Note that there is no single correct answer and the problems are intended to address a problem you have never seen before.

Example quantitative question:

We would normally start with a 'warm-up' question, e.g.:
Which volume of 10.0M H_2SO_4 is required to prepare 4.0L of 0.50M H_2SO_4?
There are different ways to answer this question, one possibility is to first calculate the dilution factor:
10/0.5 = 20, i.e. 0.05L of the 10M stock solution have to be added per litre of final solution. Since you want 4L in total, **the correct answer is 0.2L**.

We would then continue to more complex questions such as:

Cystic fibrosis is a recessive condition that affects about 1 in 2500 babies in the UK population. **Please calculate the frequency of the recessive allele in the population.**

To answer this question, we require the Hardy Weinberg Law (allele and genotype frequency):
$p^2 + 2pq + q^2 = 1$ (percentage of genotypes in population)
$p + q = 1$ (frequency of alleles in population)

We know that q^2 is 1/2500 or 0.0004. Therefore, q is the square root, or 0.02**. The answer is the frequency of the cystic fibrosis allele in the population in 0.02 or 2%.**