Health Science Pathway
Module 4: Measurement, Units and Chemistry Calculations
Practice Task 2:

1. You have a stock buffer of 1.0M phosphate buffer. You require a buffer of 0.15M for your assay. What is the volume of the stock buffer you need to make up to 1000 mL to obtain this?

**Answer**:
**$C_1V_1 = C_2V_2$**

1 x V1 = 0.15 x 1000

V1 = 150 mL

Therefore, 150 mL of stock buffer is diluted to a final volume of 1000 mL (so this means that you would add 850 ml of diluent to the 150 mL of stock buffer.

2. 54 ml of diluent is added to 134 ml of stock solution to prepare a resulting solution of 47 mmol/L. What was the concentration of the stock solution?

**Answer**:
**$C_1V_1 = C_2V_2$**

C1 x 134 = 47 x 188
C1 = $\frac{8836}{134}$ = 65.94 mmol/L

3. 3.0 ml of a stock solution is added to 5.0 ml of diluent. Then, 3.0 mL of this diluted solution is added to 6.0 mL of diluent. This procedure is repeated twice more, each time using the previously diluted solution. What is the final dilution factor?

**Answer**: Let us work through this in steps.

1st dilution = 3/8 because we have 3 parts stock to a total of 8 parts of solution.
2nd dilution = 3/8 x 1/3 = 3/24
(Because the 3.0 mL of the first solution is then diluted to 3 parts stock to 9 parts in total which equates to 1/3). Now we do that 2 more times.

3rd dilution = 3/24 x 1/3 = 3/72
4th dilution = 3/72 x 1/3 = 3/216 = 1/72

So the total dilution factor is 1/72

Alternatively you could have calculated this as follows:

**3/8 x 1/3 x 1/3 x 1/3 = 3/216 = 1/72**