

# Laboratory Skills Workbook

## Introduction:

This workbook will give you the opportunity to practice some basic lab skills, improve your technique, and give you a bit more confidence for when you start working in the laboratory. The workshop is split into three units, each addressing a different skill or activity. In small groups, you will work through each unit recording your results in this workbook. After 30 to 60 minutes, you will finish the activity and move onto the next unit. It does not matter what order you work through the units.

You will not be graded on your results, but completing the workbook and all the activities is required for course completion.

Please ask questions whenever you need to, and discuss your ideas and results with your group.

Unit 1 - Weights and Measures

Unit 2 - Volumes and Pipettes

Unit 3 - Serial Dilutions and Volumetric Glassware

## Unit 1 – Weights and Measures

Goal: The goal of this unit is to practice weighing out set amounts of different substances. You must choose the correct balance, size of weighing boat, spatula, and try and weigh out each of the following masses for 3 substances: salt, sugar, and pepper. Record in the table below the actual weight and make a note as to what it looks like. Also, note any problems or helpful tips.

Target Weight – 10 g			
	Salt	Sugar	Pepper
Actual Weight			
Notes:			

Target Weight – 125 mg (0.125 g)			
	Salt	Sugar	Pepper
Actual Weight			
Notes:			

Target Weight – 10 mg (0.01 g)			
	Salt	Sugar	Pepper
Actual Weight			
Notes:			

Target Weight – 100 µg (.0001 g)			
	Salt	Sugar	Pepper
Actual Weight			
Notes:			

## Unit 2 – Volumes and Pipets

Goal: The goal of this unit is to gain experience at pipetting different volumes of water. You need to choose the correct pipette, the correct tip, and the right size vessel and aliquot out the required volume in duplicate. You will then weigh the vessel to see how accurate you have been. Record your results below.

Volume	Pipet	Tip (color)	Vessel (size/type)	Mass 1	Mass 2
10 $\mu$ l					
50 $\mu$ l					
100 $\mu$ l					
250 $\mu$ l					
1000 $\mu$ l					
5 mL					
25 mL					
100 mL					

## Unit 3 – Serial Dilutions and Volumetric Glassware

Goal: The goal of this unit is to provide an opportunity to demonstrate the ability to create simple dilutions by determining the correct pipet and volumetric glassware to complete the task. You will determine the volume of the initial aliquot of food coloring required and decide the final vessel in which the dilution will be combined in to hit the target dilution factor (DF). Record the initial aliquot(s) and final volume(s) of the choices you make on the 1<sup>st</sup> chart below. An asterisk (\*) indicates that a serial dilution must be used. This unit will be done in two parts. Part 1 will be using volumes and Part 2 will perform the same functions but use the mass of the aliquots and dilutions to calculate the final DF.

DF (target)	Initial Aliquot (ml)	Dilution Volume (ml)	DF Calculated
5			
10			
100			
1000			
2500* (dilution 1)			
2500* (dilution 2)			
10000* (dilution 1)			
10000* (dilution 2)			

DF (target)	Initial Aliquot (g)	Dilution Volume (g)	DF Calculated
5			
10			
100			
1000			
2500* (dilution 1)			
2500* (dilution 2)			
10000* (dilution 1)			
10000* (dilution 2)			