Basic laboratory techniques

1. Working with glass and automatic pipettes

a) Weigh an empty glass beaker and write down its mass (m_0) to the table below.

b) Using the 500µl automatic pipette, measure out 5 ml of distilled water into the beaker and weigh it again ($m_{5\,ml}$).

c) Subtract the weights ($m_{5\,ml} - m_0$) and write the difference ($x_{i=1}$) to the table.

d) Empty the beaker and repeat the procedure four more times.

Write all the results to the following table:

i	m_0	m_{5ml}	$x_i = m_{5ml} - m_0$	$\bar{x}$	$\Delta = (x_i - \bar{x})$	Δ^2
1						
2						
3						
4						
5						

n .... number of measurements $\bar{x} = \dfrac{\sum x_i}{n}$ ....arithmetic mean

$s = \sqrt{\dfrac{\sum \Delta^2}{n-1}}$ .... standard deviation

e) Repeat the whole procedure using a 1ml glass pipette. Write the results again to the table:

i	m_0	m_{5ml}	$x_i = m_{5ml} - m_0$	$\bar{x}$	$\Delta = (x_i - \bar{x})$	Δ^2
1						
2						
3						
4						
5						

Task: Calculate the arithmetic mean and the standard deviation of your weight measurement.