Chapters 1 and 2

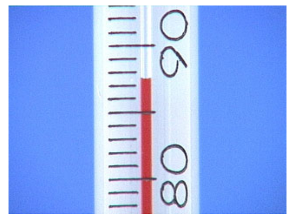
Quantitative Analysis:

Qualitative Analysis:

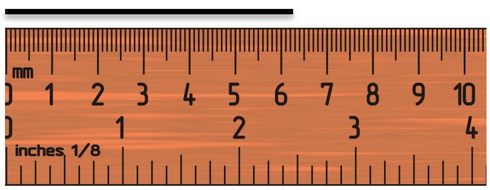
An analytical chemist does both of these.

Rule of thumb for reading volume with gradations

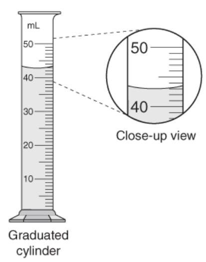
Thermometer:



Ruler:

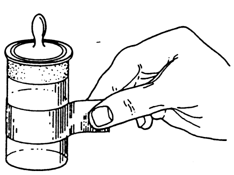


Graduated Cylinder:



Some important tools you'll use in quant lab

Weighing Bottle:



Ribbed watch glasses, oven mitt

Micro Spatula:

Dessicator:

Scooping spatula:

Dessicant:

Measuring Mass

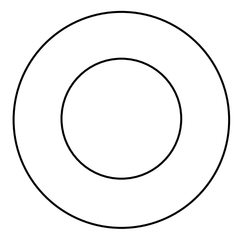
<u>Analytical Balance</u>

Weighing by difference:

Measured in g ____________ Measured in mg ________________

To calibrate:

- Check the leveling bubble before taring.



<u>Top Loading Balance</u>

Measuring Volume

Glassware: Why glass?

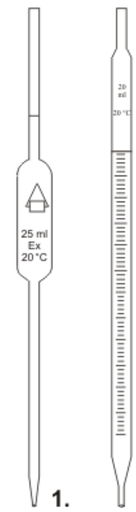
TD vs. TC

To ***calibrate*** a piece of glassware or other measurement instrument means

We often use to calibrate our glassware:

No piece of glassware is perfect, but   is most precise.

Pipet



To rinse:

Class A Transfer pipet

In lab you will use your 10-mL pipet to transfer water into a small beaker and weigh it on the analytical balance.

Sample data: Volume:

Mass:

What is the true volume of the pipet, based on the mass measurement? To answer this you'll need to convert mass to volume (p. 48). That depends on the temperature. Let's use the value for 20 °C:

Is this within the accepted tolerance (p. 44) for a Class A 10-mL pipet?

The "real rule" of significant figures:

This data is from page 44 of your book:

Nominal volume of pipet (mL)	Tolerance (mL)	Volume of pipet with correct significant figures (mL)
1		
5		
10		
25		
100		

Mohr (measuring) Pipet:

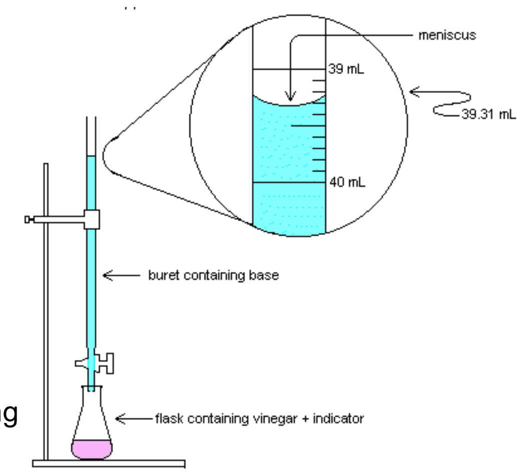
Don't blow the liquid out with your pipet bulb. Let gravity do its job, then touch the tip of the pipet into your container.

Micropipets:

The % accuracy for a 1000 μL micropipet measuring 1000 μL is _______.

When it is measuring 100 μL, it is _______.

Buret



To rinse:

Check stopcock:

- Be consistent in your readings
- Dispense any **air bubble** before taking your first reading
- Use your water bottle at the end of a titration

Reading a buret:

What is the tolerance for a 50-mL buret? (p. 41)

So every reading should have ________ digits after the decimal. Example:

We use burets to do ________________________.

Standardization titration: For example,

We are going to use a solution of ___________________ to titrate our unknown,

which contains ________________. So before we use the HCl solution, we need to

_______________________ it. To do this, we will titrate a “known”: __________

___________.

Example: A sample of 0.1855 g sodium carbonate (99.5% pure) is titrated with 36.29 mL of the HCl solution. What is [HCl]?

We use the ___________________________ ____________________ to determine the

___________________ in the unknown sample.

<u>Volumetric Flask</u>

- Don’t ever put a stirring bar in a volumetric flask. Never ever. Why?

  Then how do you mix something in a volumetric flask?

We use volumetric flasks to make solutions of known molarity. Again, using Class A flasks with small tolerances gives us more significant figures in our molarity, which is more precise. This table comes from p. 43 of your book.

Nominal volume of volumetric flask (mL)	Tolerance (mL)	Volume of volumetric flask with correct significant figures (mL)
10		
50		
100		
250		
1000		

How many grams of copper (II) sulfate pentahydrtge should be dissolved in a 250-mL volumetric flask to make a solution containing 8.00 mM Cu^{2+}?

What is the weight % of copper (II) sulfate in this solution? Assume the density of water = 1.00 g/mL.

What is 8.00 mM Cu^{2+} in ppm?

If you use a 10-mL pipet to dilute 0.1201 M HCl in a 250-mL volumetric flask, how would you do this? What would be the molarity of the dilution?

Homework: Chapter 1 # 8, 9, 11, 12, 14, 15, 18, 20
Chapter 2 # 10, 11, 12