

Metric System

mass – grams

volume – liters

Both are considered base units

Different prefixes can be used to change the order of magnitude

Kilo means 1000

1kg = 1,000 grams

Milli means 1/1000

1 g = 1,000 milligrams

*We will learn the rest of the prefixes in class

*We will also practice converting from one unit to another

Measurements – ideally want to use the most precise instrument that is available

Triple Beam Balance – measures mass

3 beams, each with a different sized weight

Make sure that when nothing is on the scale, the line on the beam must match up with the line next to the zero.

To weigh something, place it on the metal plate, then move the weights until the line on the beam matches up with the zero again.

@5:41 – misspoke – meant to say electronic balance

Electronic balance – will only give you whole number measurements.

For measuring volume

Different sized graduated cylinders (100ml, 50ml, and 10ml)

Use the 10ml cylinder for measuring out anything less than 10 ml

Use the 50ml cylinder for measuring out anything between 10 and 50ml

Use the 100ml cylinder for measuring out anything between 50 ml and 100ml

Significant Figures

- Show us how precise a measurement is
- Measurements include all known values plus one estimated value

12.5 ml → 3 sig figs

12 ml is *known*

.5 ml is *estimated*

Rules for Significant Figures

1. All non-zero numbers are significant.

273 g → 3 sig figs

2.5 ml →

2. All zeroes between non-zero numbers are significant.

102 g → 3 sig figs

110.5 ml →

3. Leading zeroes are NOT significant

.032 g → 2 sig figs

.00304 ml →

4. Trailing zeroes are significant ONLY if after a decimal.

.20 g → 2 sig figs

.0740 g →

0.0100 ml →

230 g →

230.0 g →

When adding/subtracting:

final answer must have the same number of decimal places as the initial value with the fewest decimal places.

$$372.5 + 12.25 = 384.75$$

Must round the answer to 384.8 to have the same number of decimal places as 372.5 (fewest number of decimal places)

When multiplying/dividing:

final answer must have the same number of sig figs as the initial value with the fewest sig figs.

$$23.123 \times 1.34 = 30.98482 \text{ (from calculator)}$$

Must determine how much you need to round based on the initial values

Round to 3 sig figs \rightarrow 31.0

All future calculations should reflect correct significant figures.

Remember – precision of measurements are dependent on the instrument being used.