Conversions

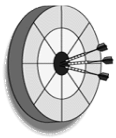
And Density Problems

Accuracy vs. Precision

- _____ – How close you are to the correct answer
- _____– How close your answers are together

For Example…

- Let's say we had the following dart board

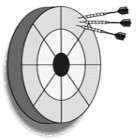


Is the accuracy good or bad? _____

Is the precision good or bad? _____

Try this one

- Let's say we had the following dart board

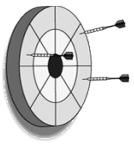


Is the accuracy good or bad? _____

Is the precision good or bad? _____

Try this one

- Let's say we had the following dart board



Is the accuracy good or bad? _____

Is the precision good or bad? _____

Dimensional Analysis

- _____ is just a big word for going from one unit to another.
- Have you ever converted inches into feet or years into days?
- If so, then you have done dimensional analysis

Dimensional Analysis

- **Dimensional Analysis** – method of problem-solving that focuses on _____
- _____ – a ratio of equal values used to go from one unit to another
  - Example: 1 foot = 12 inches
  - Can be written as $\frac{1 \text{ foot}}{12 \text{ inches}}$

Rules for Dimensional Analysis

1. **ALWAYS** start with the given!!!
2. Draw a multiplication sign and a line
3. Place the unit to be canceled on the bottom
4. Place a conversion factor on the line you have drawn
5. Cross out units and see what you have left.
6. You must have one on top & one on the bottom

Let's try an example…

Let' s convert 32.5 inches to feet.

Try this example…

- How many seconds are in 82.95 minutes?

What if you need to Change 2 Units?

Convert 65 miles per hour to kilometers per second

(0.625 miles = 1 Km)

Conversions with Prefixes

- Conversions with prefixes are done in exactly the same manner
- You just have to know the prefixes

Prefixes

Prefix	Symbol	Value
Giga	G	1×10^{9}
Mega	M	1×10^{6}
Kilo	K	1×10^{3}
Deci	d	1×10^{-1}
Centi	c	1×10^{-2}
Milli	m	1×10^{-3}
Micro	μ	1×10^{-6}
Nano	n	1×10^{-9}
Pico	P	1×10^{-12}
Femto	f	1×10^{-15}

Rules with Prefixes

- The rules are the same…
- Start with the given
- Place the cross out unit on the bottom
- Place conversion unit on top
- Keep crossing out until you get what you want

A few differences

- Always remember that _____ will go with your Prefix
- The number with in _____ will go with your base unit
- You can only go from a _____ to a _____ unit

Let's try one

- Convert 100 nm into m

Try this one…

- Convert 785 mm to km

Temperature Conversions

- The three units for measuring temperature are…
  - Celsius
  - Fahrenheit
  - Kelvin

To Convert Among Temperatures Use These Formulas

- ºF = 1.8 ºC + 32
- ºC = 0.56 (ºF – 32)
- K = ºC + 273

Try these examples

- Convert 35 °C to Kelvin

Example

- Convert 55 ºC to ºF

Example

- Convert 95.8 ºF to ºC

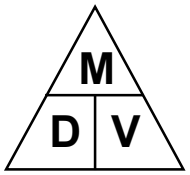
Example

- Convert 75.0 °F to Kelvin

Density

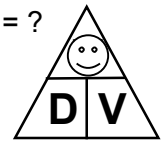
- Density **- mass per unit volume (g/cm^3)**

$$D = \frac{M}{V}$$



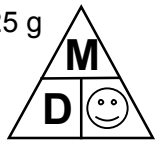
Density

- **An object has a volume of 825 cm^3 and a density of 13.6 g/cm^3. Find its mass.**

GIVEN:	WORK:
V = 825 cm^3 D = 13.6 g/cm^3 M = ? 	

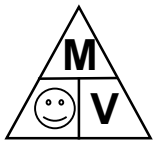
Density

A liquid has a density of 0.87 g/mL. What volume is occupied by 25 g of the liquid?

GIVEN:	WORK:
D = 0.87 g/mL V = ? M = 25 g 	—

Density

You have a sample with a mass of 620 g & a volume of 753 cm^3. Find density.

GIVEN:	WORK:
M = 620 g V = 753 cm^3 D = ? 	—

Density

- Density is that it is an _____ property
- That means that the density of a substance is the same regardless of _____
- If you find the density of an unknown material, you can look it up in a density chart to find its identity

Density

- I have a block that measures 5.25 cm by 2.25 cm by 8.50 cm.
- I weigh the block and find its mass to be 5.85 g
- Calculate the density of the block in g/cm^3

What of you have an odd shaped object?

- The density of an odd shaped object can be found by the same equation
- To find the mass, you just _____ the odd shaped object
- To find the volume, you place water in a _____ and get an initial volume
- Then you place the object into the _____.
- The volume of the object is the _____ in the two volumes

For example

- A chunk of metal has a mass of 5.25 g. It is placed in a graduated cylinder containing 25.0 ml of water. Once the metal is placed in the graduated cylinder, the water rises to 38.2 ml. What is the density of the metal?