

Grade 11 NTI Day #10 Chemistry

Please do the following:

(1) Watch this youtube video:

https://www.youtube.com/watch?v=ysai7aH6juI&list=PL5wpmHJhOEi_uGI_V8tbHMe-Ep6qyZh-p&index=3

(2) Review the slidedeck/presentation (see below). It will match the video presentation above.

(3) Complete the question sheet below the slidedeck at the end of this document.

If you have any questions, please email me: tyler.hampton@pineville.kyschools.us . This assignment is on Google Classroom. **Please turn it in through Google Classroom.** While you are there, make sure to sign the sign-in sheet. The assignment is also on the school homepage <https://www.pineville.kyschools.us/>. Go to the tab that says, "NTI". Then go to the appropriate day. **However, please turn in the assignment through Google Classroom, even if you access it through the school website.**

Day 1 - Notes

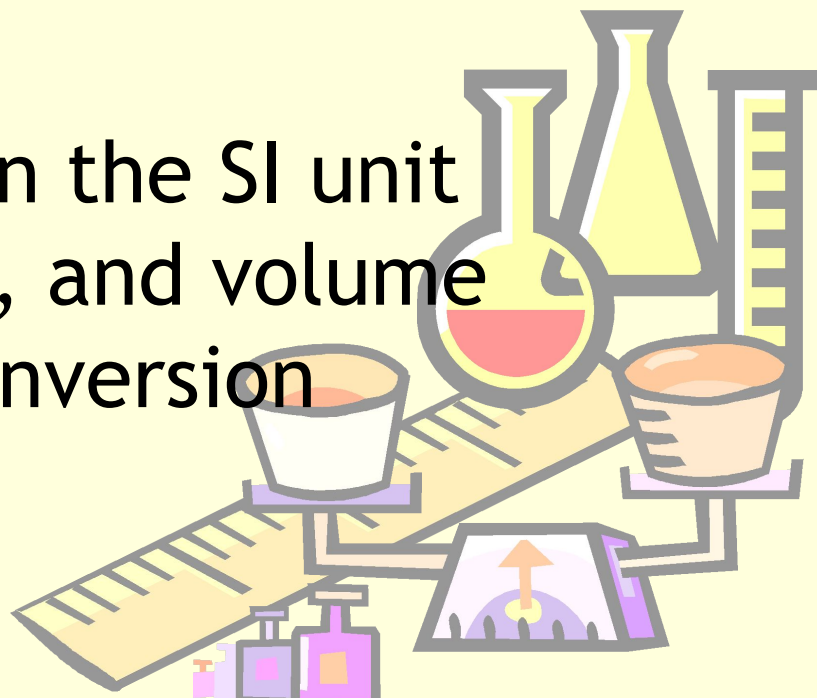
Unit: Dimensional Analysis

Introduction to Dimensional Analysis



After today, you should be able to...

- Explain what dimensional analysis is and how it is used in chemistry
- Solve one and two step conversions using dimensional analysis
- Use the appropriate conversion factors to modify base units
- Identify the units used in the SI unit system for length, mass, and volume
- Use prefixes to write conversion factors (ex: centi-)



Dimensional analysis: *A method used to convert units.*

- Uses “conversion factors”

60 minutes = 1 hour

24 hours = 1 day

100 cm = 1 m

12 in = 1 ft

16 oz = 1 lb



Important Measurement Prefixes

Base Units

Mass in grams (g)
Volume in liters (L)
Length in meters (m)

Prefix	Symbol	Meaning	Example
Mega-	M	1,000,000	1Mm = 1,000,000m
Kilo-	k	1,000	1kL=1000L
BASE UNITS			
Deci-	d	0.10	1m = 10dm
Centi-	c	0.010	1L=100cL
Milli-	m	0.0010	1g=1000mg
Micro-	μ	1×10^{-6}	1m=1x10 ⁶ μ m

BIG PREFIXES

SMALL PREFIXES



Important Measurement Prefixes

Base Units

Mass in grams (g)

Volume in liters (L)

Length in meters (m)

Helpful hint: **Always**
put the “1” with
the **BIGGER UNIT!**



BIG PREFIXES

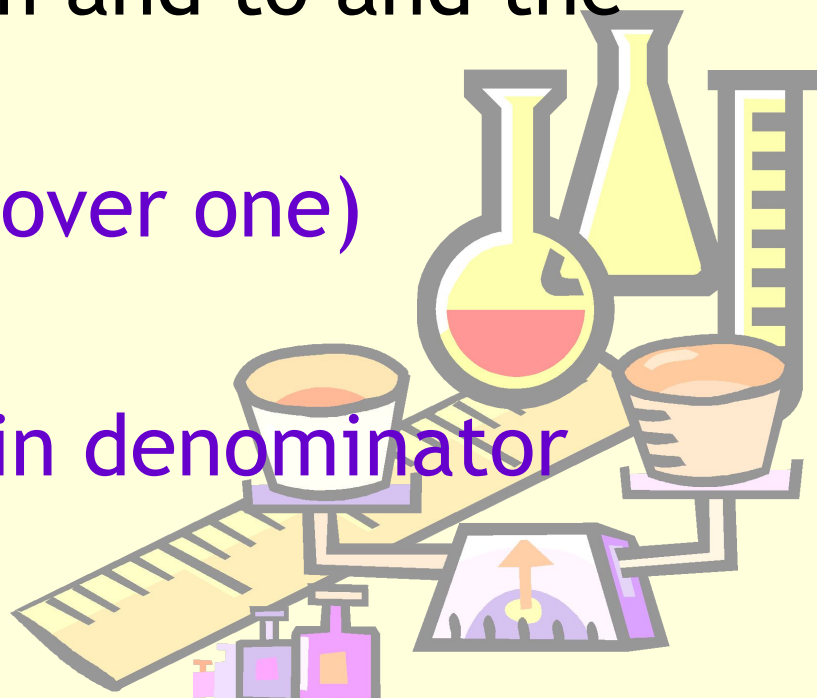
SMALL PREFIXES

Centi-			
Milli-			
Micro-			



Steps for Dimensional Analysis

1. Write the “*K:*” and the “*U:*” (K is what you KNOW, U is what you are trying to FIND)
2. Write out your *plan* (write out the units you are converting from and to and the conversion factors)
3. Write your *known* (put over one)
4. Write “ *x* _____ ”
5. Write the *known units in denominator*



Example

How many cm are in 2.7m?

K: 2.7m

U: ? cm

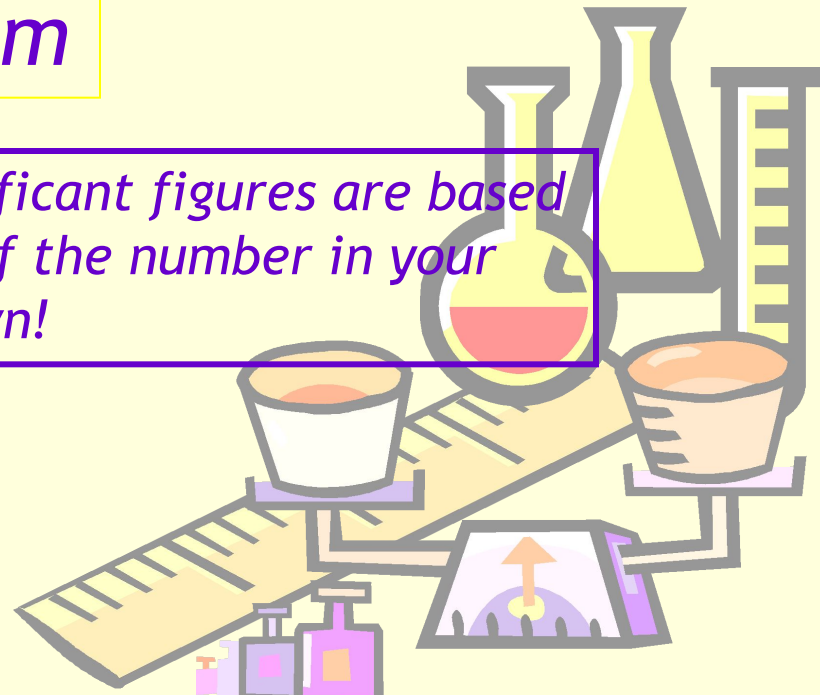
“The plan” $m \rightarrow cm$
 $1m = 100cm$

Recall, the bigger unit
always gets the “1.”

$$\frac{2.7\cancel{m}}{1} \times \frac{100\cancel{cm}}{1\cancel{m}} = 270cm$$

*Notice, the units that you
don't want need to cancel to
leave the units that you do!*

*Significant figures are based
off of the number in your
known!*



Example

How many feet are equal to 54.7in?

K: 54.7in

*“The plan” in → ft
12in = 1ft*

U: ? ft

$$\frac{54.7\cancel{\text{in}}}{1} \times \frac{1\cancel{\text{ft}}}{12\cancel{\text{in}}} = 4.56\text{ft}$$



Example (2 steps)

How many kg are equal to 45,000 mg?

K: 45,000mg

U: ? kg

“The plan” mg → g → kg
1000mg=1g 1000g=1kg

$$\frac{45,000\cancel{\text{mg}}}{1} \times \frac{1\cancel{\text{g}}}{1000\cancel{\text{mg}}} \times \frac{1\text{kg}}{1000\cancel{\text{g}}} = 0.045\text{kg}$$

Whenever you go from a prefix to another prefix
this will ALWAYS have TWO conversion factors!
YOU MUST GO THROUGH THE BASE UNIT!





Failure to use
Dimensional
Analysis on homework,
quizzes, tests, and the
like, will result in a ZERO
for these assignments.



Questions?

Begin Worksheet #1



Day #10 Questions

Multiple-Choice Questions

1. What is dimensional analysis primarily used for in chemistry?
 - a) Measuring the mass of substances
 - b) Converting between units using conversion factors
 - c) Calculating chemical reaction rates
 - d) Measuring the accuracy of experiments

2. Which prefix represents 1/1,000th of a unit?
 - a) Centi-
 - b) Milli-
 - c) Micro-
 - d) Deci-

3. If there are 1,000 milligrams in a gram, how many grams are in 45,000 milligrams?
 - a) 4.5 g
 - b) 45 g
 - c) 0.045 g
 - d) 450 g

Short Answer Question

4. Why is it important to always use dimensional analysis in this chemistry class? Provide one example of a situation where it would be necessary.