Mrs. Farmer's Example Composition Notebook Honors Chemistry

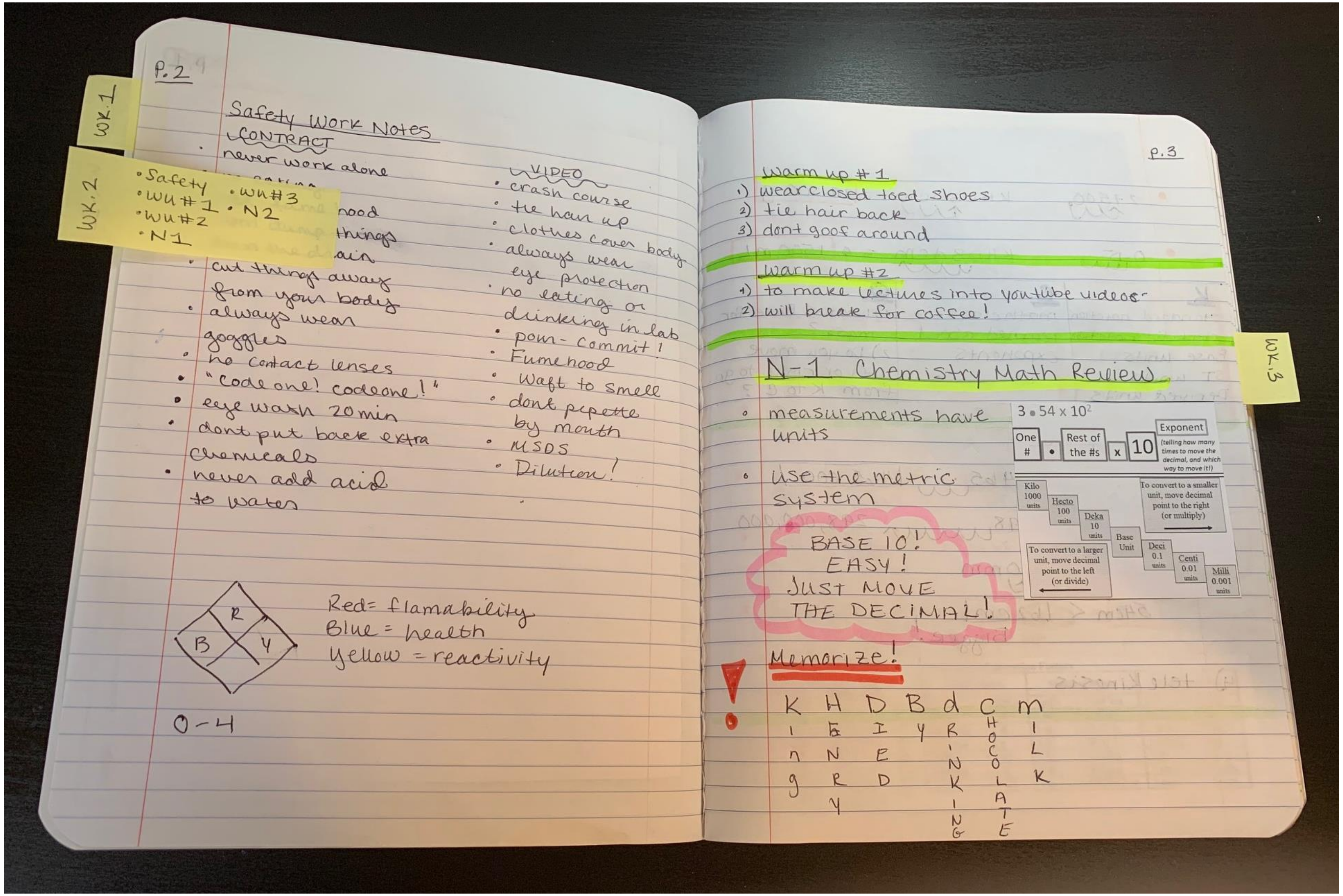
Please note

This is just an example of what your notebook should look like. Yours may have different warmups, different notes – depends on the year. Please use this as a general guide only. Read the reference sheets in your 3-ring binder for more specifics

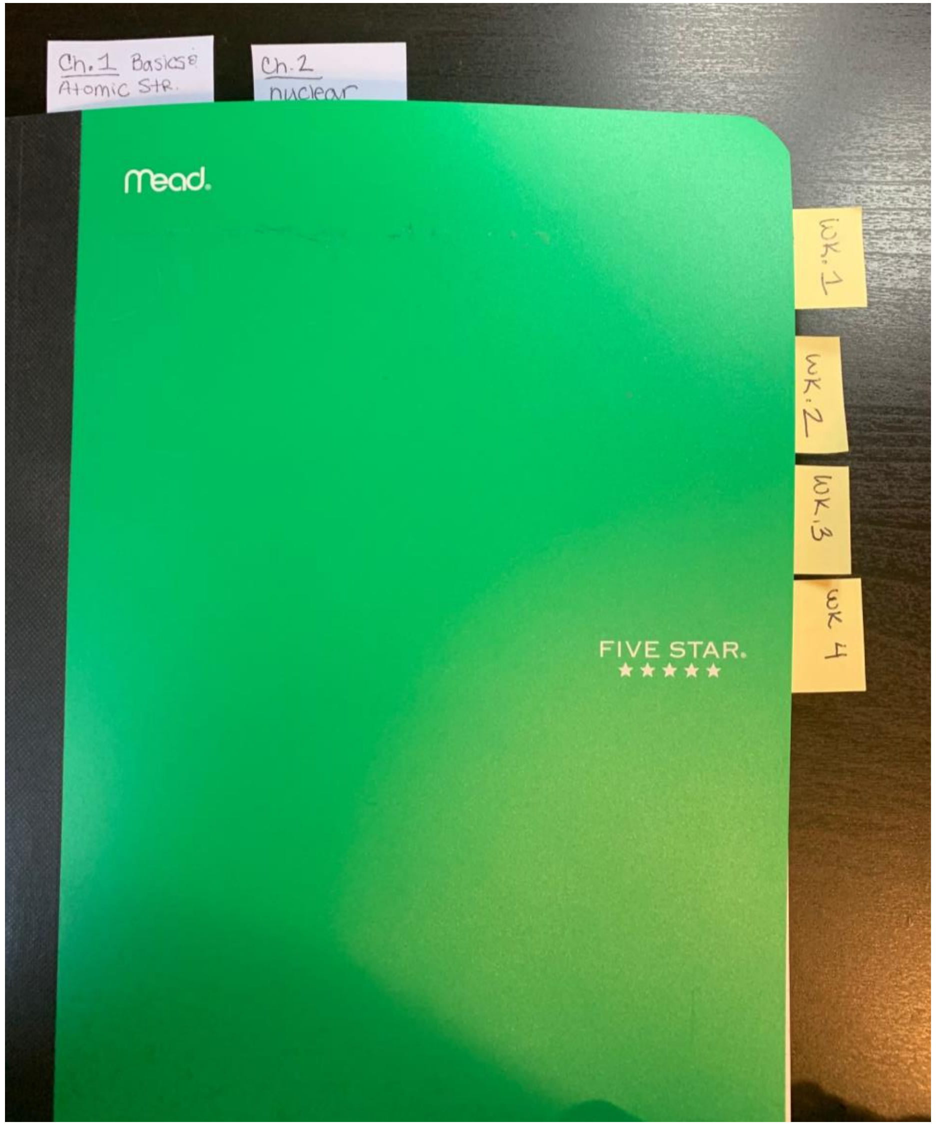
All About Me Page 1

Safety Work Page 2

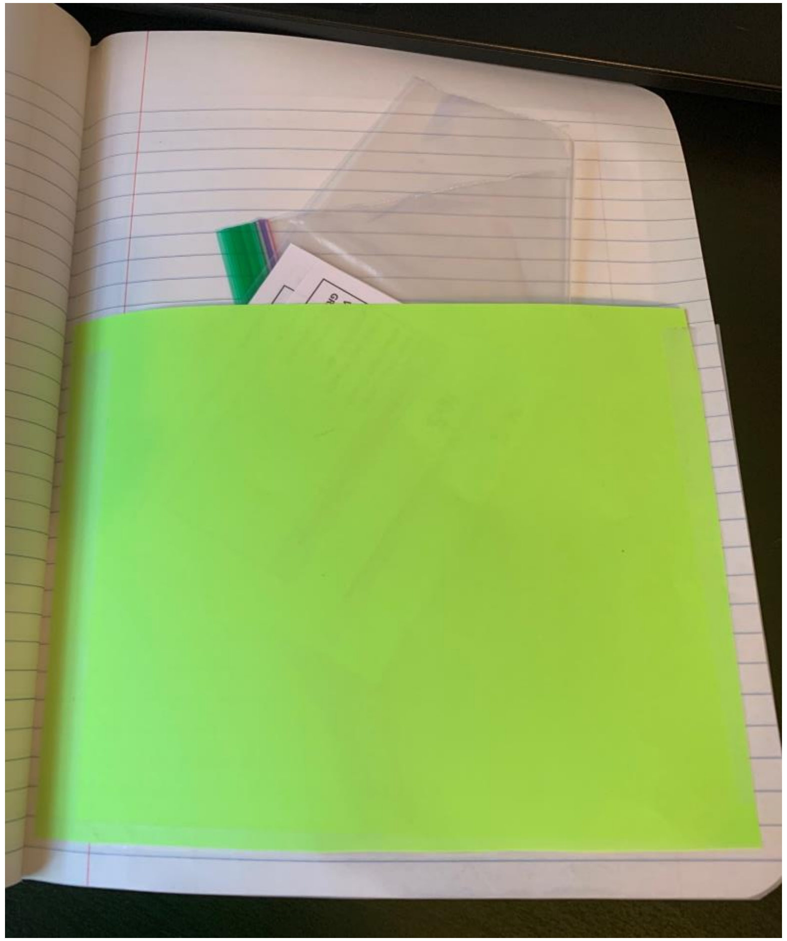
First Warmup Page 3

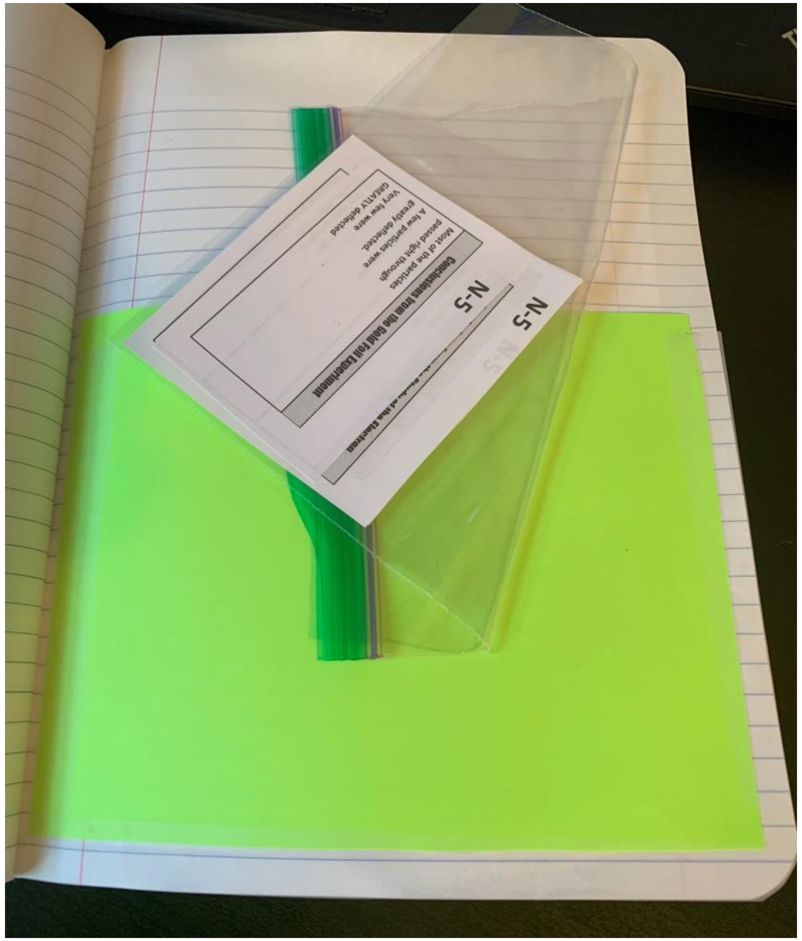


Feel Free to add tabs, bookmarks, etc to your notebook! Make it work for you!

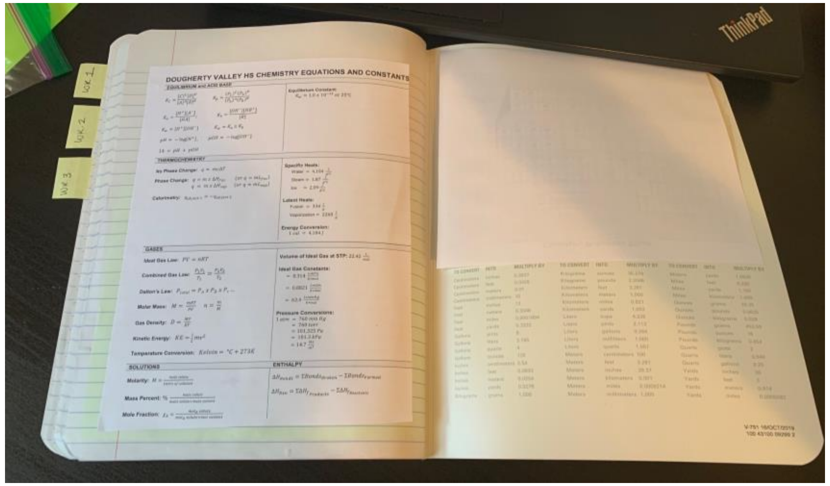


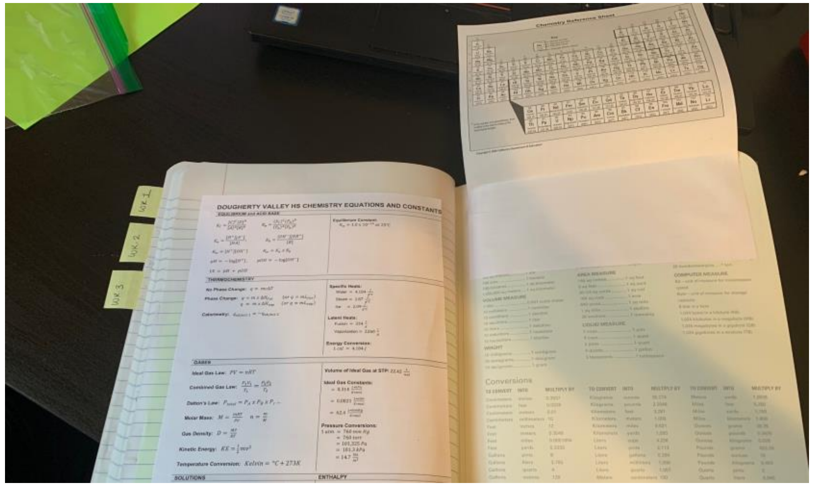
I like to make a pocket in the back to hold a little ziplock bag filled with my Glue Ins for my notes. That way I can print them all at once, cut them to size, and not lose them!

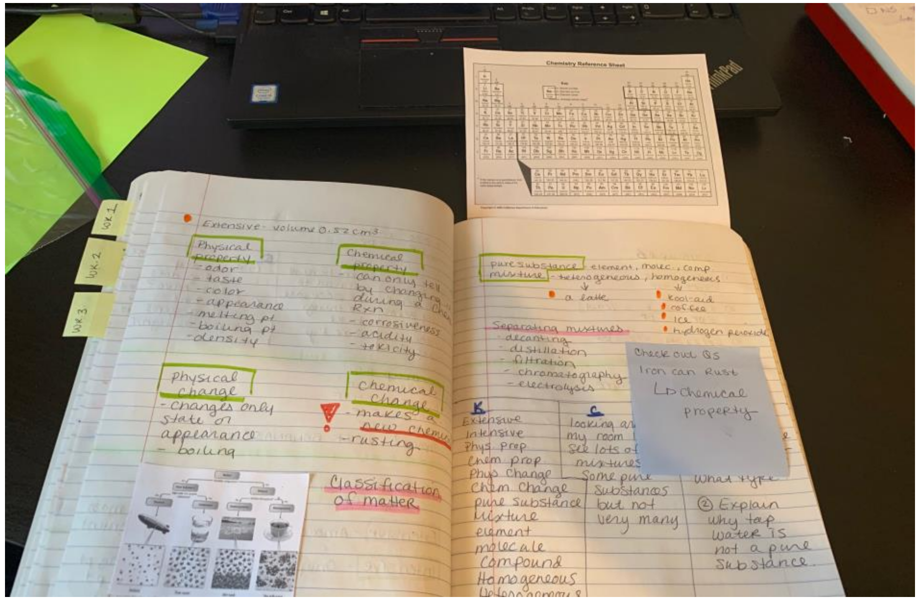




I like to print a small periodic table (you can shrink it down to 75% in the print menu) and then I glue/tape it onto the back inside cover so it flips out of my notebook! Very handy!







The next set of slides are just examples of the first few weeks of warmups and notes. Try to look for the following things.

- Large clear numbering and titles on warmups and notes.
- Highlighter lines separating the different assignments.
- Warmups have numbered questions, show all your work not just an answer!
- Space left in the notes around important points – do not crowd your notes! We have lots of space in our notebooks, use it!
- You can just start the next assignment directly under the highlighter divider – you do not need to start on a new page!

The next set of slides are just examples of the first few weeks of warmups and notes. Try to look for the following things.

- Color Annotations adding a minimum of three additional colors to the notes.
- Color Annotations done in a meaningful way – I didn't just scribble the background or highlight every word a different color.
- More is not always better!
- Be careful to not focus on "decorating" or "coloring" your notes – you are supposed to be doing color "annotations." Sometimes people have beautiful notes but they spent more time on what they look like than thinking about what the notes say!

The next set of slides are just examples of the first few weeks of warmups and notes. Try to look for the following things.

- KCQ Boxes added to the end of each set of notes
- Make the boxes fit the work that needs to be in them, don't draw the boxes and then squeeze in the information! Use as much space as needed.
- All key terms, not just words that're new to you!
- Connections can be to previous classes, things you saw on TV etc – but they should be specific. Don't just write "7^{th} grade"
- Questions – two questions, one lower level, one higher level. You do not have to answer them!

WK.1

WK.2
- Safety
- wu#1
- wu#2
- N1
- wu#3
- N2

Safety Work Notes

CONTRACT
- never work alone
- [illegible]
- [illegible] hood
- [illegible] things
- [illegible] drain
- cut things away from your body
- always wear goggles
- no contact lenses
- "code one! codeone!"
- eye wash 20 min
- dont put back extra chemicals
- never add acid to water

VIDEO
- crash course
- tie hair up
- clothes cover body
- always wear eye protection
- no eating or drinking in lab
- pom-commit!
- Fumehood
- Waft to smell
- dont pipette by mouth
- MSDS
- Dilution!

Red= flamability
Blue = health
Yellow = reactivity

0-4

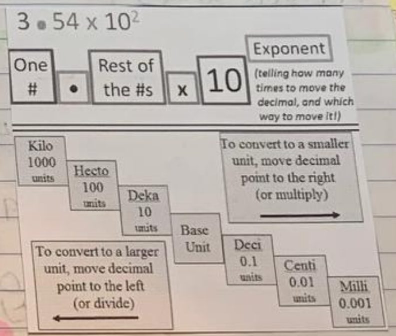
WK.3

Warm up #1
1) wear closed toed shoes
2) tie hair back
3) dont goof around

Warm up #2
1) to make lectures into youtube videos
2) will break for coffee!

N-1 Chemistry Math Review

- measurements have units
- use the metric system



BASE 10! EASY! JUST MOVE THE DECIMAL!

Memorize!

K H D B d c m

King HENRY DIED BY DRINKING CHOCOLATE MILK

WK.1

WK.2

Check Out Qs

48.5 KHDBdcm

48500mg

13,500

1.35×10^4

m = 27.500 g

cm = 1500 mL

K

standard

scientific notation

Base units

SI units

Derived units

exponents

Q

1) What is Base for mass?

2) Do you move left or right to go from K to C?

Warmup #3

1) KHDBdcm 465 → 465,000

2) KHDBdcm 298 → 298,000,000

3) 54 cm vs 620 mm

54cm < .62 cm

Bigger!

4) teleKinesis

N2 - Dimensional Analysis

also known as unit conversion

$\frac{15\ cm^3}{5\ cm} = 3\ cm^2$ top & bottom cancel out

Conversion factors

12 in = 1 ft $\frac{12\ in}{1\ ft} = 1$

CAN FLIP CONVERSION FACTORS!

$\frac{12 in}{1 ft}$ $\frac{1 ft}{12 in}$

WK.3

- $85\ in \times \frac{1\ ft}{12\ in} = 7.1\ ft$
- $3.6\ mi \times \frac{5280\ ft}{1\ mi} \times \frac{12\ in}{1\ ft} \times \frac{1\ cm}{0.3937\ in} = 5.8 \times 10^5\ cm$
- $15\ yrs \times \frac{365\ d}{1\ yr} \times \frac{24\ hr}{1\ d} \times \frac{60\ min}{1\ hr} = 7.9 \times 10^6\ min$
- 15 yrs | 365 d / 1 yr | 24 hr / 1 d | 60 min / 1 hr = 7.9×10^6 min

LINE M

DOUBLE/

Fix the

Fix the

FLIPPY!

Some Useful Conversion Factors

Metric to Metric		English to Metric		English to English	
1 km	= 1000 m	1 mile	= 1.609 km	1 ft	= 12 in
100 cm	= 1 m	1 in	= 2.54 cm	1 yd	= 3 ft
1000 mm	= 1 m	1 m	= 39.37 in	1 mile	= 5280 ft
1000 mg	= 1 g	1 ft^3	= 28.32 L	1 gallon	= 4 qt
1000 g	= 1 kg	1 L	= 1.057qt	1 lb	= 16 oz
1000 ml	= 1 L	1 lb	= 453.6 g	1 quart	= 4 cups
1 cm^3	= 1 ml	1 g	= 0.03527 oz	1 pint	= 2 cups

WK.1
WK.2
WK.3
• WU#4 • WU#6
• N3 • N5
• WU#5
• N4

☑ FIX TOP 1ST
☑ FIX BOTTOM 2ND

• 20 mi / 1 hr | 5280 ft / 1 mi | 12 in / 1 ft | 1 hr / 60 min | 1 min / 60 sec = 352 in/sec

• 30 km / 1 d | 1000 m / 1 km | 39.37 in / 1 m | 1 d / 24 hr | 1 hr / 60 min = 820 ft/min

cubed units

• $5\,in^2 \mid \frac{(2.54\,cm)^2}{(1\,in)^2} = 32.258\,cm^2$

! when square/cube/etc you need to do it to the # & the unit

K	C	Q
Dimensional Analysis unit conversion Line method Double/derived	in Algebra you cancel units all the time	① what is the conv factor to go from mi to km? ② when do you use derived units?

warm up # 4

1) 100.12 ft | 12 in / 1 ft | 2.54 cm / 1 in = 3051.7 cm

N3 - Significant figures

Nonzero Integers	ALWAYS COUNT as SIGNIFICANT	3456 4 sig figs
Leading Zeros	NEVER COUNT as SIGNIFICANT	0.0486 3 sig figs
Captive Zeros	ALWAYS COUNT as SIGNIFICANT	16.07 4 sig figs
Trailing Zeros	AFTER A DECIMAL ALWAYS COUNT as SIGNIFICANT	9.300 4 sig figs
SOMETIMES COUNT as SIGNIFICANT	NO DECIMAL NEVER COUNT as SIGNIFICANT	9300 2 sig figs
Exact Numbers	INFINITE NUMBER of sig figs ∞	1 in = 2.54 cm 12 in = 1 ft
Multiplication & Division	Answer based on LEAST number of SIG FIGS in the problem	6.38 x 2.0 = 12.76 → 13 2SF
Addition & Subtraction	Answer based on LEAST number of DECIMAL PLACES in the problem	6.8 + 11.934 = 18.734 → 18.7

■ signif.
■ type of # or zero
SF
DP

measurements are uncertain

Accuracy - how close to real value
Precision - how consistent

• 1.0070 5 sig figs
• 17.10 4 sig figs

- 100,890 5 sig figs
- 3.29×10^3 3 sig figs
- 0.0054 2 sig figs
- 3,200,000 2 sig figs
- 0.0056030 5 sig figs
- 3.24 m × 7.0 m = 23 m^2
  3SF 2SF
- 100.0 ÷ 23.7 = 4.22 g/cm^3
  4SF 3SF
- 0.02 cm × 2.371cm = 0.05 cm^2
  1SF 4SF
- 710 ÷ 3.0 = 240 m/s
  2SF 2SF

× / ÷ Count Sig figs

- 3.24 + 7.0 = 10.2
  2DP 1DP
- 0.02 + 2.371 = 2.39
  2DP 3DP

+ / − count Decimals!

- 2.030 − 1.870 = 0.160
  3DP 3DP

K	C	Q
sig figs leading zeros captive zeros trailing zeros Exact #'s Accuracy precision	when baking you need to be accurate so things bake correctly	① How many sig figs does 1.040 have? ② Why dont leading zeros count as signif.

warm up #5

1) 5.7020 = 5 SF
2) 0.004005 = 4 SF
3) 500.43 = 5 SF
4) 8300 = 2 SF
5) Apples! NEVER BANANAS! ew!

N4 - Properties, Changes, types of matter

Extensive - Amount matters / volume, mass energy content

Intensive - Only type matters - melting pt Boiling pt density

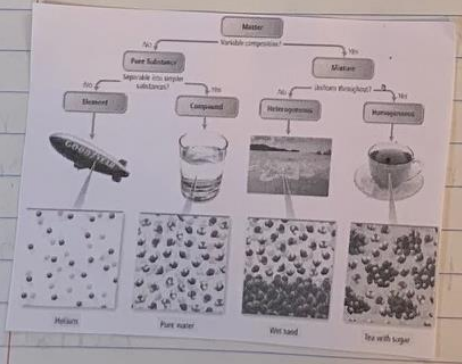
- Extensive - volume 0.52 cm^3

Physical property
- odor
- taste
- color
- appearance
- melting pt
- boiling pt
- density

Chemical property
- can only tell by changing it during a Chem. Rxn
- corrosiveness
- acidity
- toxicity

physical change
- changes only state or appearance
- boiling

chemical change
- ! makes a new chemical
- rusting



Classification of matter

pure substance - element, molec., comp.
mixture - heterogeneous, homogeneous

heterogeneous ↓
- a latte

homogeneous ↓
- kool-aid
- coffee
- ice
- hydrogen peroxide

Separating mixtures
- decanting
- distillation
- filtration
- chromatography
- electrolysis

K	C	Q
Extensive intensive Phys. prop. chem. prop. Phys. change Chem. Change pure substance Mixture element molecale Compound Homogeneous Heterogeneous	looking around my room I can see lots of mixtures, & some pure substances but not very many	① is salt water a pure substance or a mixture? What type? ② Explain why tap water is not a pure substance.

WK.1
WK.2
WK.3

Warmup #6

1) 4.25 x 4.555 = 19.4
(3SF) 4SF

2) 8.345 + 21.6 = 29.4
3 DP (1 DP)

3) 62/27.44 = 12.3 SF
(2SF) 4SF

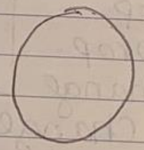
N5- Atomic Structure

N-5

Dalton's Atomic Theory (1808)

#	Postulate	✓ or X
1	All matter composed of extremely small particles called atoms	✓
2	Atoms of a given element are identical in size, mass, and other properties	X
3	Atoms of different elements differ in size, mass, and other properties	✓
4	Atoms cannot be subdivided, created, or destroyed	X
5	Atoms of different elements combine in simple whole-number ratios to form chemical compounds	✓
6	In chemical reactions, atoms are combined, separated, or rearranged	✓

Dalton's
Billiard ball
model

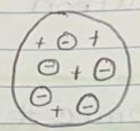


N-5 electron

Conclusions from the Study of the Electron

Cathode rays have identical properties regardless of element used	All elements have same charge e⁻s
Atoms are neutral	Atom must have + particles b/c e⁻ are negative
Electrons have very little mass compared to the atom's mass	Atoms must have heavier particles too

Thomson's
Plum pudding
model

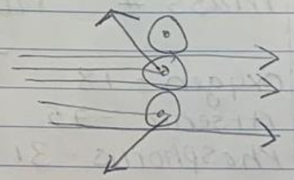


N-5 NUCLEUS

Conclusions from the Gold Foil Experiment

Most of the particles passed right through	nucleus small
A few particles were greatly deflected.	nucleus is dense, +
Very few were GREATLY deflected	mostly empty space

Rutherford's
gold foil
experiment



Bohr model

Rutherford's
model

Quantum model

WK.1
WK.2
WK.3

Atomic Particles

Particle	Charge	Mass	location
electron	-1	Ø	electron cloud
proton	+1	1	nucleus
Neutron	Ø	1	nucleus

Atomic # = # protons

element	# P	Atomic # (Z)
C	6	6
P	15	15
Au	79	79

Mass # **mass # = #p + #n**

	p	n	e^-	mass #
Oxygen - 18	8	10	8	18
Arsenic - 75	33	42	33	75
Phosphorus - 31	15	16	15	31

! # protons determines the identity
↳ the name

Ions **change # e^-**

cation	lost e^-	$P > e$	+	Ca^{2+}
Anion	gained e	$P < e$	−	N^{3-}

Isotopes - **same #p, different #n**
! ∴ same name! ∴ different mass!

Average Atomic Mass

C-12	6p 6n	98.89%	
C-13	6p 7n	1.11%	
C-14	6p 8n	< 0.01%	

} on Periodic table weighted Average
↓
C = 12.011

K	C	Q
Dalton Thomson Cathode Ray Rutherford Bohr Quantum nucleus electron Proton Atomic # Mass # Ion Cation Anion Isotopes Average Mass	Isotopes are used in dating fossils. We did bohr models in middle School	① who discovered the nucleus? ② explain what was wrong with Daltons model

WK.1

WK.2

WK.3

WK 4
- WU#7
- N6
- WU#8
- WU#9
- N7

Warm up #7

Copper

1) Z = 29   63 - 29 = **34 neutrons**
   A = 63

N6- Average Atomic Mass Calcs.

Weighted Average

12.011 → C-12, C-13, C-14
most is C-12

% Abundance

…ss = (mass #1 * % Ab.#2)
 + (mass#2 * %Ab #2)
 + (mass#3 * %Ab#3)

DECIMAL FORM

Mg-24	23.99	x	78.99%	=	18.9497
Mg-25	24.99	x	10.00%	=	2.499
Mg-26	25.99	x	11.01%	=	+ 2.861499

IN DECIMAL FORM!

24.31 on periodic table

Finding % Abundance

(x) = %Ab #1
(1-x) = %Ab #2

b/c #1 + #2 = 100%
↓
1 in decimal form!

B-10 = 10.013 (x)
B-11 = 11.009 (1-x)
Avg mass = 10.81

10.81 = (10.013)(x) + (11.009)(1-x)

B-10 = x = 0.1998 * 100 = 19.98%
B-11 = 1-x = (1-0.1998) * 100 = 80.02%

K	C	Q
Weighted Avg. % Abundance	we take averages of so many things in life, but not usually weighted Avg	① what is the Avg. mass of Iron? ② why would you use Avg. mass & not mass # during a lab experiment?

WK.1

WK.2

WK.3

WK.4

warmup #8

54 * 0.05845
56 * 0.91745
57 * 0.02119
+ 58 * 0.00282

55.9 amu !

warm up #9

Study notes - however you want

Scratch paper for Unit Wrap up go formative Assessment

N7 - Nuclear Chem

Study of changes to atomic nuclei

$^{14}_{6}C$

! large amt energy released !

Chemical Reactions	Nuclear Reactions
Occur when bonds are broken	Occur when nuclei emit particles and/or rays
Atoms remain unchanged, although they may be rearranged	Atoms often converted into atoms of another element
Involve only valence electrons	May involve protons, neutrons, and electrons
Associated with small energy changes	Associated with large energy changes
Reaction rate influenced by temperature, particle size, concentration, etc.	Reaction rate is not influenced by temperature, particle size, concentration, etc.

N-7

Particle	Symbol	Composition	Charge	Mass
Alpha	$^{4}_{2}He$ α	Helium Nuclei	+2	4 amu
Shielding	**Approx. Energy**	**Penetrating Power**	**Change to Mass #**	**Change to Atomic #**
Paper Clothing	5MeV	Low 0.05mm body tissue	-4	-2
Particle	**Symbol**	**Composition**	**Charge**	**Mass**
Beta	e^{-} β	Like an electron	-1	1/1837th amu basically 0
Shielding	**Approx. Energy**	**Penetrating Power**	**Change to Mass #**	**Change to Atomic #**
Aluminum foil	0.05-1MeV	Moderate 4mm body tissue	0	+1
Particle	**Symbol**	**Composition**	**Charge**	**Mass**
Gamma	γ	High energy electromagnetic radiation	0	0
Shielding	**Approx. Energy**	**Penetrating Power**	**Change to Mass #**	**Change to Atomic #**
Lead Concrete	1MeV	High Penetrates easily	0	0

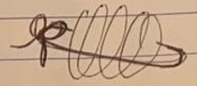
Proton	Neutron	Positron
$^{1}_{1}p$	$^{1}_{0}n$	$^{0}_{+1}e$

Fission = splitting

Fusion = combining

Stable	marginal	unstable
# 1-20	# 21-82	# > 82
1:1 ratio	1:1.5	> 1:1.5
p:n	p:n	p:n
C-12	Hg-200	uranium
6:6	80:120	plutonium

Strong force - Keeps nuclei together!



Strong force analogy: Rope tied around a spring

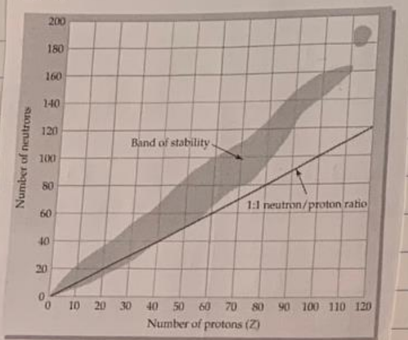
WK.1

WK.2

WK.3

WK.4

N-7



Parent = starting atom

Daughter = ending atom

α = Helium nucleus → atomic # goes down

β = like an e^-

neutron → β, new proton → atomic # goes up

positron = like β but +

proton → $^{0}_{+1}e$, neutron → atomic # goes down

γ = energy, no change to #'s

- $^{210}_{84}Po \rightarrow {}^{4}_{2}He + {}^{206}_{82}Pb$
- $^{226}_{88}Ra \rightarrow {}^{4}_{2}He + {}^{222}_{86}Rn$
- $^{97}_{40}Zr \rightarrow {}^{0}_{-1}e + {}^{97}_{41}Nb$
- $^{14}_{6}C \rightarrow {}^{0}_{-1}e + {}^{14}_{7}N$

neutron bombardment

$(2 \times 1) + 235 = 237$ | $(3 \times 0) + 237 = 237$

- $2\,{}^{1}_{0}n + {}^{235}_{92}U \rightarrow 3\,{}^{0}_{-1}e + {}^{237}_{95}Am$

$(2 \times 0) + 92 = 92$ | $(3 \times -1) + 95 = 92$

electron capture

$0 + 218 = 218$ | $218 + 0 = 218$

- $^{0}_{-1}e + {}^{218}_{85}At \rightarrow {}^{218}_{84}Po + \gamma^{0}_{0}$

$(-1) + 85 = 84$ | $84 + 0 = 84$

WK.1

WK.2

WK.3

WK.4

K	C	Q
nuclear chem fusion fission Strong force band of Stability Parent daughter α, β, γ positron neutron bombardment e- capture	In history we learned about nuclear bombs in WWII writing nuclear eq's is just algebra!	① What are the symbols for α, β, γ? ② Why are some nuclei unstable & some are stable?