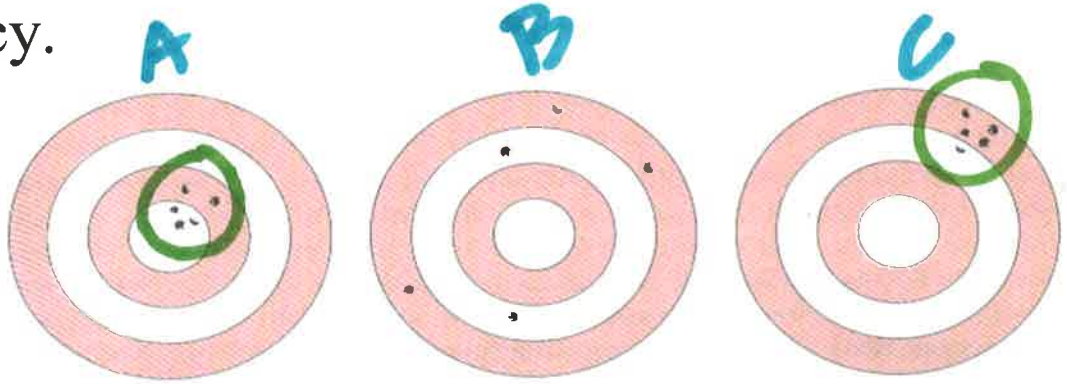
Chapter 1-3 Review

1. Label these diagrams with low or high precision and low and high accuracy.



A. high precision, moderate accuracy

B. low/no precision, low/no accuracy

C. high precision, low accuracy

precision: consistent

accuracy: correct

Chemistry: Study of matter and the changes it undergoes.

2. Define the 5 branches of chemistry in your own words:

a. organic - Study of carbon containing compounds

b. inorganic - study of non-carbon containing compounds

c. biochemistry - study of chem in living organisms

d. physical - study of mechanisms, rates, & energy transfers

e. analytical - study of what makes stuff up (chemical composition)

3. What measurements are indicated by the following units? Choices are in the last column.

a. g/mL	density	density
b. s	time	length
c. km	length	mass
d. g	mass	time
e. cm^3	volume	volume
f. mm	length	

g. mg mass

h. L volume

i. g/cm^3 density

↓ ↓

mass volume

mass: g

vol: L or $V = l \cdot w \cdot h = m^3$ or cm^3

length: m

time: sec, min ...

$density = \frac{m \rightarrow g}{V \rightarrow L}$

big KHDudcm small

4. Put these in order from smallest to biggest: ~~m~~, ~~cm~~, ~~Km~~, ~~mm~~

mm → cm → m → Km

5. Classify the following properties as physical (P) or chemical (C).

P a. Color

P c. Density (m/v)

C e. Flammability

C b. Acid resistant

P d. Odor

Physical property: any property that can be observed without changing the chem. make up.

Chemical property: any property that can be observed during a chemical change. New substance!

6. Classify the following changes as physical (P) or chemical (C).

C a. wood burning

P b. sugar dissolving in water

C c. baking a lasagna

C d. dyeing your hair

P e. tearing magnesium ribbon

P f. a person cools by sweating evaporation (l→g)

Is a new substance formed?

Yes: Chemical change

No: Physical change

Changes in states of matter = Physical change!

7. Classify each as an element, compound, homogeneous mixture, or heterogeneous mixture:

comp. a. CO_2

heterog. mix b. Hot chocolate w/ marshmallows

element c. Lithium

homog. mix d. Jello

comp. e. Sucrose ($C_{12}H_{22}O_{11}$)

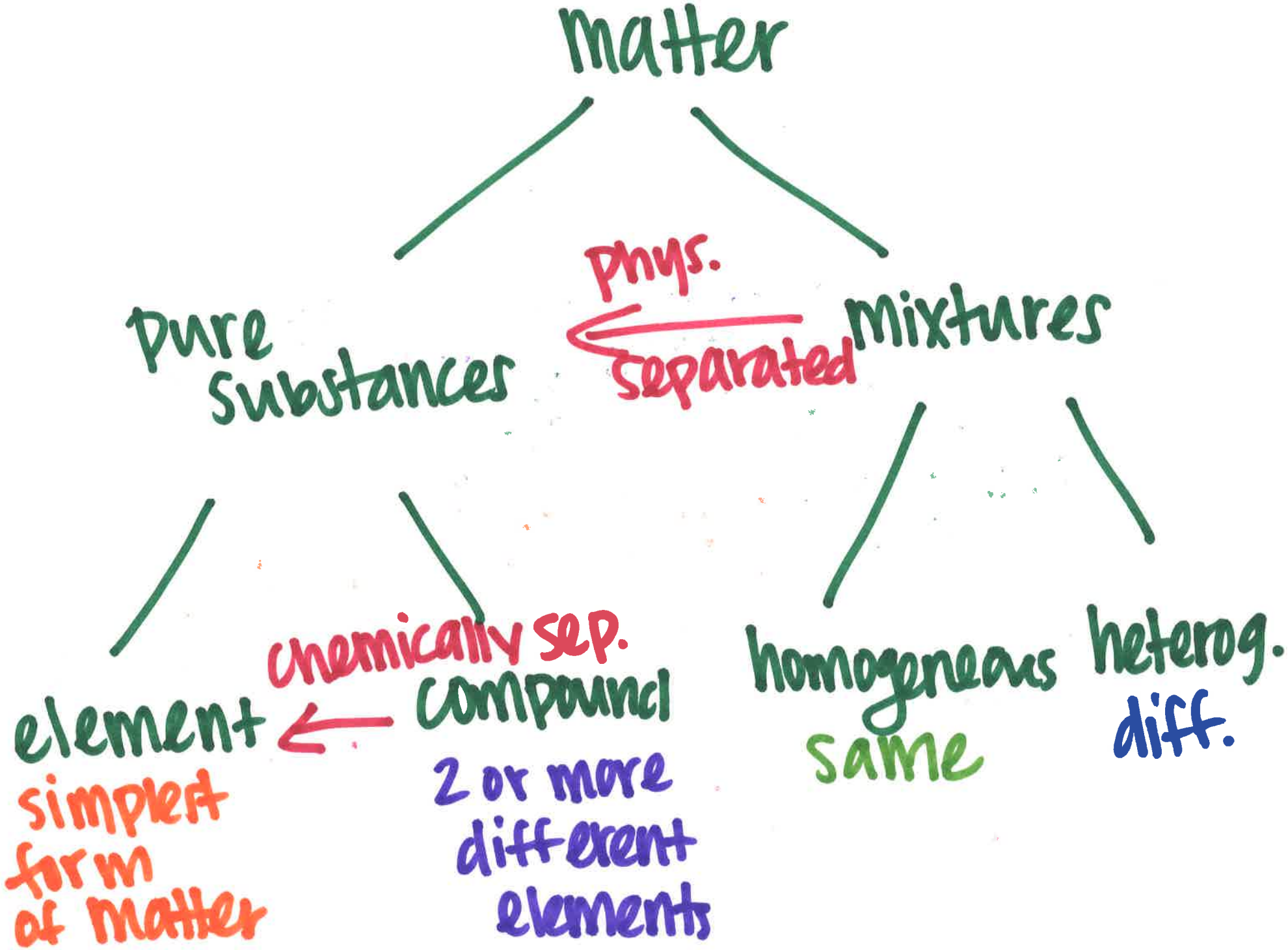
heterog. mix f. Blood

homog. mix g. Air

homog. mix h. A solution of KI

↑ dissolved in water

element i. Nitrogen (N_2)


matter
Pure Substances
Mixtures
phys.
separated
element
simplest form of matter
chemically sep.
compound
2 or more different elements
homogeneous
same
heterog.
diff.

8. In order to be a pure substance it has to be either an

element or a compound.

9. In your own words, explain the law of conservation of mass.

mass of reactants = mass of products

- what goes into a reaction, must come out of the reaction
- It can behave differently, but the same atoms will be involved.

10. What is the difference between quantitative and qualitative?

quant: involves numbers (quantity)

qual: involves descriptive words
no numbers
(quality)

11. Determine the number of significant figures in each of the following measurements.

a) 3427 4SF b) 0.00456 3SF c) 123,453 6SF

d) 172 3SF e) 0.000984 3SF f) 0.502 3SF

g) 3100.0 5SF h) 0.0114 3SF i) 107.2 4SF

1. all nonzero digits are significant
2. leading zeroes are Never significant
3. zeroes at end are only Sig. if a dec. is present
4. zero "sandwiches" always sig.
5. # before "x" in sci.not. are sig.

12. Addition and subtraction – answer is expressed to the same number of significant digits as the number in the calculation with the fewest digits to the right of the decimal point

*rounding →0-4 round down, 5-9 round up

look behind decimal!!

Example:

10.6871 (4 sig figs to the right of the decimal)

+1.42 (2 sig figs to the right of the decimal)

12.1071 = 12.11 (2 sig figs to the right of the decimal)

a) 4.53
+ 2.2

6.73

6.7

b) 5.65123
- 4.632

1.01923

1.019

13. Multiplication or Division - the answer is expressed to the same number of significant digits as the number with the fewest significant digits

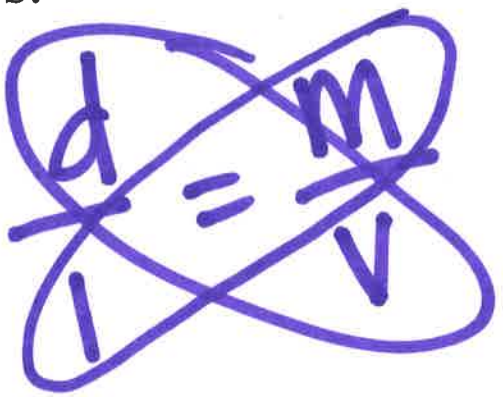
2.34	×	3.225	= 7.5465	=	7.55	
3 sig figs		4 sig figs			3 sig figs	

look at the entire #!

a. 3.95 / 1.5 = 2.6333... = 2.6

b. (3.5)(6.456) = 22.596 = 23

14. Write the density formula 3 different ways.



① $d = \frac{m}{v}$

② $m = d \cdot v$

③ $v = \frac{m}{d}$

$\frac{m}{d} = \frac{d \cdot v}{d}$