WS 3.0 Subatomic Particles! *Name:*_____ *p.*____

Reading for this topic: Chapter 3 pages 74-84.

1. Fill in the masses and charges of the following subatomic particles.
(OK to round to the nearest whole numbers.)

Subatomic Particle	Charge	Mass (amu*)
proton	_____	_____
neutron	_____	_____
electron	_____	_____

* 1 atomic mass unit (amu) = 1.66×10^{-24} grams.

2. Fill out this chart:

Type of atom	element symbol	# of protons	# of neutrons**	# of electrons
Carbon				
	K			
		78		
Chromium				
				27
Hydrogen				
		11		
Plutonium				

** for #2, determine the number of neutrons for the average/typical isotope of the element;
Use the mass from the periodic table to determine this.

3. Consider this data for the four naturally occurring isotopes of Chromium (Cr):

Symbol	Natural Abundance (%)	Isotope Mass (amu)
$^{50}_{24}Cr$ or Cr-50	4.345	49.9460
$^{52}_{24}Cr$ or Cr-52	83.789	51.9405
_____	9.501	52.9407
_____	2.365	53.9389

a. Complete the last two lines of the "symbol" column.
b. How are Cr's four isotopes similar?

c. How are Cr's four isotopes different? Give two differences.

d. The "natural abundance" of Cr-50 is 4.345 %. What does this mean?

4. Consider this data for carbon's two isotopes. (These two isotopes account for *essentially* 100% of all carbon atoms.)

Symbol	Natural Abundance (%)	Isotope Mass (amu)
_____	_____	12.0000
_____	_____	13.0034

a. Write the symbol for each isotope of carbon. (in the chart, above)
b. One of carbon's isotopes has a natural abundance of 98.93%. Calculate the abundance of the other isotope. Show your math!

c. What is the average atomic mass of carbon, according to the periodic table?_____
d. Determine which isotope of carbon has the abundance of 98.93%, and fill in both abundances in the chart.

5. Data for another element:

Natural Abundance (%)	Isotope Mass (amu)
100	54.9380

a. What element is this?_____

b. Write the symbol for this element _____

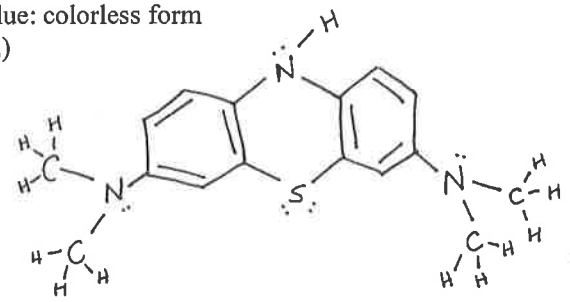
6. The element Argon is a gas that makes up about 1% of our atmosphere. Consider this data for argon's 3 isotopes:

Symbol	Natural Abundance (%)	Isotope Mass (amu)
^{36}Ar	_____	35.968
^{38}Ar	0.06	37.963
^{40}Ar	_____	39.963

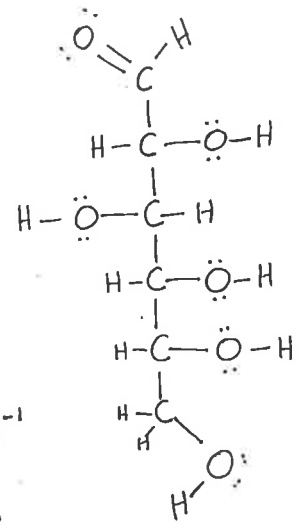
One of argon's isotopes has a natural abundance of 99.60 %.
a. Which argon isotope (Ar-36 or Ar-40) has this natural abundance? _____
b. Calculate the abundance of argon's other isotope, and fill in both blanks in the above chart. Show math!

7. Demo! The solution in today's demo contains Water (H_2O), potassium hydroxide (KOH), glucose, and methylene blue. Glucose and methylene blue are shown below.

Methylene Blue: colorless form
($C_{16}H_{19}SN_3$)



Glucose
($C_6H_{12}O_6$)



Methylene Blue: blue form
($C_{16}H_{18}SN_3Cl$)