

WS 3.1 Protons, Neutrons, Electrons

1. Fill in the table below with the correct numbers (first one is done as an example)

symbol	name	atomic number	mass number	charge	# of particles in nucleus	# of protons	# of neutrons	# of electrons
$^{23}_{11}\text{Na}$	sodium-23	11	23	0	23	11	12	11
$^{60}_{29}\text{Cu}$								
	gold - 198							
$^{39}_{19}\text{K}$								
$^{41}_{19}\text{K}$								
$^{41}_{19}\text{K}^{1+}$								
		12	25	0				
		36					42	36
				1-	35			18
						7	7	10
				1+	1			
					238	92		92
$^{14}_6\text{C}$								

- How many n's are there in an atom of P-33? ____ How many p's in an Fe-58³⁺ ion? ____
- How many total particles (p, n & e's) are in an O-16 atom? ____ In a F-19¹⁻ ion? ____
- All chromium particles must have the same number of (p, n or e?) ____
- (p, n, or e?) The # of ____ determines what element a particle is, the # of ____ determines what isotope of that element, and the # of ____ determines the particle's overall charge.
- An atom has a mass # of 62 and has 33 neutrons; what element is this atom?
- A particle has 13 p, 14 n, and 10 e; what is its mass #? ____ What is the particle's charge? ____ What element is it? ____
- A particle has 35 p, 45 n, and 36 e; what is its mass #? ____ What is the particle's charge? ____ What element is it? ____
- If a mercury-198 atom were to lose a proton, it would become a ____.
- If two lithium-6 atoms fused (joined together), it would create a ____.
- If a thorium-234 atom absorbed a neutron, it would become a ____.
- If a uranium-238 atom were split into two equal halves, it would make two ____.

Average Atomic Mass Worksheet

- 1) Rubidium has two common isotopes, ^{85}Rb and ^{87}Rb . If the abundance of ^{85}Rb is 72.2% and the abundance of ^{87}Rb is 27.8%, what is the average atomic mass of rubidium?

- 2) Uranium has three common isotopes. If the abundance of ^{234}U is 0.01%, the abundance of ^{235}U is 0.71%, and the abundance of ^{238}U is 99.28%, what is the average atomic mass of uranium?

- 3) Titanium has five common isotopes: ^{46}Ti (8.0%), ^{47}Ti (7.8%), ^{48}Ti (73.4%), ^{49}Ti (5.5%), ^{50}Ti (5.3%). What is the average atomic mass of titanium?

- 4) Explain why atoms have different isotopes. In other words, how is it that helium can exist in three different forms?

Atomic Structure Worksheet

Fill in the blanks for the elements in this chart. For the purposes of this chart, round all atomic masses to the nearest whole number.

Element	Number of Protons	Number of Neutrons	Number of Electrons	Atomic Mass #	Atomic Number
lithium				7	
carbon		6			
chlorine				35	
silver				108	
lead				207	
calcium		22			
tantalum				181	
radium				226	
samarium				150	
uranium				238	
americium				243	
lawrencium				262	

Name: _____ Student ID Number: _____ Period: _____
 Date: _____

8. Write a chemical equation that represents the following word equation:
 One molecule of nitrogen (N_2) reacts with 3 molecules of hydrogen (H_2) to form 2 molecules of ammonia (NH_3).

9. Differentiate between protons and electrons in terms of their relative charges.

10. Decide whether each of the following atoms is electrically neutral.

Element	Protons	Electrons	Neutral?
Gold	79	76	
Helium	2	2	
Fluorine	9	10	

11. Classify the following as anions, cations, or electrically neutral atoms.

a. K^+ _____ b. Ag _____ c. N^{3-} _____ d. Ba^{2+} _____

12. Write the symbol and show the electrical charge (if any) on the following atoms or ions:

- a. helium with one proton and one electron _____
 b. lithium with three protons and two electrons _____
 c. fluorine with nine protons and ten electrons _____

13. Complete the following table by writing the name and formula for the compound formed from the following ions.

Cation	Anion	Formula	Name
Mg^{2+}	O^{2-}		
Al^{3+}	Cl^-		
Mg^{2+}	NO_3^-		
NH_4^+	CO_3^{2-}		

14. As an environmental chemist, you are testing for the presence of chloride ion in samples of stream water. You perform the appropriate test on a sample from Stream A and observe a white precipitate. The same test performed on a sample from Stream B yields no change.

- a. What is a precipitate?

 b. What can you conclude about the presence of chloride ion in Stream A?

 c. Can you make a definite conclusion about the presence of the chloride ion in Stream B? Why or why not?

