

Critical Thinking Questions

- How many protons are found in ^{12}C ? _____ ^{13}C ? _____ $^{13}\text{C}^-$? _____
- How many neutrons are found in ^{12}C ? _____ ^{13}C ? _____ $^{13}\text{C}^-$? _____
- How many electrons are found in ^{12}C ? _____ ^{13}C ? _____ $^{13}\text{C}^-$? _____
- Based on the data presented above,
 - What do all carbon atoms (and ions) have in common?
 - What do all hydrogen atoms (and ions) have in common?
- What is the significance of the atomic number, Z ? Where will you find it on the periodic table?
- Look at a periodic table, what do all nickel (Ni) atoms have in common?
- How is the mass number, A , determined?
- What structural feature is different in isotopes of a particular element?
- What feature distinguishes a neutral atom from an ion?
- Where is most of the mass of an atom, within the nucleus or outside of the nucleus? Explain your reasoning.
- Complete the chart below:

Isotope	Atomic Number Z	Mass Number A	Number of Electrons
^{31}P	15		
^{18}O			8
	19	39	18
$^{58}\text{Ni}^{2+}$		58	

- What is the mass (in amu) of
 - one ^1H atom? _____
 - one ^{12}C atom? _____

13. Define mass number

14. Define atomic number.

15. How many electrons, protons, and neutrons are found in each of the following?

Atom or ion	Electrons	Protons	neutrons
^{24}Mg			
$^{23}\text{Na}^+$			
^{35}Cl			
$^{35}\text{Cl}^-$			
$^{56}\text{Fe}^{3+}$			
^{15}N			
$^{16}\text{O}^{2-}$			
$^{27}\text{Al}^{3+}$			

16. Summary of Activity: Describe an atom