

**Move question 1 to end of worksheet?**

1) Use your textbook to complete the following table and answer the questions below.

Subatomic particle	Location in atom	Mass (kg)	Mass (amu)	Relative charge
Proton				
Neutron				
Electron				

Some of the questions below require you to use scientific notation. If you aren't comfortable with scientific notation right now see if someone in your PAL team can help you out or read over section 2.2 in your textbook.

- Later this semester we will look at what happens to atoms when they gain and lose electrons. When we do this, we will assume that the mass of the atom doesn't change even when several electrons are gained or lost. Why is this assumption reasonable?
- How many electrons are needed to have the same mass as one proton? Show your work
- What mass of electrons would be required to just neutralize the charge of 3.0 kg of protons?

- d. How many electrons would it take to equal the mass of one atom of B-11?

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- 2) The table below contains information about 3 possible atoms. Use this information to answer the questions that follow:

	# of protons	# of neutrons	# of electrons
Atom #1	11	7	7
Atom #2	9	18	9
Atom #3	8	10	8

- a. Which of the above atoms (#1-#3) would have a mass of approximately 18 amu and be charge neutral? Briefly explain your answer.

- b. For the other two atoms, briefly explain why they aren't the right answer:

Atom #\_\_ is not the right answer because....

Atom #\_\_ is not the right answer because....

- c. Using the X-A notation, write the isotope symbol for the atom you identified in question 2a.

3) Carbon has two stable, naturally occurring isotopes, carbon-12 and carbon-13 (also called  $^{12}_6\text{C}$  and  $^{13}_6\text{C}$ , respectively).

a) Regardless of which isotope it is, how many protons does an atom of carbon always have? How did you figure this out?

b) Determine the number of neutrons in each of these isotopes of carbon. Beneath each answer, show how you figured this out.

carbon-12 has \_\_\_\_\_ neutrons

carbon-13 has \_\_\_\_\_ neutrons

c) What is the name and symbol given to the “number of protons” in an element?

d) What is the name and symbol given to the “number of protons + neutrons” in an element?

e) Draw pictures of the carbon-12 and the carbon-13 nuclei. Use solid circles (●) to represent the protons and open circles (○) to represent the neutrons.

carbon-12 nucleus

carbon-13 nucleus

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4) Fill in the table below with the corresponding numbers of protons and neutrons.

	sulfur-32	sulfur-33	sulfur-34	sulfur-36
# of protons				
# of neutrons				

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Atomic number				
Mass number				