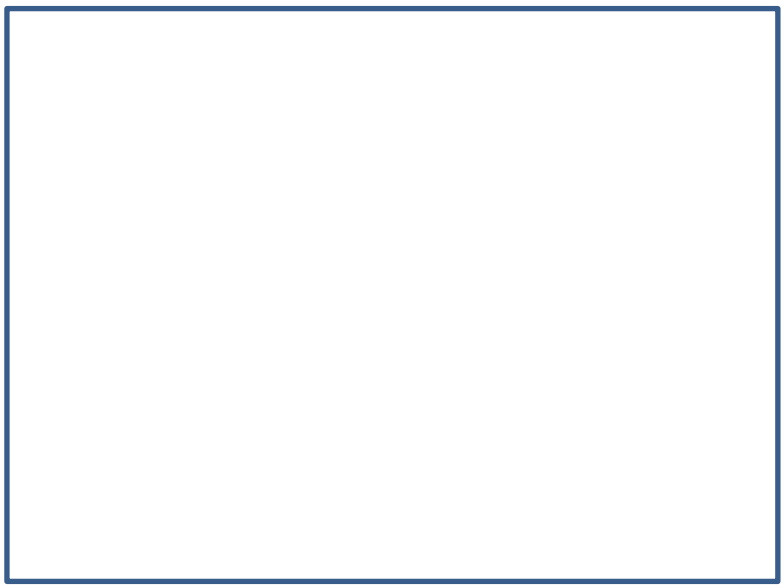
Name: _____ **Period:** _____

Pre-lab for Build an Atom

1. You build an atom that has the following components:

   3 protons (P)
   4 neutrons (N)
   3 electrons (E)

   Draw a picture of how you would build your atom below:



   W**hich element is this atom on this periodic table?**

   _____

   The mass of this atom is:
   a. 3 mass units
   b. 4 mass units
   c. 6 mass units
   d. 7 mass units
   e. 11 mass units

   Explain what ideas you used to choose an answer:
   _____
   _____

   The charge of this atom is:
   a. 0, this is a neutral atom
   b. -3
   c. -1
   d. +1
   e. +3

2. You start with your atom: 3 protons
   4 neutrons
   3 electrons

You want to change your atom's properties.
Mark <u>YES</u> if a change will work, and mark <u>NO</u> if it will not work.

A. Hydrogen, Helium, Lithium, Beryllium, Boron, Carbon are all different elements.

If you want to **change the type of element** your atom is, you can either:

	(circle)
Add a proton	Yes or No
or Add a neutron	Yes or No
or Add an electron	Yes or No

B. If you want to **change the charge** of your atom, you can either:

	(circle)
Add a proton	Yes or No
or Add a neutron	Yes or No
or Add an electron	Yes or No

C. If you want to **change the mass** of your atom, you can either:

	(circle)
Add a proton	Yes or No
or Add a neutron	Yes or No
or Add an electron	Yes or No

Name: _____ **Period:** _____

Build an Atom

Learning Objectives:

1. Draw models that show atoms or ions.
2. Use information about the number of protons, neutrons, and electrons to
   - Identify an element and its position on the periodic table
   - Draw models of atoms
   - Determine if the model is for a atom or an ion.
3. Predict how changing the number protons, neutrons, or electrons will change the element, the charge, and the mass of an atom or ion.

Directions:

1. Explore the ***Build an Atom*** simulation with your partner (about 5 minutes). As you explore, talk about what you find with your partner.

2. Using ***Build an Atom,*** talk with your partner as you play with the parts of atoms to find:

   A. What parts go in the center of the atom? _____

   B. You can call the center of the atom, the **nucleus**. Most atoms in our environment have a **stable** nucleus.

   C. Play around, and write down three examples of atoms that have a **stable nucleus** and include a drawing of your nucleus.

	Number of particles in your nucleus:	Draw your nucleus	What element is it?
1.	Protons: __ Neutrons:__		
2.	Protons: __ Neutrons:__		
3.	Protons: __ Neutrons:__		

D. Everything around us is made up of different elements. The air has Oxygen (**O**) and Nitrogen (**N**). Plants and people have lots of Carbon (**C**). Helium (**He**) is in balloons. Hydrogen (**H**) is in water.

Play until you discover which **particle (or particles)** determines the name of the **element** you build. What did you discover?

_____

E. Test your idea by identifying the element for the 3 cases.

	Particles	What Element ?	What Determines the Element?	What's the Element symbol
1.	Protons: 6 Neutrons: 6 Electrons: 6		□ Proton □ Neutron □ Electron	
2.	Protons: 7 Neutrons: 6 Electrons: 6		□ Proton □ Neutron □ Electron	
3.	Protons: 6 Neutrons: 7 Electrons: 7		□ Proton □ Neutron □ Electron	

5. Play until you discover what affects the **charge** of your atom or ion.
What is a rule for making...

A. A atom **neutral** (one with 0 extra charge)?

_____

B. A **+ion** (positive ion, one with extra positive charge)?

_____

C. A **- ion** (negative ion, one with extra negative charge)?

_____

6. Show a neutral atom, a positive ion, and a negative ion. (These examples should be consistent with the rules you discovered.) All of your examples should also have a **stable nucleus**.

	Number of Particles?	Draw Your Atom or Ion	What is the Charge?
Neutral	Protons: __ Neutrons:__ Electrons:__		
+ Ion	Protons: __ Neutrons:__ Electrons:__		

- Ion	Protons: __ Neutrons:__ Electrons:__		

7. Play until you discover what affects the **mass** of your atom or ion.

   Which particles are heavy and which particles are light?

   _____

   What is a rule for determining the mass?

   _____

8. Using all of your rules, figure out what changes for each of these actions to an atom or ion. You can test your ideas with the simulation. If you have new ideas, rewrite your rules.

Action	What Changes?	How Does it Change?
Add a Proton	□ Element	
	□ Charge	
	□ Mass	

Action	What Changes?	How Does it Change?
Remove a Neutron	□ Element	
	□ Charge	
	□ Mass	

Action	What Changes?	How Does it Change?
Remove an Electron	□ Element	
	□ Charge	
	□ Mass	

Action	What Changes?	How Does it Change?
Add a Electron	□ Element	
	□ Charge	
	□ Mass	