

Name: _____

Date: _____

Hour: _____



Topic: Atomic Structure (Unit 2)

PhET: Build an Atom

Instructions: Go to <http://phet.colorado.edu/en/simulation/build-an-atom> and fill in your answers for the following charts and questions using the simulation. To start the simulation click on the **Run Now!** button.

Directions:

1. Explore the **Build an Atom** simulation for a few minutes.
2. Using **Build an Atom**, play with the parts of atoms to find ...
 - A. What parts go in the center of the atom? _____
 - B. What is the center called? _____
 - C. Play until you discover a good rule for making the center of the atom "stable". What seems to make the center of the atom "unstable"? _____
 - D. Fill in the table like below and identify three examples – at least 1 stable and at least 1 unstable – that shows your rules **for stability** work and include a drawing of your nucleus.

	What is in your nucleus?	Draw your nucleus	Is it stable or unstable?	What <u>Element</u> is it?
1				
2				
3				

3. Everything around us is made up of different elements. The air has Oxygen and Nitrogen. Plants and people have lots of Carbon. Helium is in balloons. Hydrogen is in water.

- Play until you discover a rule for what determines the name of the **element** you build. What did you find determines the element?

4. Play until you discover some good rules about the **charge** of your atom or ion.

- What is a rule for making:
 - 1) A neutral atom which has no charge.

- 2) A positive ion which has positive charge?

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3) A negative ion which has negative charge?

- Write about how you used the tools in the sim helped you decide if the atom had a positive, negative, or 0 charge.

- Fill in the below and identify three examples of atoms and ions (1 neutral with 0 extra charges, 1 with a positive charge, and 1 with a negative charge) that show your rules **for charge** work and include a drawing of your atom. **(All of your examples should also have a stable nucleus.)**

	What is in your atom or ions?	Draw your atom or ion	What is the charge?	Is it a neutral atom, positive ion, or negative ion?
1	# of protons: # of neutrons: # of electrons:			
2	# of protons: # of neutrons: # of electrons:			
3	# of protons: # of neutrons: # of electrons:			

5. Play until you discover some good rules about the **mass** of your atom or ion.

- What is a rule for determining the mass?

6. **Using all of your rules**, figure out what changes for each of these changes to an atom or ion. Fill in this table and make predictions, then test your ideas with the simulation. If you have new ideas, rewrite your rules.


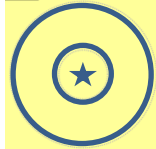
Make the change:	What changes also? Element name, charge, mass?
Add a proton	
Remove a neutron	
Remove an electron	
Add an electron	

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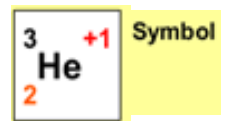
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7. Design challenges: Try these with your partner.

Design a positive ion with a charge of +2 include a drawing:		Design neutral, stable atom with a mass of 8 include a drawing:	
Number of protons __ Number of neutrons __ Number of electrons __		Number of protons __ Number of neutrons __ Number of electrons __	
What element is your ion?		What element is your atom?	
What mass is your ion?		What is the charge of you atom?	
Is the nucleus of your ion stable or unstable?		Is the nucleus of your ion stable or unstable?	

8. What does the tool called **Symbol** tell you about what parts are in an atom or ion?



- What rules can you use to tell how many protons, neutrons and electrons make up an atom or ion?

- Check your ideas and write down two examples that show your rules work and include a drawing for each.
