

Class 1.6 Date: _____

Build An Atom Discovery Activity

Procedure:

- i. Log in to the Harbor, go to topics, Class 1.6 and Click the “BUILD AN ATOM” link
- ii. Click on the Play Button (circle with a triangle in it) in the middle of the screen.
- iii. Make sure the “Atom” tab on the bottom is highlighted. You will be doing the game as part of your assessment at the end.
- iv. GETTING FAMILIAR WITH THE PROGRAM

The pane contains:

A blank periodic table

A tally of protons, neutrons, and electrons

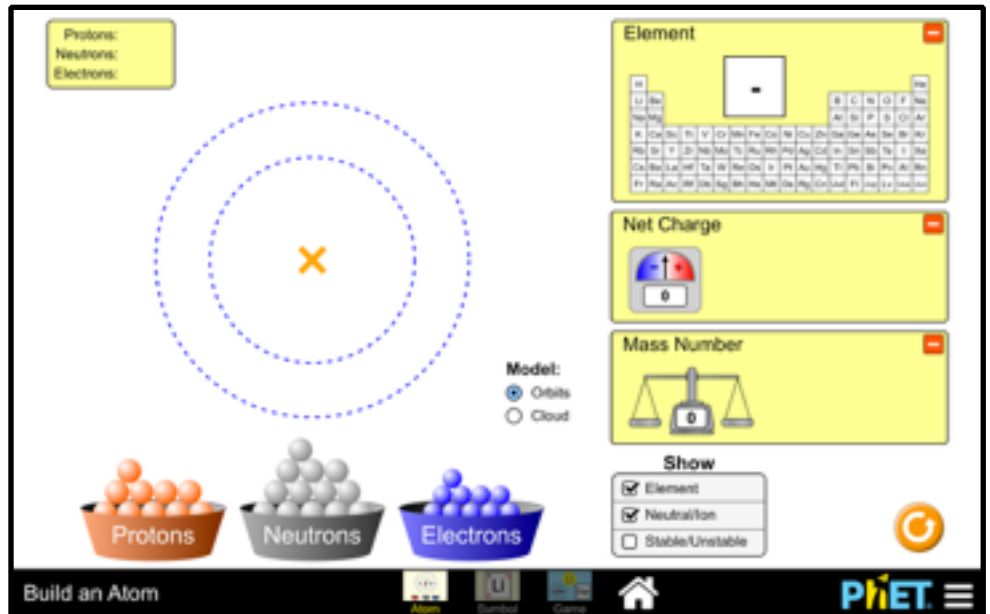
A blank atom diagram with an X to mark the nucleus, where you can drag protons and neutrons

Energy levels you can drag electrons to

Tubs with protons, neutrons, and electrons

Model type (keep on “Orbits” the whole time)

Information about the element symbol, mass number, and net charge



4) BUILD YOUR FIRST ATOM - Clear everything using the Reset button

a) Drag ONE proton from the Proton bucket over to the X in the center of the atom.

Element Symbol?	Element Name?	Net charge? (+, -, or neutral)

b) Click the green + signs to the right of Net Charge, Mass Number and Symbol and record their values below.

Net charge? (+, -, or neutral)	Mass Number	Symbol

i. What did you discover about the proton?

A proton has a mass of ____ atomic mass unit, a charge of ____ and goes in the _____ of the atom.

c) Drag ONE neutron to the center of the atom where your proton sits alone. Record the information that shows:

Element Symbol?	Element Name?	Mass Number	Net charge? (+, -, or neutral)

i. Did adding the neutron change the identity of the element? _____

ii. Did adding the neutron change the charge of the element? _____

d) What did you discover about the neutron?

A neutron has a mass of ____ atomic mass unit, a charge of ____ and goes in the _____ of the atom.

e) Next, drag ONE electron to the atom and drop it between the inner and outer ring.

1. Where does the electron immediately go? _____
2. Record the information that shows up:

Element Symbol?	Element Name?	Mass Number	Net charge? (+, -, or neutral)

1. Did adding the electron change the identity of the element? _____
2. Did adding the electron change the charge of the element? _____

f) Drag A SECOND electron to the atom and let it go.

1. Where does the electron immediately go? _____
2. Record the information that shows up:

Element Symbol?	Element Name?	Mass Number	Net charge? (+, -, or neutral)

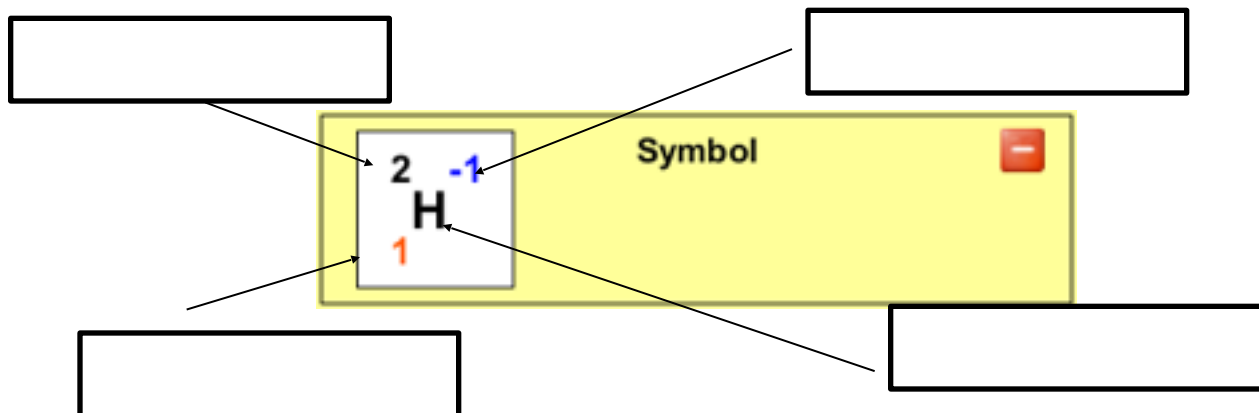
g) What did you discover about the electron?

An electron has a mass of ____ atomic mass unit, a charge of ____ and goes in the _____ of the atom.

h) What has to be true of the number of electrons compared to protons in order for the atom to have no charge?

5) What Does The Symbol Mean?

- Click the Symbol Tab on the bottom of the screen.
- Fill in the blanks and label the diagram below with what each part of the symbol means.
 - If you are unsure, change some of the subatomic particles to see what else changes with it.



6) **Build More Elements** - Using your bucket of protons, neutrons, and electrons, build the atoms shown below based on their symbol. Fill in the information about the number of protons, neutrons, and electrons for each.

Symbol	Element Name	Protons	Neutrons	Electrons
${}^3_1\text{H}^0$				
${}^4_2\text{He}^0$				
${}^5_2\text{He}^0$				
${}^6_3\text{Li}^0$				
${}^6_3\text{Li}^{+1}$				
${}^8_3\text{Li}^0$				
${}^7_4\text{Be}^0$				
${}^9_4\text{Be}^0$				
${}^9_4\text{Be}^{+2}$				
${}^9_5\text{B}^0$				
${}^{10}_5\text{B}^0$				
${}^{10}_5\text{B}^{+3}$				
${}^{11}_5\text{B}^0$				

8) **Make the following atoms and fill in the information:**

a) A NEUTRAL atom of OXYGEN with more neutrons than protons.

Symbol	Element Name	Protons	Neutrons	Electrons	Stable or Unstable?

b) A -3 charged ION of NITROGEN with more neutrons than protons.

Symbol	Element Name	Protons	Neutrons	Electrons	Stable or Unstable?

c) A +4 ION of CARBON with fewer neutrons than protons.

Symbol	Element Name	Protons	Neutrons	Electrons	Stable or Unstable?

d) A -1 ION of HYDROGEN with more neutrons than protons.

Symbol	Element Name	Protons	Neutrons	Electrons	Stable or Unstable?

9) Wrapping it up - use the information from the work you did as evidence to support your answers.

a) What does changing the number of protons do to the atom?

b) What does changing the number of neutrons do to the atom?

c) What does changing the number of electrons do to the atom?

d) Under what conditions can an atom be unstable?

10) The Game

a) Click the Game tab on the upper left corner of the window.

b) Start at Level 1. Timer On. Sound Off.

c) Click Start.

d) Finish the first five questions.

e) Leaving the results of the game on the screen, call the teacher over to fill in your results.

f) Move on to Level 2. Repeat the process.

g) Continue until you have completed all four levels.

You will need to use your Periodic Table to do some of this.



Teacher Check

Level	1	2	3	4
Score				
Time				

Grade:

Total Score For All Four Levels out of 40: _____ Completed All Parts of the Task out of 43: _____

Stayed On Task for the Duration of the Task out of 17: _____

Total Points / 100: _____