Phet Simulator: Build an Atom! Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

1. Go to the following: <http://phet.colorado.edu/en/simulation/build-an-atom> and click **Play**, then select **Atom**. Are you working on a larger or smaller scale than yesterday? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Use the tools to build any three, different types of atoms and fill in the information about them below:

**Element #1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# of protons: \_\_\_\_\_\_\_

# of neutrons: \_\_\_\_\_\_\_

# of electrons: \_\_\_\_\_\_\_

Sketch:

Atomic #: \_\_\_\_\_\_\_

Atomic mass: \_\_\_\_\_\_\_\_\_\_

Symbol on Periodic Table: \_\_\_\_\_\_\_

**Element #3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# of protons: \_\_\_\_\_\_\_

# of neutrons: \_\_\_\_\_\_\_

# of electrons: \_\_\_\_\_\_\_

Sketch:

Atomic #: \_\_\_\_\_\_\_

Atomic mass: \_\_\_\_\_\_\_\_

Symbol on Periodic Table: \_\_\_\_\_\_\_

**Element #2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# of protons: \_\_\_\_\_\_\_

# of neutrons: \_\_\_\_\_\_\_

# of electrons: \_\_\_\_\_\_\_

Sketch:

Atomic #: \_\_\_\_\_\_\_

Atomic mass: \_\_\_\_\_\_\_

Symbol on Periodic Table: \_\_\_\_\_\_\_

1. Which subatomic particle is the ***boss*** of the atom? What **evidence** does the simulator give you for this?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Create a Hydrogen (H) atom (1 proton, 1 neutron, 1 electron). Follow the directions, observe what happens and complete the table below. **(You need to RESET back to your original Hydrogen (H) atom (1 proton, 1 neutron, 1 electron) after you make each change!)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Add a Neutron**  (to original atom) | **Add an Electron**  (to original atom) | **Add a Proton**  (to original atom) |
| Observe and record ALL changes to the original Hydrogen (H) atom when each subatomic particle is added! | **How does it change the:**  Overall charge: \_\_\_\_\_\_\_\_\_  Mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Atomic Number: \_\_\_\_\_\_\_\_  Type of Atom: \_\_\_\_\_\_\_\_\_\_ | **How does it change the:**  Overall charge: \_\_\_\_\_\_\_\_\_  Mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Atomic Number: \_\_\_\_\_\_\_\_  Type of Atom: \_\_\_\_\_\_\_\_\_\_ | **How does it change the:**  Overall charge: \_\_\_\_\_\_\_\_\_  Mass: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Atomic Number: \_\_\_\_\_\_\_\_  Type of Atom: \_\_\_\_\_\_\_\_\_\_ |

1. Based on what you’ve observed, **which two particles appear to determine the mass of the overall atom?** Which particle ***doesn’t*** seem to have a measurable impact on the mass? Explain why you think this is!

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Based on what you’ve observed, ***summarize the relationship*** between how protons, neutrons and electrons affect the overall charge of an atom.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If you’ve been paying attention, you should have noticed that the term **Ion** appears from time to time. Experiment with the simulator and list the two ways you can create a positive ion and a negative ion:
2. Two ways to create a ***positive*** ion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Two ways to create a ***negative*** ion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What do you think the term ion means? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Click **Symbol** at the very bottom of the simulator window. Pick three, ***new*** atoms to create. Display a sketch of the atom as well as how it would appear on the Periodic Table:

**Element #3: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Sketch of atom:

How it would appear on periodic table:

**Element #2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Sketch of atom:

How it would appear on periodic table:

**Element #1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Sketch of atom:

How it would appear on periodic table:

1. Click **Game** at the bottom of the simulator window. Play the four games- can you get all ***five stars*** each time?! ☺