

What Atoms Are Made of

In this online activity, you will “build” different atoms to see how the different pieces of an atom join together.

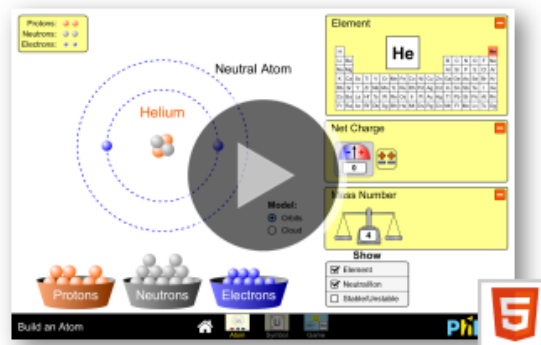
Go to:

https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_en.html

Or search “Phet build an atom”

Click on the grey play button to start the activity. Once it has loaded, select the “Atom” activity (you will get to try the other parts later when you have finished the required parts)

Build an Atom



Procedure:

1. Click on the green + signs on the right to open up the “Net Charge” and “Mass Number” boxes. Also, check the “Stable/Unstable” box in the “Show” menu (all 3 boxes should be checked).
2. Atoms are made of 3 parts, called “Sub-atomic Particles.” These are the 3 types of spheres in the trays at the bottom. **What are the 3 types of sub-atomic particles that make up ALL atoms?**
3. You can drag the sub-atomic particles into the atom, but each type can only go in one of two places: the orange X in the middle represents the “Nucleus” or center of the atom, and the blue rings are called the “Orbits.” **For each sub-atomic particle, state where it is allowed to go:**
4. Make an atom with ONE OF EACH sub-atomic particle.
 - a. **What is the name of the Element (type of atom) that you have made?**
 - b. **What element Symbol does it have (see the yellow “Element” box)?**
 - c. **What “Mass Number” does it have (see the yellow “Mass Number” box)?**

5. Experiment by adding in more protons, neutrons, and electrons. Keep experimenting until you notice the patterns that allow you to answer the following questions:
 - a. **How many electrons can “fit” in the smaller orbit, before they start filling up the bigger orbit?**
 - b. **Which sub-atomic particle(s) determine the type of the atom?**
 - c. **Which sub-atomic particle(s) determine the net charge of the atom?**
 - d. **Which sub-atomic particle(s) determine the mass of the atom?**
6. A normal atom is “Neutral” in charge; this happens when the total + charges balance out the total – charges. If not, it is an “Ion.”
 - a. **What type of charge (+ or -) do protons have?**
 - b. **What type of charge (+ or -) do electrons have?**
 - c. **What type of charge (+ or -) do neutrons have?**
 - d. **What two subatomic particles must be equal in number to make a neutral atom?**
7. You may have noticed that sometimes the nucleus shakes and says it is “unstable.” See if you can make the nucleus stable by adding or removing a number of ONE TYPE of sub-atomic particle (hint: this particle won’t change the element type or the charge). **An atom will be unstable if it has too many or too few of which sub-atomic particle?**
8. At the very bottom of the page, click on the “Symbol” box. This allows you to build an atom and it shows you what is called the “Isotope” Symbol. Experiment with this to **figure out what the 3 numbers in the symbol tell you about the atom.** Now you may click on the “Game” box at the bottom 😊.