

Atom Modeling

Using abstraction make tiny particles come to life

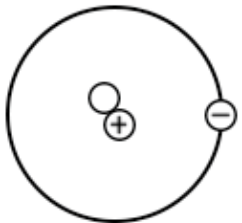
Name: _____ Date: _____ Block: _____

STEP 1: With your partner, choose five of the following nine elements. Circle your choices.

He Li Be B C N O F Ne

STEP 2: Open the Build an Atom simulation by navigating to <https://tinyurl.com/modelatoms> and clicking on "Atom". Create your first atom of your element by dragging protons, neutrons and electrons onto the model. Your atom should not be an ion - it should have a neutral charge. Use the periodic table to help determine how many protons, neutrons and electrons you need!

STEP 3: Once done in the simulation, copy and label your model in Box 1 below. Repeat for your other four elements.

<p>EXAMPLE</p>  <p>Chemical Symbol: <u>H</u></p> <p>Protons: <u>1</u></p> <p>Neutrons: <u>1</u></p> <p>Electrons: <u>1</u></p>	<p>1.</p> <p>Chemical Symbol: _____</p> <p>Protons: _____</p> <p>Neutrons: _____</p> <p>Electrons: _____</p>
<p>2.</p> <p>Chemical Symbol: _____</p> <p>Protons: _____</p> <p>Neutrons: _____</p> <p>Electrons: _____</p>	<p>3.</p> <p>Chemical Symbol: _____</p> <p>Protons: _____</p> <p>Neutrons: _____</p> <p>Electrons: _____</p>
<p>4.</p> <p>Chemical Symbol: _____</p> <p>Protons: _____</p> <p>Neutrons: _____</p> <p>Electrons: _____</p>	<p>5.</p> <p>Chemical Symbol: _____</p> <p>Protons: _____</p> <p>Neutrons: _____</p> <p>Electrons: _____</p>

STEP 4: After completing your five atomic models in the boxes on the previous page, answer the following questions.

1. How did you determine the number of protons in the atoms of each element?

2. What needs to happen in order to make an atom neutral?

3. How do we know how many neutrons an atom has?

4. How many electrons are needed to fill the innermost electron shell in an atom?

5. How many electrons are needed to fill the second electron shell in an atom?

6. Which elements have a second electron shell in their atoms?

7. What is an atom called if it has more or fewer electrons than protons?

STEP 5: Choose one of your five atoms to recreate as a wire model. Follow these steps:

1. Choose a different color for each type of subatomic particle.
2. Determine the correct number of small foam beads to serve as your protons, neutrons, and electrons. Once you know the numbers, go up and collect your materials.
3. Bend a length of hobby wire into a loop, which will serve as your innermost electron shell. If necessary for your element, bend a second length of wire into a larger loop, which will serve as your outer electron shell.
4. Place your foam beads representing electrons into their correct shells.
5. Glue one bead (proton or neutron) to the end of a length of string. This is the core of your nucleus. Glue the remaining protons and neutrons onto the nucleus - don't use too much glue!
6. Tie the electron shell(s) onto the string, so the nucleus is in the center of the shell(s).
7. Use a piece of painter's tape to label your model with the name of your element and your and your partner's names.

STEP 6: After completing your physical model, answer the two questions below.

1. Your large wire model is obviously not a "real" atom, but it does represent how we think about them. Explain how models like these help us understand how atoms work and how they differ from one another.

2. As with any model, your model of an atom uses some simplifications so that it doesn't get too complicated. These simplifications lead to some limitations in how powerful and accurate the model is. What limitations in our understanding of atoms might the simplifications in your model lead to?
