Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ UGA myID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Subatomic particles: What happens when atoms change?**

This activity explores what happens when the number of electrons, protons, and neutrons change in an atom. You will need a periodic table for this activity.

I will build atoms in a simulation (<https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_all.html>) and change the number of each subatomic particle. Use your periodic table and previous knowledge to predict what will happen to the atom, then observe the change.

1. The first atom is lithium-7. What does the ‘7’ represent in the name?
2. How many protons, neutrons, and electrons are in lithium-7?
3. \_\_\_\_\_\_\_ protons
4. \_\_\_\_\_\_\_ neutrons
5. \_\_\_\_\_\_\_ electrons
6. One electron has been removed from the lithium atom. What has been created? \_\_\_\_\_\_\_
7. Ion
8. Isotope
9. New element
10. What is the charge of lithium now that one electron has been removed? \_\_\_\_\_\_\_
11. One neutron has been removed from the lithium atom. What has been created?
12. Is this atom chemically different than the atom with four neutrons? If yes, explain how it is chemically different. If no, explain why it is not.

**Discussion break:** We will discuss number 6 as a class before beginning question 7.

1. Two neutrons have been added to the lithium atom. What do you notice?
2. We have returned to lithium-7. What is created when one proton is removed? \_\_\_\_\_\_\_
3. Ion
4. Isotope
5. New element
6. Is the atom stable or unstable after the proton has been removed? If it is unstable, what subatomic particle could be changed to make it more stable?
7. How many protons, neutrons, and electrons does a stable fluorine atom contain?
8. \_\_\_\_\_\_\_ protons
9. \_\_\_\_\_\_\_ neutrons
10. \_\_\_\_\_\_\_ electrons
11. How many stable isotopes exist for fluorine? \_\_\_\_\_\_\_
12. Lithium’s outer shell contained one electron, and we removed it to create a stable cation, Li+. Fluorine’s outer shell contains seven electrons. Are we more likely to remove seven electrons to create an ion, or add one electron?
13. What is the charge of the fluoride ion? \_\_\_\_\_\_\_