

Made to Order

Imagine that you are a new employee at the Elements-4-U Company, which custom builds elements. Your job is to construct the **atomic nucleus** for each element ordered by your clients. You were hired for the position because of your knowledge about what a nucleus is made of and your understanding of how isotopes of an element differ from each other. Now it's time to put that knowledge to work!

Procedure

1. Use the table below to record your data.

	Hydrogen -1	Hydrogen-2	Helium-3	Helium-4	Lithium-7	Beryllium-9	Beryllium-10
# Protons							
# Neutrons							
Atomic #							
Mass #							

2. Your first assignment: the nucleus of hydrogen-1. It will contain on single proton (thus have an atomic number of 1). Congratulations! You have just built a hydrogen-1 nucleus, the simplest nucleus possible. Now follow the steps below and fill out the table above.

3. Count the number of protons and neutrons in the nucleus, and fill in the corresponding rows for this element in the table.

4. Count the number of protons in the nucleus and place that number in the box for Atomic #.

5. Add together the number of protons and neutrons, this is the mass # for the atom.

You have now filled in the table for Hydrogen-1, the most common element in the universe. Draw the nucleus in the box at the left, add the proper number of electrons in the proper orbits.



Hydrogen-1

6. Hydrogen-2 is an isotope of hydrogen that has one proton and one neutron. Using a strong-force connection, add a neutron to your hydrogen-1 nucleus. Repeat steps 3-5.

7, Helium - 3 is an isotope of helium that has two protons and one neutron. Add one proton to your hydrogen-2 nucleus to create a helium-3 nucleus. Each particle should be connected to the other two particles so they make a triangle, not a line. Protons and neutrons always form the smallest arrangement possible because the strong force pulls them together. Repeat steps 3-5.

Now draw a hydrogen-3 atom in the box at the left, add the proper number of electrons in the proper orbits.



Hydrogen-3

8. For the next part of the lab, you will need to use information from the periodic table of the elements. For your job, the most important information in the periodic table is the atomic number (this is the number of protons in the nucleus). You can find the atomic number of any element at the top of its entry on the table. For, example, the atomic number of carbon is always 6.

9. Use the information in the periodic table to fill in the table for the following isotopes of elements: helium-4, lithium-7, beryllium-9, and beryllium-10. Repeat steps 3-5 for each isotope.

10. What is the relationship between the number of protons and the atomic number?

11. If you know the atomic number and the mass number of an isotope, how could you figure out the number of neutrons in its nucleus?

Analyze the Results

12. Use the periodic table to give the number of protons in each of these elements then calculate the number of neutrons for each of the following atoms.

	Uranium 235	Radium 226	Thallium 204	Radon 222	Iodine 126	Cesium 132	Lead 207
Protons							
Neutrons							