

Chemistry Activity Bag

Build An Atom: Student Activity Guide

Everything is made up of atoms. Have you ever wondered what makes up an atom? In this activity, you will explore the tiny particles that make up atoms and build models of different atoms.

Materials From Your Teacher

- 1 atom bag containing:
 - marshmallows
 - Cheerios
 - toothpicks
 - pipe cleaners
- Periodic Table
- Student Activity Sheet

Part 1: Building A Helium Atom

In this part of the activity, you will explore what makes up a Helium atom.

1. Get a student activity sheet from your teacher and fill out the information for Helium.
2. How many protons does the Helium atom have? + marshmallows represent protons. Take the correct number of + marshmallows out of your bag.
3. How many neutrons does the Helium atom have? Unlabeled marshmallows represent neutrons. Take the correct number of unlabeled marshmallows out of your bag.
4. You should have two + marshmallows and two unlabeled marshmallows. Using toothpicks, put all of the marshmallows together.

What's happening...

You have just created the nucleus of the atom. The nucleus is the center of the atom and is made of protons and neutrons. The + marshmallows represent protons, as protons have a positive charge. The unlabeled marshmallows represent neutrons, which do not have a charge. Protons and neutrons make up the atomic mass of an atom.

5. How many electrons does the Helium atom have? Cheerios represent electrons. Take the correct number of Cheerios out of your bag.
6. Take a pipe cleaner out of your bag. Place the Cheerios on the pipe cleaner. You should have two Cheerios.
7. Attach the two ends of the pipe cleaner to create a circle.

What's happening...

You have just created the first electron shell of the atom. The first electron shell can only hold two electrons. The Cheerios represent electrons, which have a negative charge. When atoms have an overall charge of zero, the number of electrons is the same as the number of protons.

8. Place the nucleus inside the electron shell. You have created a model of the Helium atom.
9. Sketch the Helium atom on your student activity sheet. Label the subatomic particles (protons, neutrons, electrons) and their charges.

10. After you have completed the sketch, take apart your Helium atom and place everything back into the bag.

Where are the protons and neutrons found in an atom? Where are the electrons found in an atom? In your model what represents the protons? What represents the neutrons? What represents the electrons?

Part 2: What Atom Do You Have?

In this activity, you will work with a partner to identify an atom based on its structure.

1. Remove all the items from your bag. How many protons, electrons, and neutrons do you have?
2. Build your atom, being sure to place each part in the correct position.
3. Sketch your model.

Based on your model what is your element name, element symbol, and atomic mass? You may use a periodic table.

4. Rotate to a different group's model and determine which atom their model represents based on its structure. Record the number of protons, number of neutrons, number of electrons, element name, and symbol for the atom. Repeat this process two more times.

What's happening...

As of today, there are over 118 different elements that have been discovered. 90 of these elements occur naturally on Earth, while the others have been created using technology. *If an element with 300 electrons and an atomic mass of 600 was discovered, how many neutrons and protons would you expect it to have? Explain your answers. Where would each particle be located in an atom of this element?*