

LESSON 2

element
compound

atom
molecule

nucleus
proton

positive charge
neutron

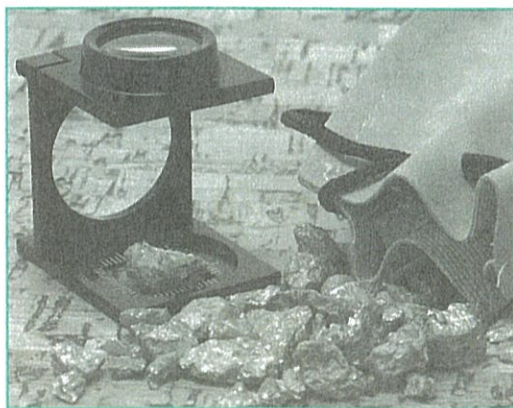
electron
negative charge

Most objects are made up of billions of smaller things, which are made up of even smaller things. Read this selection to learn more about the structure of matter.

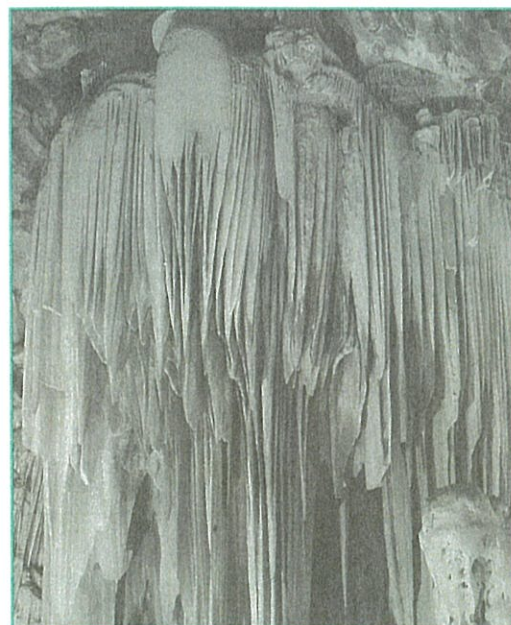
The Structure of Matter

Elements and Compounds

A substance can be an element or a compound. An **element** is a substance that cannot be broken down into simpler substances by a chemical change. A **compound** is a substance made up of two or more elements. A compound has properties that are different from those of its elements. But compounds can be broken down again into the elements they contain by a chemical change.



Gold is an element.



Calcium carbonate is a compound.



Atoms and Molecules

An **atom** is the smallest unit of an element that still has the properties of that element. Every element consists of atoms of the same type. Some elements have one atom, and others have many more.

The smallest unit of a compound that still has the properties of that compound is a **molecule**. A molecule is made up of two or more different types of atoms. All the atoms making up each element in the compound combine to form a molecule.

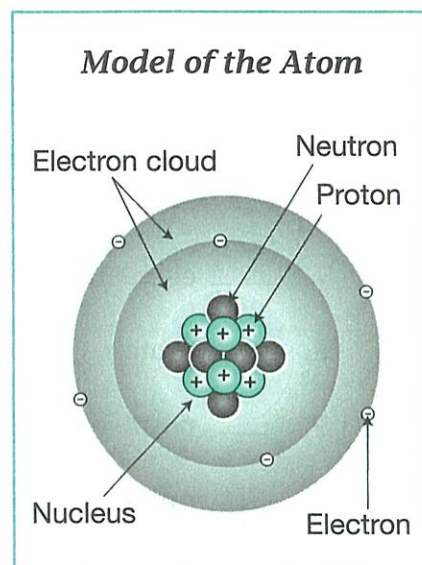
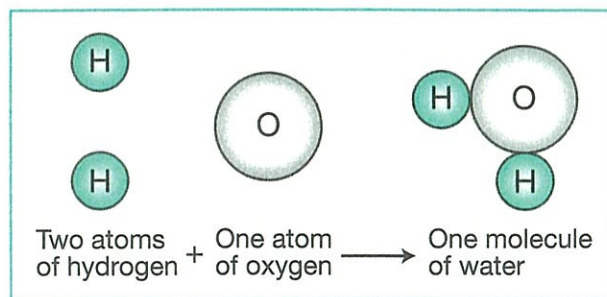
The Structure of an Atom

Over the years, scientists have created many models of the atom. Today, scientists believe the atom has a center nucleus with tiny particles spinning around it. The **nucleus** is the part of the atom that has the greatest amount of matter, or mass.

The nucleus contains at least one proton. A **proton** is a particle with a positive charge. A **positive charge** is an electric charge greater than zero. An atom may also have one or more neutrons in the nucleus. A **neutron** is a particle with no electric charge.

Electrons orbit the nucleus in a sort of cloud. An **electron** is a particle with a negative charge. A **negative charge** is an electric charge that is less than zero.

Each known element has a specific number of protons in the nucleus and an equal number of electrons in the cloud. The electric charges of the protons and electrons balance.



My Science Vocabulary

Go to page 94 to list other words you have learned about the structure of matter.



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Match each word with its meaning. Write the letter of the correct meaning on the line in front of each word.

1. ____ molecule
 2. ____ negative charge
 3. ____ atom
 4. ____ electron
 5. ____ compound
 6. ____ neutron
 7. ____ element
 8. ____ proton
 9. ____ positive charge
 10. ____ nucleus
- a. the smallest unit of an element with the properties of that element
 - b. a particle in the nucleus of an atom with a positive charge
 - c. an electric charge less than zero
 - d. a substance made up of two or more elements
 - e. a particle in the nucleus of an atom with no electric charge
 - f. the smallest unit of a compound with the properties of that compound
 - g. the center part of an atom where protons and neutrons are found
 - h. a particle in an atom with a negative charge
 - i. a substance that cannot be broken down into simpler substances by a chemical change
 - j. an electric charge greater than zero

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Choose and write the two words that best complete each sentence.

element electron negative charge compound

1. An _____ cannot be broken down into simpler substances by a chemical change, but a _____ can.

molecule nucleus atom proton

2. The smallest unit of an element is an _____ ,
and the smallest unit of a compound is a _____ .

negative charge molecule positive charge compound

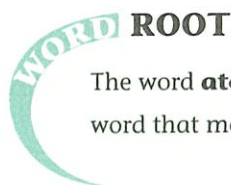
3. The nucleus of an atom contains particles with a _____ ,
and is surrounded by a cloud containing particles with a
_____ .

electron proton neutron nucleus

4. In the nucleus of an atom, the _____ has a positive
charge, but the _____ has no electric charge.

electron molecule nucleus negative charge

5. In the current model of the atom, each _____ orbits the
_____ .



The word **atom** comes from **atomos**, a Greek word that means "unable to be divided."

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C. Write the vocabulary word that best completes each pair of sentences.

1. The smallest unit of a compound is a _____ .
Different types atoms make up a _____ .
2. An electric charge greater than zero is a _____ .
A proton is a particle with a _____ .
3. Protons and neutrons are found in the _____ of an atom.
The _____ is the part of the atom with the greatest mass.
4. A substance with of two or more elements is a _____ .
During a chemical change, a _____ can break apart.
5. The negatively charged particle in an atom is an _____ .
In an atom, an _____ orbits the nucleus.
6. The particle in an atom with a positive charge is a _____ .
An atom's nucleus contains at least one _____ .
7. An electric charge less than zero is a _____ .
The particle in an atom with a _____ is an electron.
8. Protons and electrons are particles in an _____ .
The smallest unit of an element is an _____ .
9. The particle in an atom that has no charge is a _____ .
The proton and the _____ are the two kinds
of particles in the nucleus.
10. A substance that cannot be broken down by a chemical change
is an _____ .
A compound is made up of more than one _____ .



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D. Use each pair of words in a sentence.

1. element, atom

2. molecule, compound

3. positive charge, negative charge

4. proton, electron

5. nucleus, neutron



Write!

*Write your response to the prompt on a separate sheet of paper.
Use as many vocabulary words as you can in your writing.*

Imagine that you could travel inside an atom. What would you see?

