

where Earth's gravity is too weak to prevent particles of gas from drifting into space.

Atom

The tiny particles called atoms are the basic building blocks of all matter. Atoms can be combined with other atoms to form molecules, but they cannot be divided into smaller parts by ordinary means.

The word atom comes from the Greek word *atomos*, meaning “indivisible.” The ancient Greeks were the first to think of the atom as the basic unit of all matter. It was not until the early 1800s, though, that scientists began to understand how atoms work.

Structure

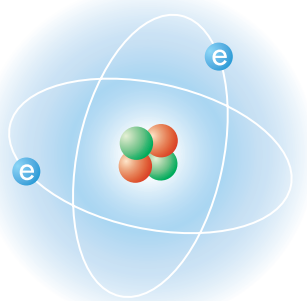
Each individual atom is made up of smaller particles—electrons, protons, and neutrons. These are called subatomic particles. At the center of an atom is a nucleus. The nucleus consists of protons and neutrons. Protons carry a positive electrical charge, while neutrons carry no electrical charge. Together, protons and neutrons are called nucleons. Surrounding the nucleus is a cloud of negatively charged electrons.

Scientists believe that subatomic particles—protons, neutrons, and electrons—are themselves made up of smaller substances. The substances are called quarks and leptons.

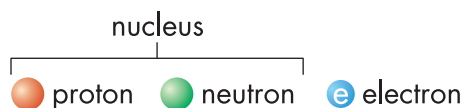
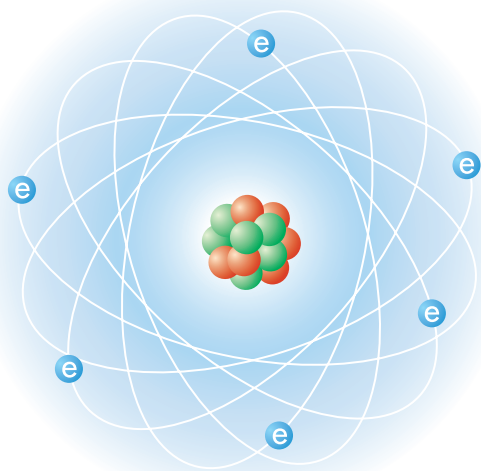
Properties

The single most important thing to know about an atom is how many protons it has in its nucleus. This is known as its atomic number. The atomic number determines what kind of atom it is. Every atom is associated with a specific chemical element. An atom is the smallest unit of an element, and each chemical element has a unique atomic number. For instance, hydrogen has an

Helium



Carbon



All atoms have the same basic parts. These are a nucleus and at least one particle called an electron. The nucleus contains protons and neutrons. Diagrams of two kinds of atoms show that each kind of atom has a different number of electrons.

atomic number of 1 because every hydrogen atom has one proton in its nucleus. No other element has an atomic number of 1.

Another property of atoms is their atomic weight. This is roughly equal to the total number of protons and neutrons in an atom. Atoms that have the same atomic number but different atomic weights are called isotopes. Carbon-12, the ordinary form of carbon, has six protons and six neutrons per atom. Carbon-14 is an isotope with eight neutrons per atom. It still has six protons. If it did not have six protons, it would not be carbon.

An ordinary atom has an equal number of protons and electrons. This means that the positive and negative charges are balanced. Some atoms, however, lose or gain electrons in chemical reactions or in collisions with other particles. Ordinary atoms that gain or lose electrons are called ions. If a neutral atom loses an electron, it becomes a positive ion. If it gains an electron, it becomes a negative ion.

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Atsina

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Attucks, Crispus

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Did You Know?

One proton is about as heavy as 2,000 electrons.