

Atoms

This page has something important in common with the breakfast you ate this morning. Your breakfast has something in common with your hands holding this page. In fact, everything around you has it in common; can you guess what it is?

It's matter, and everything is composed of it. Matter is defined as anything that takes up space. Even microscopic substances take up space; therefore they are matter.

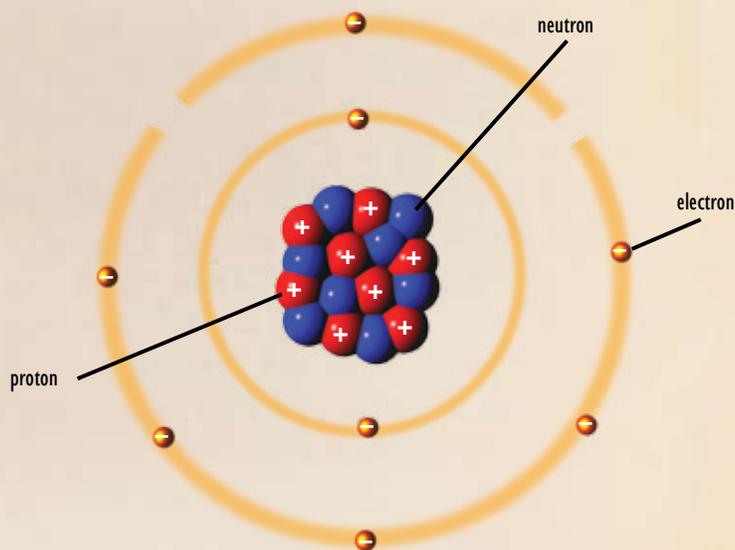
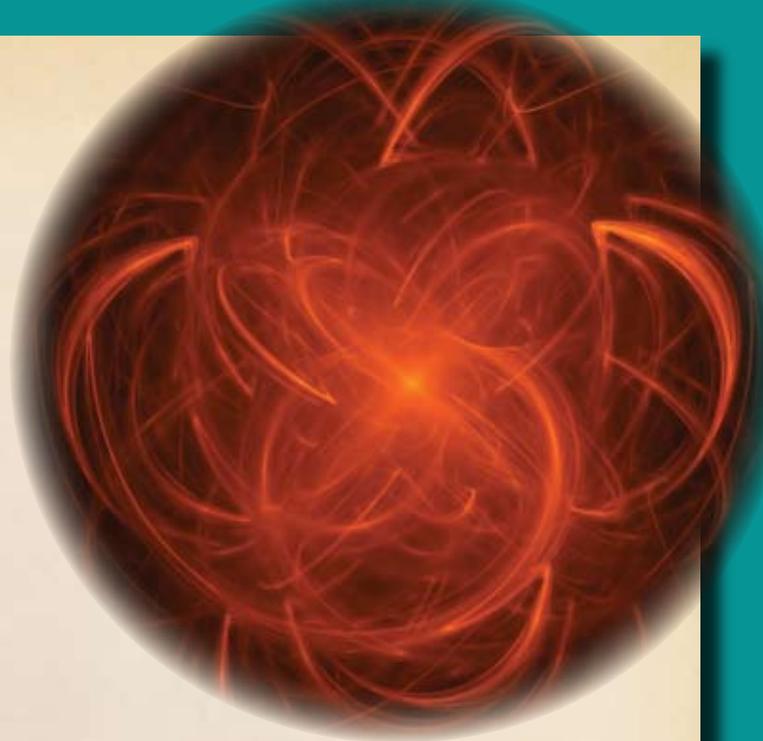
No matter what, matter is made of tiny particles called atoms. Atoms are the building blocks of everything in the universe. They are everything in the world around you: they are the air you breathe, the food you eat, the things you touch, and the clothes you wear. They even are the building blocks of you, your family, and your friends!

Different Atoms, Different Things

Different things are made of different atoms. An iron bar is made of iron atoms; oxygen gas is made of oxygen atoms.

Objects get properties (PROP-er-tees) from the atoms they are made of. For instance, iron atoms conduct electricity. An iron bar, then, also conducts electricity. Oxygen atoms combine with other atoms easily. Oxygen gas is one of the most reactive substances known to man.

Some substances are combinations of different atoms. Rust is composed of iron and oxygen atoms. Because it is made of a mix of atoms, it has different properties.



Oxygen atom

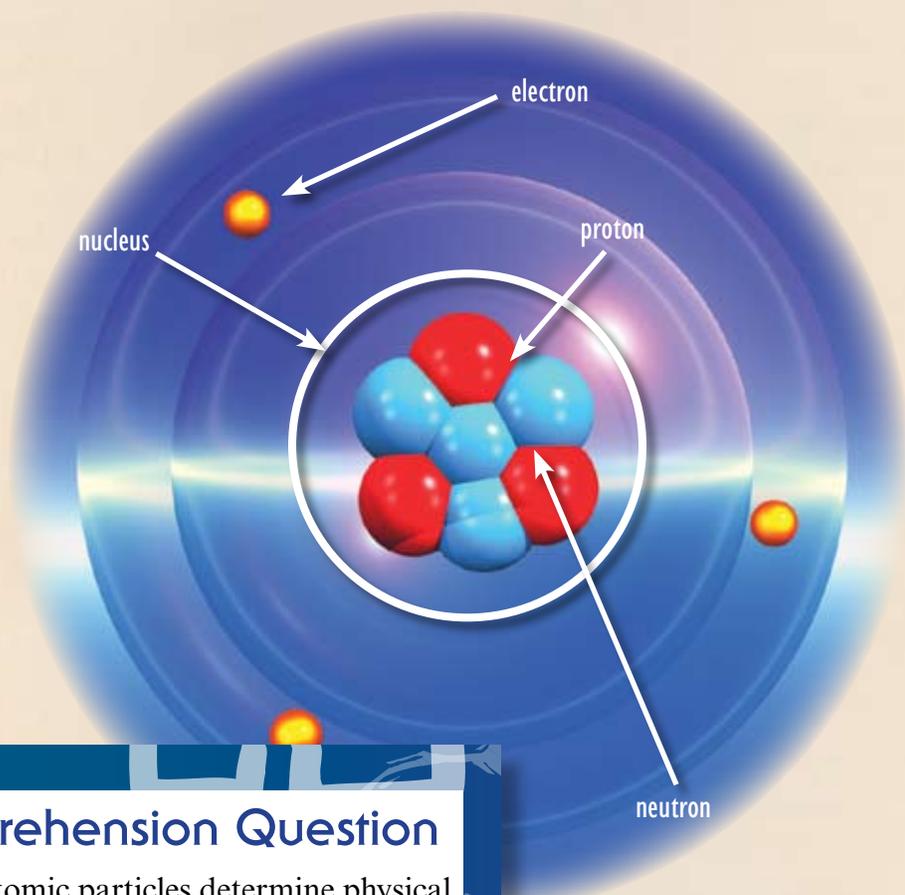
Inside the Atom

If you could peek inside an atom, you would see a lot going on. First you might notice its small, tightly-packed center: the nucleus (NOO-klee-uhs). Inside the nucleus are even tinier particles: protons (PROH-tons) and neutrons (NOO-trons). Usually, there is approximately the same number of protons and neutrons in the nucleus. They are squeezed tightly together; these forces are some of the strongest in the universe.

Look again; around the nucleus you will see clouds of particles called electrons (uh-LEK-trons). They orbit around the nucleus. Each atom has the same number of electrons and protons. If it doesn't, it tries to balance out.

Protons and electrons are charged particles. Protons have a positive charge; electrons have a negative charge. Since there are the same number of each, they balance the atom's charge. The atom as a whole is neither positive nor negative.

With the discovery of the electron, scientists thought they knew all the parts of an atom. In 1961, two scientists suggested there were even smaller particles. They were named quarks (kwarks), after a nonsense word from a novel, because the scientists weren't sure they really existed. Over the next twenty years, scientists found that protons and neutrons are made of these smallest particles.



Comprehension Question

How do atomic particles determine physical properties, like conduction?