



TEACHER GUIDE

ATOMS AND MOLECULES GRADES 6-8

COMMON MISCONCEPTIONS

- **The atomic structure in our video is what atoms look like in real life.**
The atomic structure learned about at this grade level is a **model** that helps us understand how atoms behave and react, but it is just a model. It is close to reality, but simplified. At higher grade levels they will learn that electrons do not orbit in defined circles for example.
- **The space between atoms is filled with air.**
The space between atoms is empty space. Students often find empty space difficult to imagine, and “fill” it with something they can visualize.
- **The periodic table needs to be memorized.**
The Periodic Table of Elements is a reference table that many scientists reference for their jobs. It is useful to know your way around it, but it does not need to be memorized.

ATOMIC STRUCTURE

Scientists have developed theories of atomic structure for hundreds of years through experimentation. To date, we have found 95 naturally occurring elements. Each one takes on the same basic atomic structure: neutrons and protons make up the nucleus of the atom and electrons orbit the nucleus (in this simplified model). In more advanced models, electrons are shown as electron clouds (general areas where they are mathematically most likely to be found). The only difference between each element is the number of protons, neutrons and electrons they have.

ISOTOPES

Isotopes are atoms of a single element that differ in the number of neutrons. For example, hydrogen usually has 1 proton, 1 electron, and no neutrons. Hydrogen can also exist with 1 neutron. In that form, it is called deuterium. Another isotope of hydrogen is tritium which has 1 proton, 1 electron, and 2 neutrons. The number of protons and electrons remain the same in each isotope. Only the number of neutrons changes, which also results in a change to atomic mass. In this lesson, we did not discuss isotopes to keep the introductory lesson on atoms simple.

MOLECULES AND COMPOUNDS

Molecules are any combination of 2 or more atoms. A molecule could be 2 of the same type of atom, such as a molecule of oxygen (O_2), or a molecule could be made up of 2 or more different atoms, such as water (H_2O). If there are 2 **different** types of atoms, this molecule is called a compound. So, water is a molecule and compound. Oxygen gas (O_2) is a molecule but not a compound.



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