

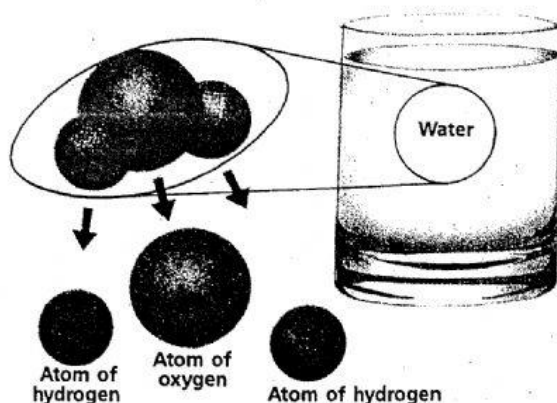
14-1 What are atoms?

Objectives ▶ Identify an atom as the smallest part of an element. ▶ List the parts of Dalton's atomic theory.

TechTerm

- ▶ **atom:** smallest part of an element that can be identified as that element

Atoms An **atom** is the smallest part of an element that can be identified as that element. Elements are simple substances that cannot be broken down into simpler substances. What happens if you keep cutting an element into smaller and smaller pieces? There is a smallest piece of an element that cannot be divided any further. This smallest piece is called an atom.



Define: What is an atom?

Democritus The first person to suggest the idea of atoms was the Greek philosopher Democritus (di-MAHK-ruh-tus). More than 2400 years ago, Democritus asked whether it is possible to divide a sample of matter forever into smaller and smaller pieces. After much thought, Democritus came to the conclusion that it is not possible to divide matter forever. At some point, a smallest piece would be reached. Democritus named this smallest piece an atom. The word "atom" comes from a Greek word that means "cannot be divided."

Democritus and his students did not know what scientists today know about atoms. However, they hypothesized that atoms were small, hard particles that were all made out of the same material. They also thought that atoms were infinite in number, that they were always moving, and that they could be joined together.

Identify: What does the word "atom" mean?



Dalton's Atomic Theory In the early 1800s, an English chemist named John Dalton did some experiments. Based on his observations, Dalton stated an atomic theory of matter. The main parts of Dalton's atomic theory are as follows:

- ▶ All elements are composed of atoms. Atoms cannot be divided or destroyed.
- ▶ Atoms of the same element are exactly alike.
- ▶ Atoms of different elements are different.
- ▶ The atoms of two or more elements can join together to form compounds.

Like Democritus, Dalton had some ideas about atoms that scientists no longer agree with. However, Dalton's atomic theory was the beginning of the modern theory of atoms.

List: What are the parts of Dalton's atomic theory?