Grade 6; What do You Know about H_2O?

SOL 6.4

Supplemental Resource Available on eCART

What is Electricity? Book 2: R002EF0

Image Credits

Cover picture of the Earth by NASA; retrieved on January 12, 2011. http://visibleearth.nasa.gov/view_rec.php?id=2429

Beach photograph by C.M. Walton; taken Nov. 25, 2010

Aluminum foil photograph by C.M. Walton; taken July 24, 2011

Brick house photograph by C.M. Walton; taken Jan. 15, 2011

Bricks photograph by C.M. Walton; taken Jan. 15, 2011

Periodic Table of Elements from WP Clipart; retrieved Jan. 19, 2011 http://www.wpclipart.com/science/atoms_molecules/periodic_tables/periodic_table_of_the_elements.png

Sky photograph by C.M. Walton; taken June 29, 2010

All other images are from Microsoft Clip Art:

Credits

This instructional support material was created as a result of a joint project in 2011. It has been produced under the supervision of Stephanie Roche, Elementary Science Specialist and Karen Hensley, ESOL Specialist. Members of the curriculum team were Christina Russell, Ursula Pece, and Catherine Walton.

Atoms, Atoms Everywhere!

Written by Fairfax County Public Schools
Summer Curriculum Project 2011

Table of Contents

Words to Remember

matter

atom

proton

neutron

electron

atomic nucleus

electron cloud

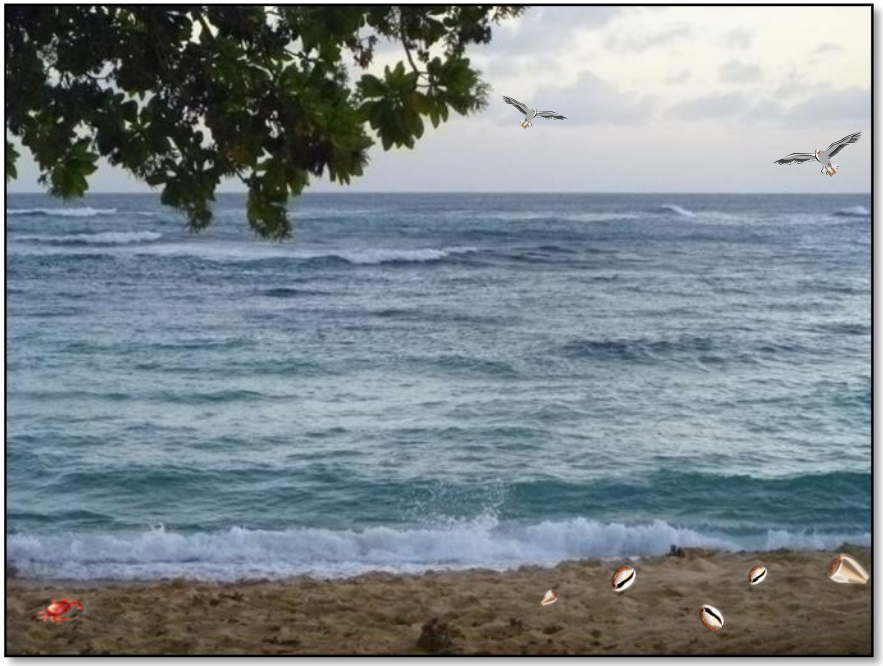
element

compound

Matter

Matter is anything that takes up space and has mass.

Look at the picture:



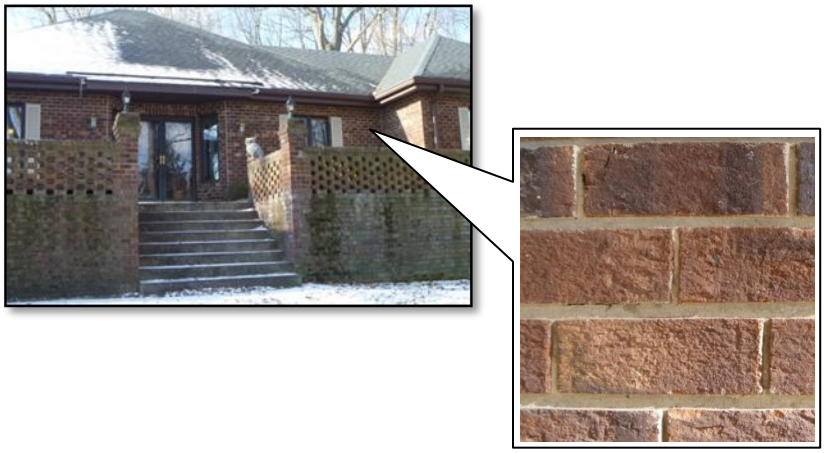
What in the picture is matter?

That's right – everything. Water, plants, animals, sand, clouds, and air are all matter.

Atoms

Atoms are the building blocks of matter.

Just like this house is made of many bricks, all matter is made up of many atoms.

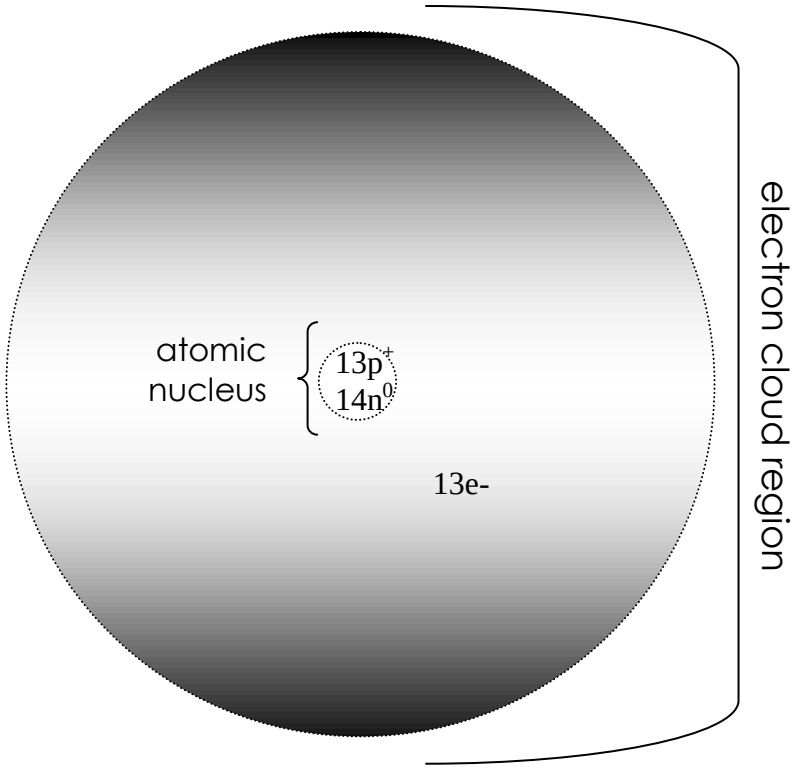


Bricks on a building are easy to see. Atoms that make up matter are not. Atoms are very small; so small, that one atom cannot be seen without a special machine.

Aluminum is a common metal used in most kitchens for food storage. Aluminum is an element.

Imagine you could see into a speck of dust from the aluminum foil. You would see countless numbers of aluminum atoms!

If you were to look at <u>one</u> aluminum atom in the foil, it would probably look like this:



Every atom has neutrons, protons, and electrons. It is the number of neutrons, protons, and electrons that makes atoms different from one another.

Notice within the aluminum atom diagram there are symbols and words.

p^+ is the symbol for **protons**

n^0 is the symbol for **neutrons**

e^- is the symbol for **electrons**

In the aluminum atom, there are 13 protons, 14 neutrons, and 13 electrons. The number of protons identifies the type of atom. This atom has 13 protons so it is aluminum.

The protons and neutrons are located within the **atomic nucleus** of the atom.

The electrons are located in a region around the atomic nucleus called the **electron cloud**.

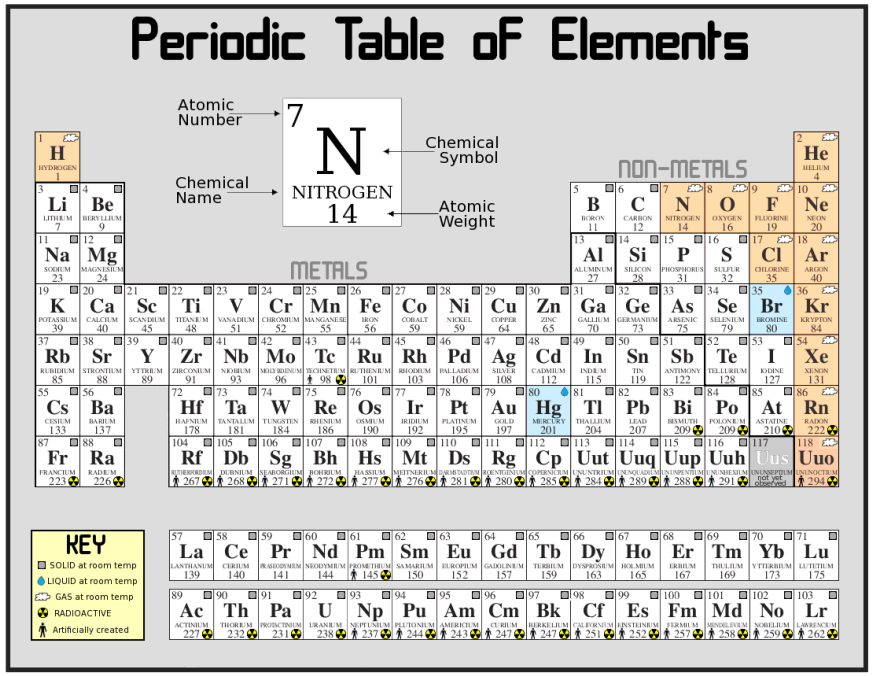
Elements

An **element** is a form of matter made up of only one type of atom. For example the aluminum in the foil is made up of only aluminum atoms.

So, foil is one form of the element aluminum.

Remember, although the aluminum foil is made up of only the element aluminum, there are many, many aluminum atoms within the foil.

There are a lot of elements that have been discovered. All of the known elements are organized on a chart called the Periodic Table of Elements.

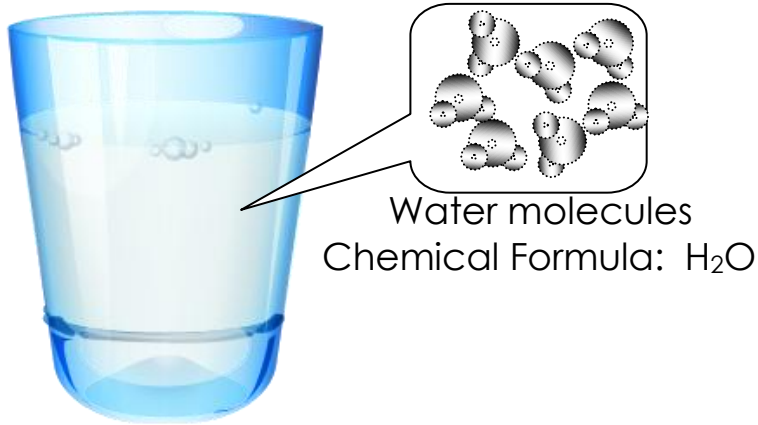


Although there are a large number of elements, there are only about 15 elements that make up most of the living and nonliving things occurring naturally on Earth.

Combining Atoms

Atoms from the same or different elements combine to form different types of matter.

Two or more atoms can combine chemically to form different substances. For example, two hydrogen (H) atoms and one oxygen (O) atom combine to form a water molecule.



Water molecules
Chemical Formula: H_2O

Atoms of different elements can combine: for example, a carbon (C) atom can combine with two oxygen (O) atoms to form carbon dioxide (CO_2). Carbon dioxide is an important gas that plants need to survive.

Atoms of the same element can combine: for example, two oxygen (O) atoms can combine to form the oxygen (O_2) gas in the air that we breathe.

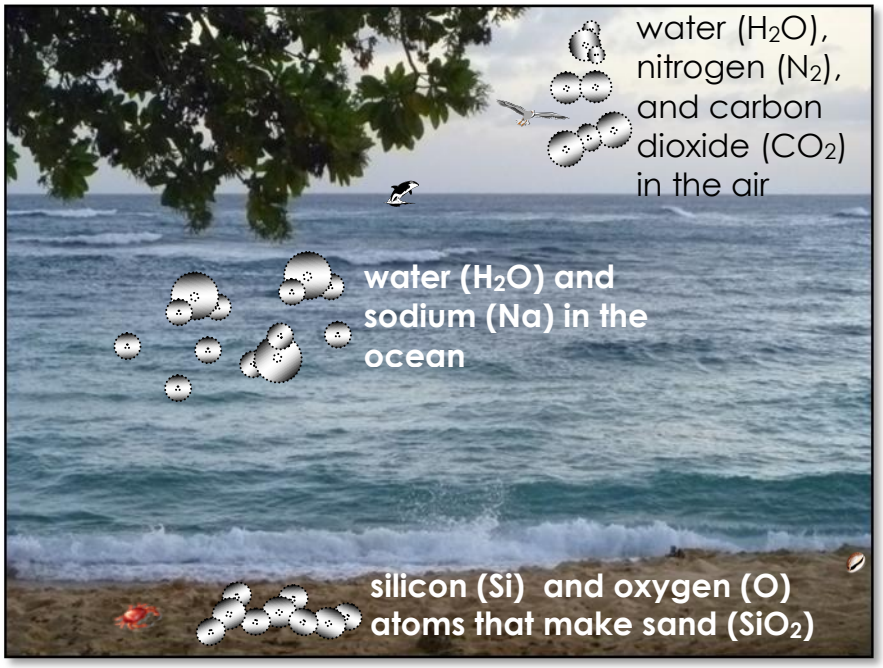
The element nitrogen (N_2) is one of the main ingredients found in air. Nitrogen makes up 78% of air; oxygen is about 21%.

The element iron (Fe) is found naturally in the soil.

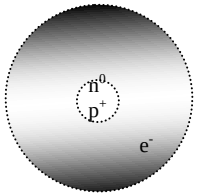
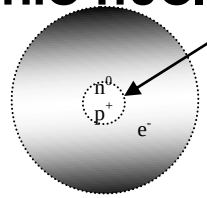
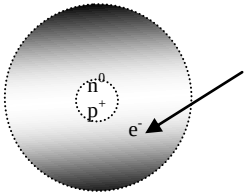
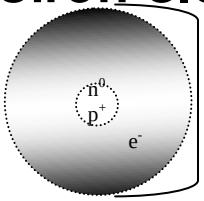
Iron (Fe) and Carbon (C) are the elements that go into making the steel **compound** (Fe_3C). The head of this hammer is made of steel.

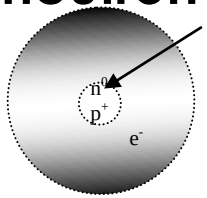
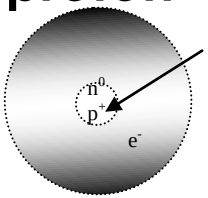
Silicon (Si) and oxygen (O) are combined to make the compound for glass (SiO_2).

Look at the picture and find some of the different elements and compounds that make up the air, water, and sand.



Glossary

atom 	building blocks of matter
atomic nucleus 	center of the atom that has the neutrons and protons within it
compound  steel: Fe_3C	two or more atoms of different elements that are joined together
electron 	negatively charged particle that is located in the electron cloud region of an atom
electron cloud 	area around the atomic nucleus of an atom that contains the electrons

element 	a form of matter made up of only one type of atom
matter 	anything that takes up space and has mass
neutron 	atomic particle with no charge located in the atomic nucleus of the atom
proton 	positively charged particle that is located in the atomic nucleus of the atom

Index