Matter and Energy

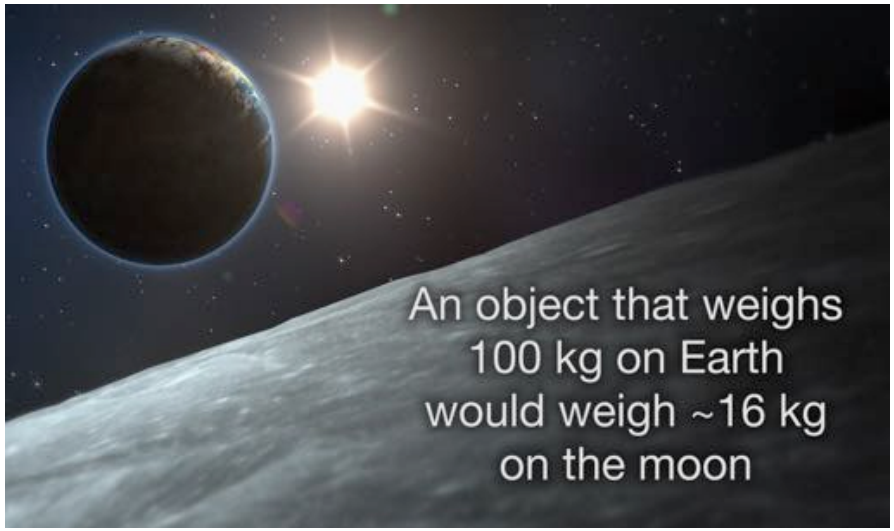
Intro to Environmental Science

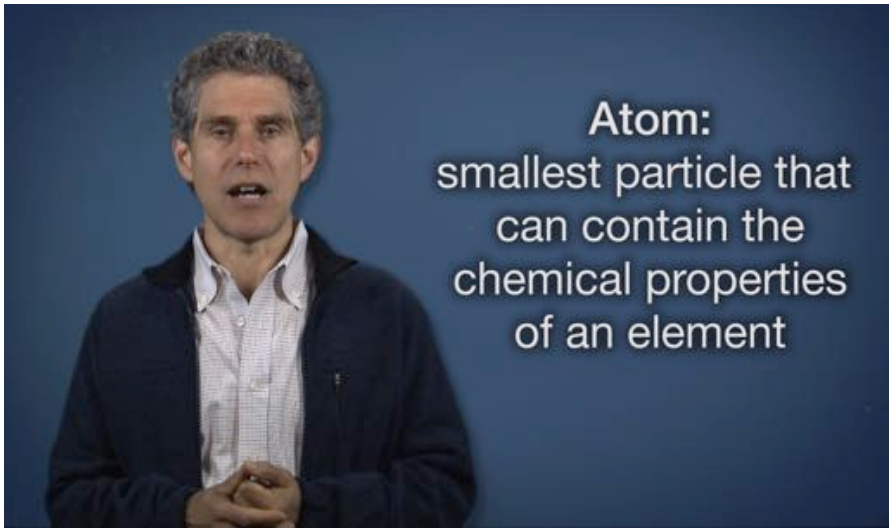
DartmouthX

Matter:
anything that
occupies space
and contains mass

Mass:
the amount of
matter an object
contains

Weight:
the force that results
from the action
of gravity on mass





Element:

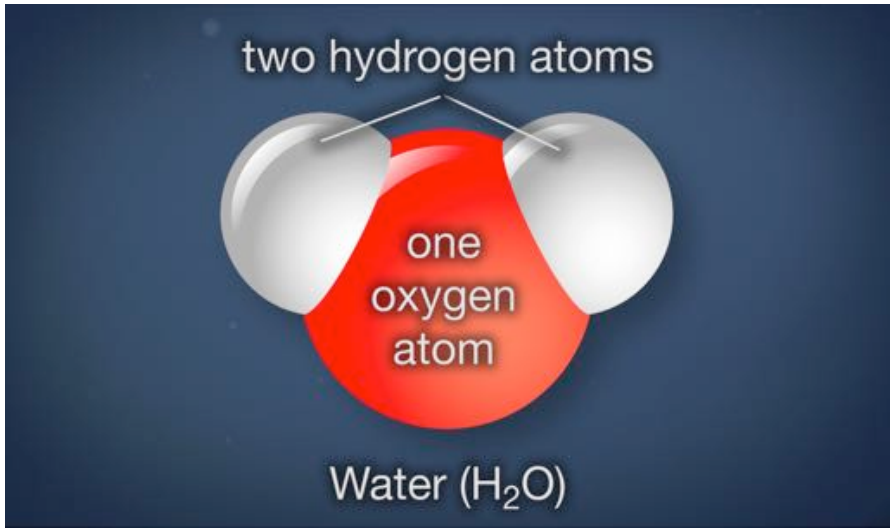
substance composed of atoms
that cannot be broken down into
smaller, simpler components

Molecules:

particles that contain
more than one atom

Compounds:

molecules that contain
more than one element



Atoms are composed of

Protons: positively charged
Electrons: negatively charged
Neutrons: neutral (no charge)

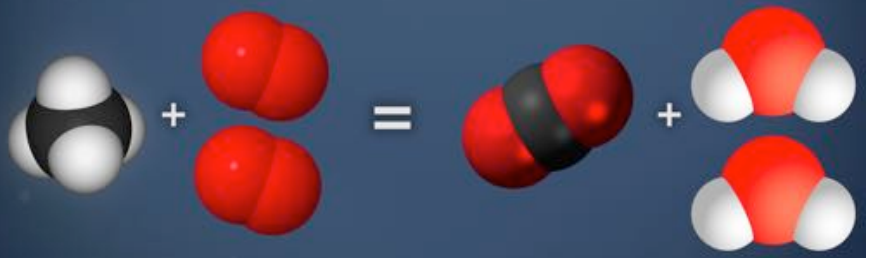
System:

any set of interacting components that influence one another by exchanging energy or materials

Chemical reaction:

when atoms separate from the molecules they are part of or combine with other molecules

$CH_4 + 2O_2 = CO_2 + 2H_20$



Law of Conservation of Matter:
matter cannot be created
nor destroyed;
it can only change form

Energy:
the ability to do work or
transfer heat

Joule:
a unit of energy;
one joule is needed
to light a one watt
lightbulb for
one second

calorie:

a unit of energy;
the amount of energy
needed to raise one
gram of water one
degree centigrade

First Law of Thermodynamics:

energy can neither be created nor
destroyed, only transformed from
one form to another

Second Law of Thermodynamics:

when energy is transformed
there is always a loss in energy quality
(the ability to do work decreases)

Efficiency of electrical generation
using coal as a fuel