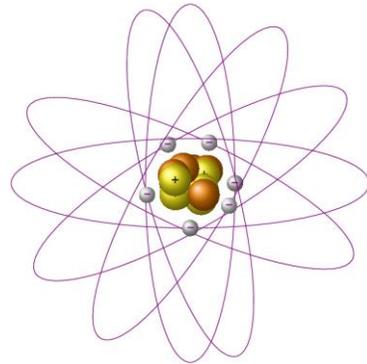


Chapter 9

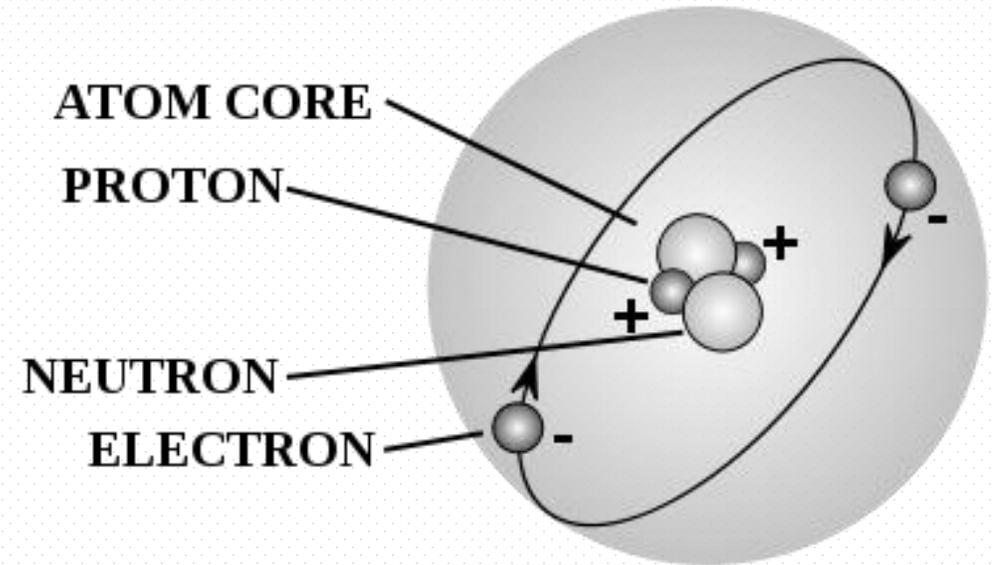
Lesson-1. Elements and atoms

- **The link between elements and atoms**
- **The properties of elements**



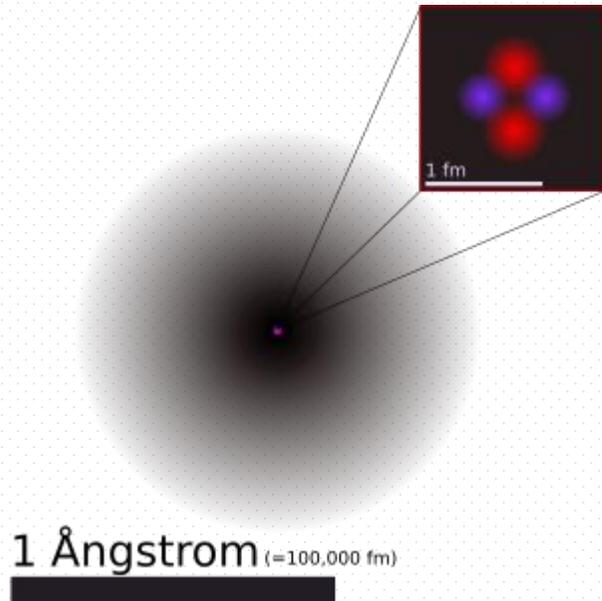
Atom

- Basic unit of matter
- Structure=
Protons +
Electrons-
Neutrons \pm
- Cannot break down further



Atoms

- Atoms are made up of electrons neutrons and protons.

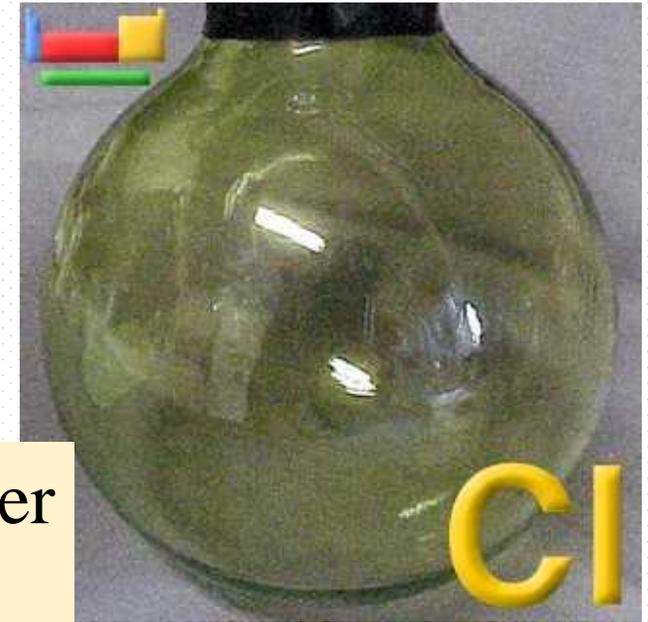


One atoms diameter

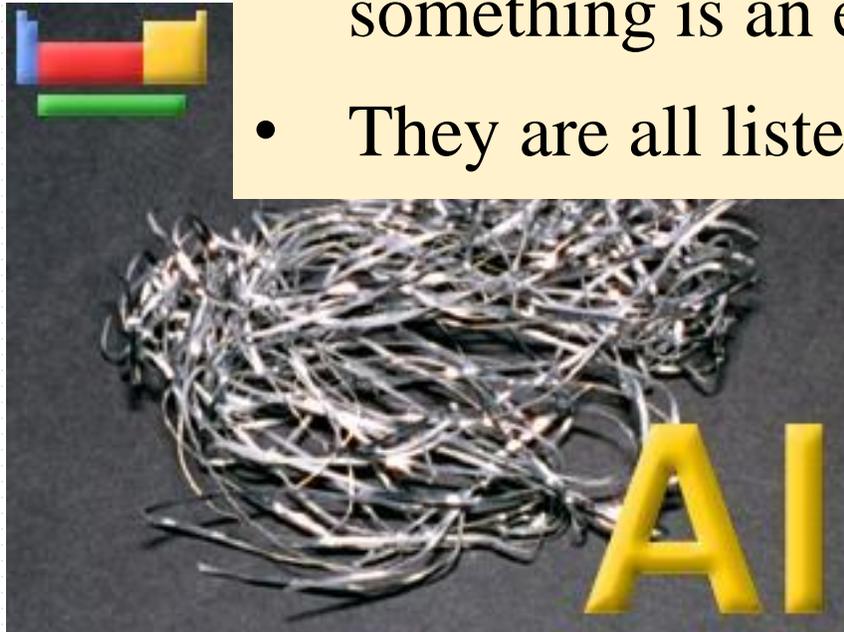


Empire state Building





- How can you determine whether something is an element or not?
- They are all listed on the periodic table



ELEMENT
SONG



Particles of matter

- Atom- indivisible

Compounds

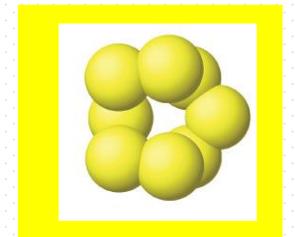
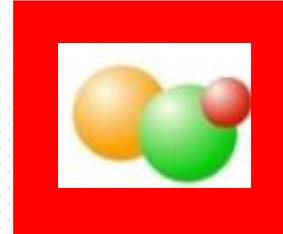
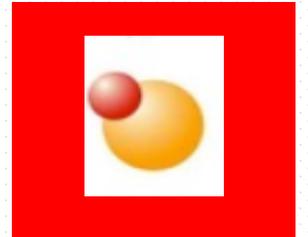
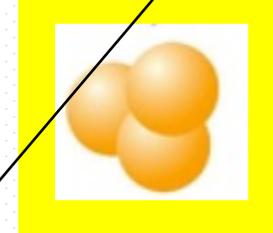
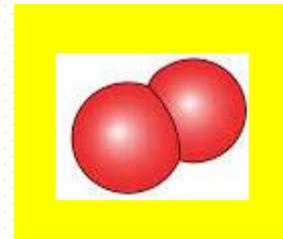
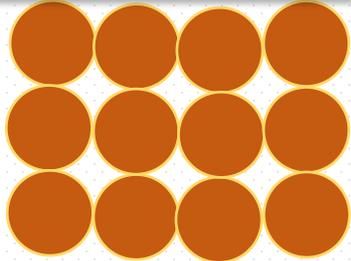
Atoms

Molecules



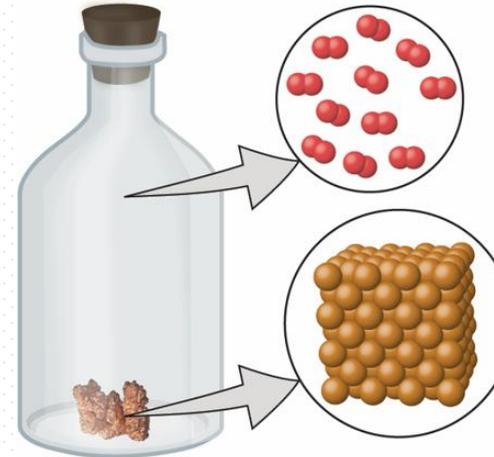
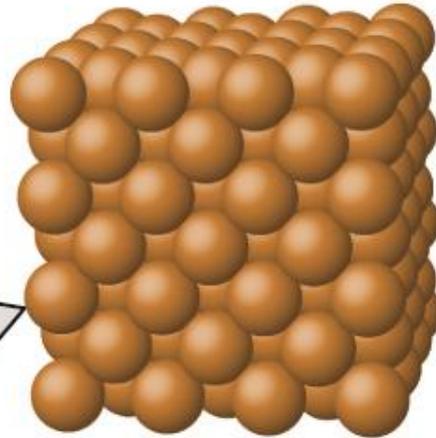
Elements

(118 element)

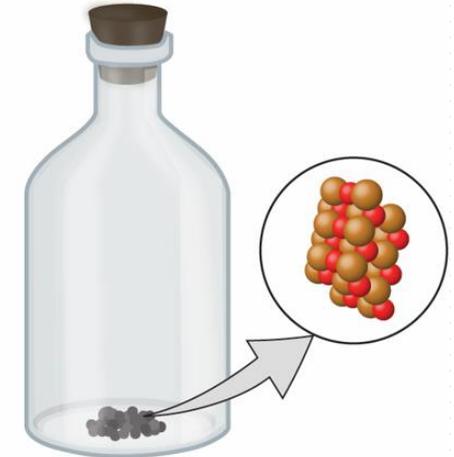


Which would
be the
elements?

Elements



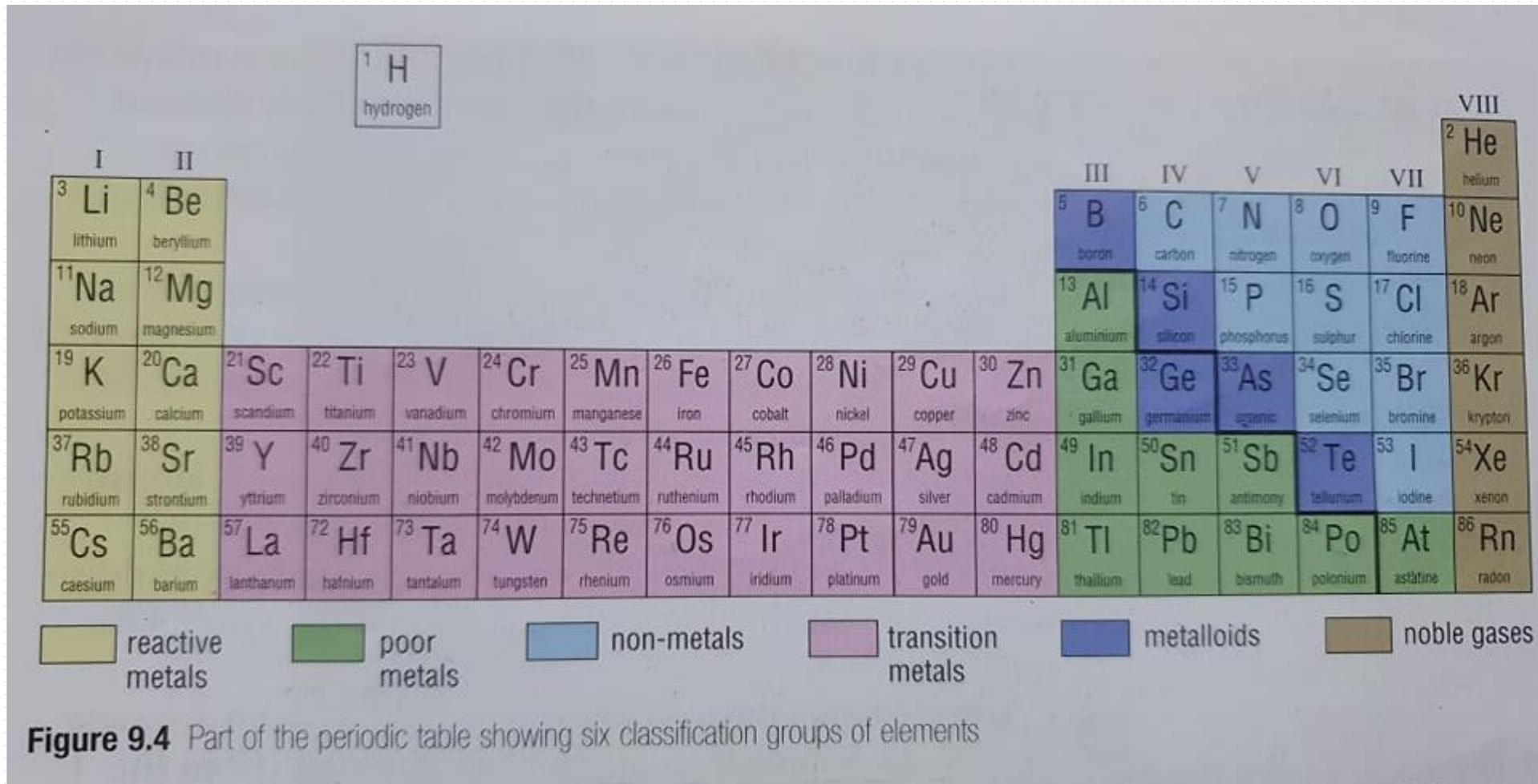
The elements
copper and oxygen



The compound
copper(II) oxide

- A sample of copper atoms (Cu). All atoms in the sample consist of copper, so the substance is homogeneous.
- A sample of copper (II) oxide molecules (CuO). All molecules in the sample consist of copper (II) oxide, so the substance is homogeneous.

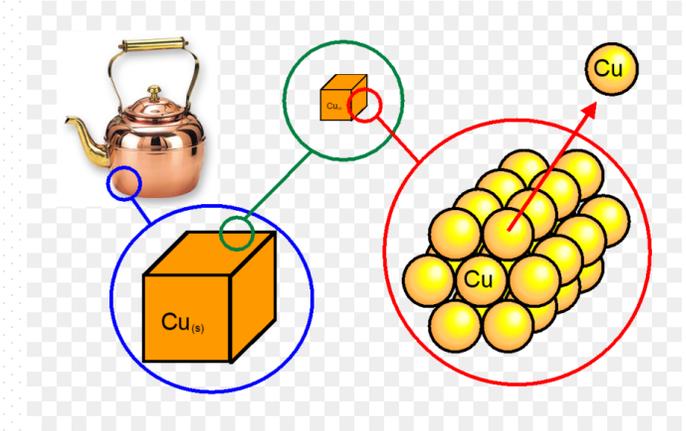
Periodic table



Elements

1. Pure substance

- Made of only 1 type of particle
- Ex: copper wire only has copper atoms



2. Can't be separated into simpler substances by chemical or physical means



Elements

3. Each has a unique set of properties

- Called characteristic properties
- Can be physical or chemical



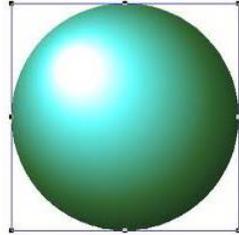
At room temperature
Standard pressure

- a yellow-green
- melting point -101°C
- Boiling point -34°C

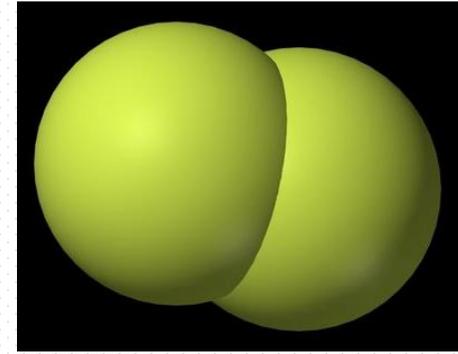
- a soft, silver-white metal
- melting point 98°C
- Boiling point 884°C



- ❖ Most elements can exist as a single atom (Fe, Cu).



- ❖ But some elements (mostly gases) usually exist as diatomic molecules (groups of 2 atoms).



Diatomic Gases

Hydrogen H_2

Nitrogen N_2

Oxygen O_2

Fluorine F_2

Chlorine Cl_2

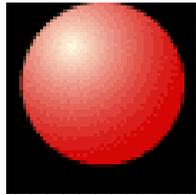
Bromine Br_2

Iodine I_2

Allotropes

Different structural forms of the same element.

Oxygen has 3 allotropes:



O
Monatomic
Oxygen
(Single Oxygen
Atom)



O₂
Diatomic
Oxygen
Molecule

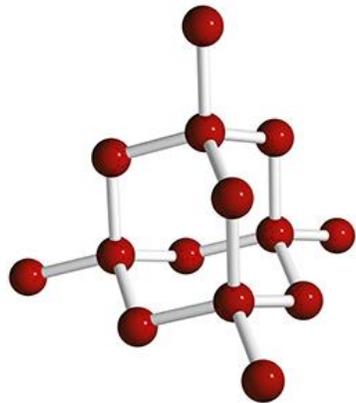


O₃
Ozone
Molecule

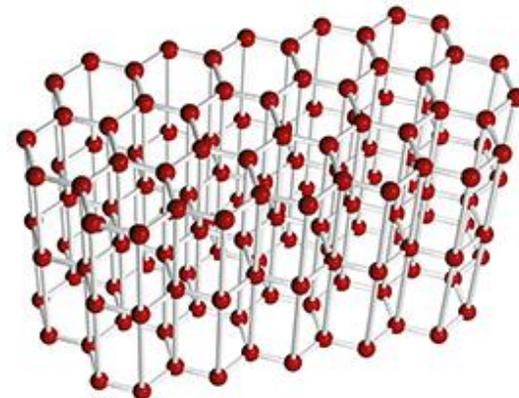
Allotropes of Carbon

All are pure carbon. Each has a different structure.

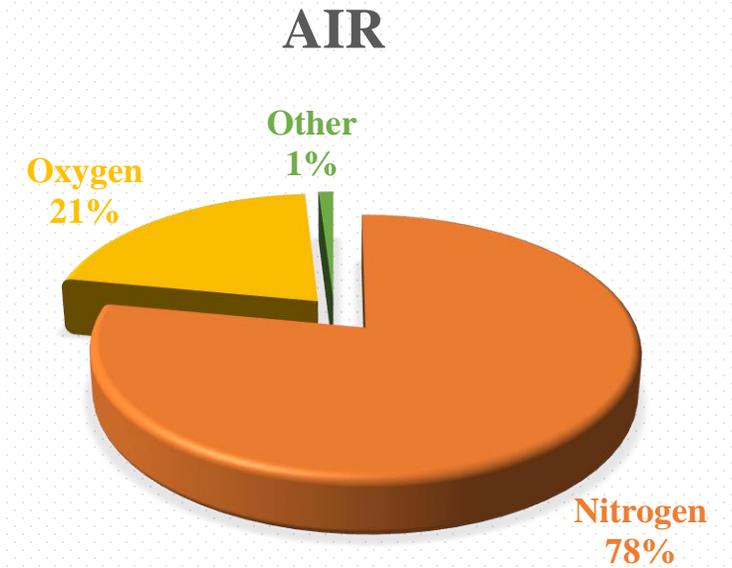
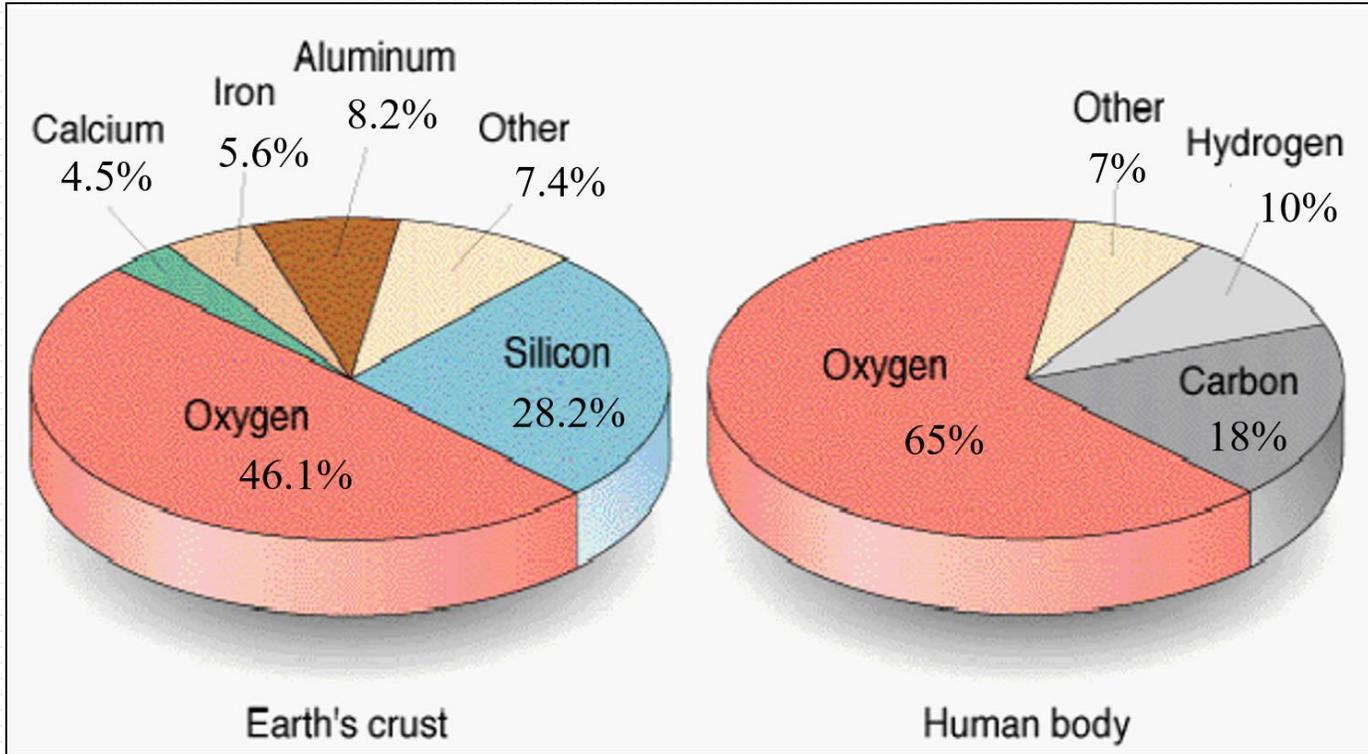
Diamond

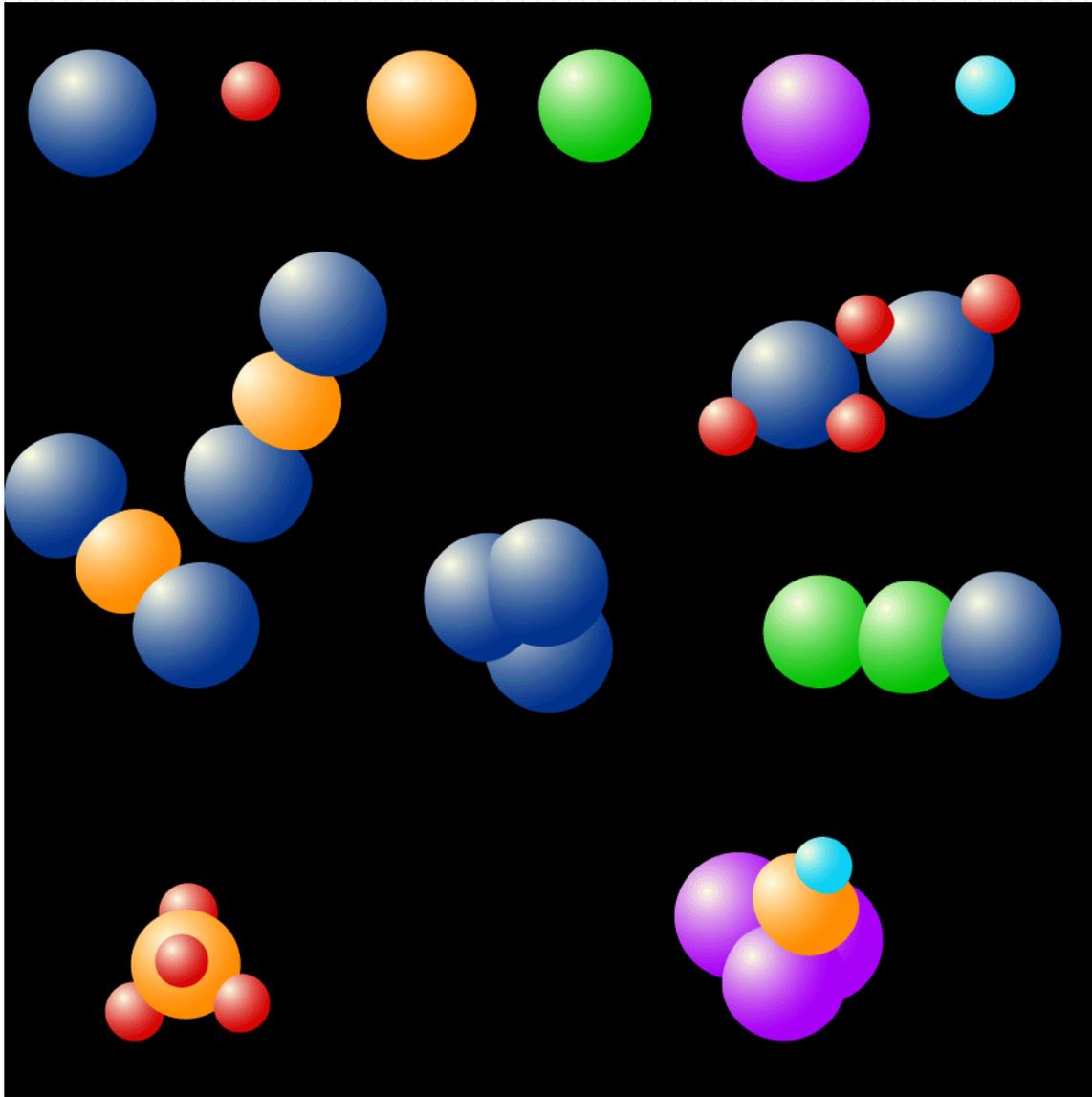


Graphite



The main elements in the Earth's crust, the air and human body

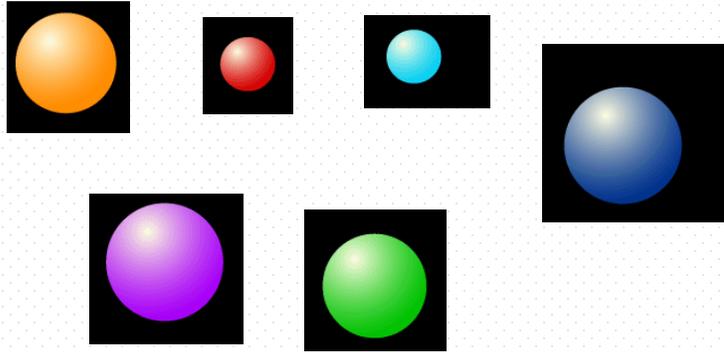




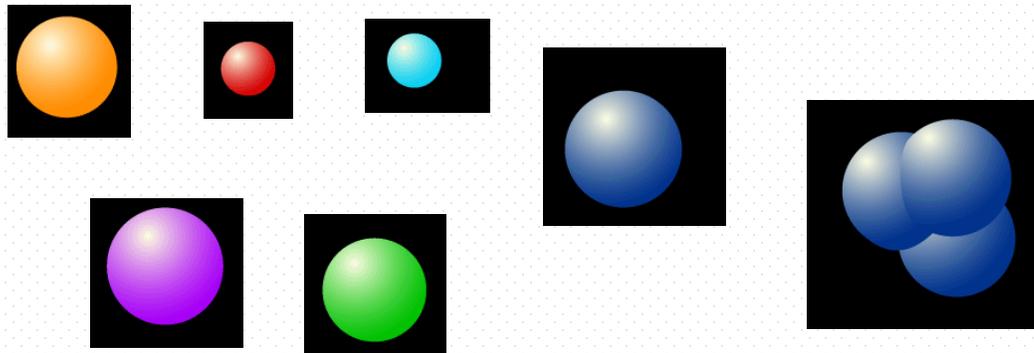
1. What are each of these?

**Atom, Element,
Molecule, or
Compound**

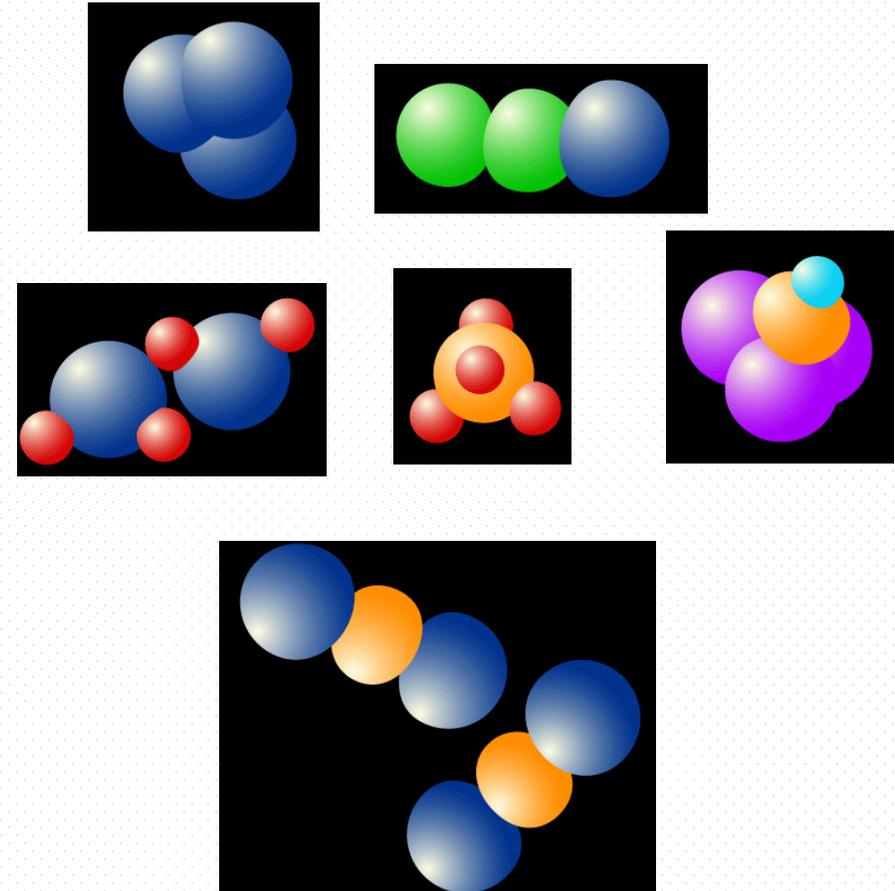
Atoms



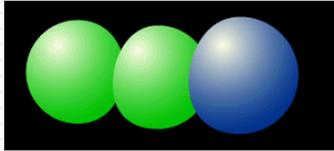
Elements



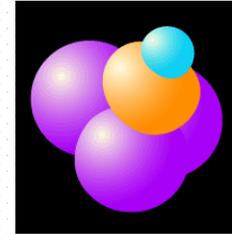
Molecules



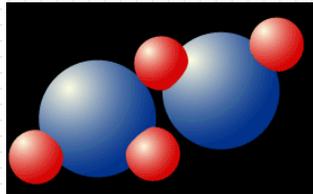
Compounds



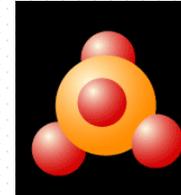
elements-2,
atoms-3



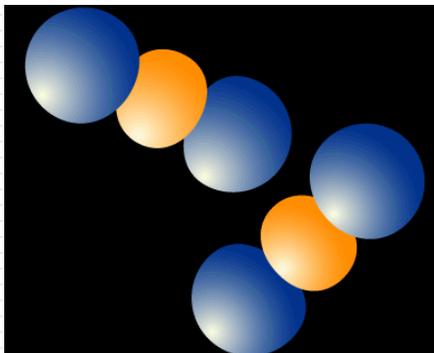
elements-3,
atoms-5



elements-2,
atoms-3,
molecules-2



elements-2,
atoms-5



elements-2,
atoms-3,
molecules-2

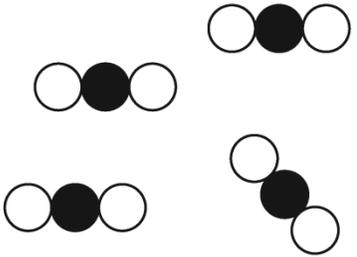
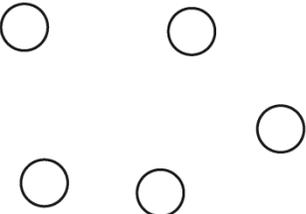
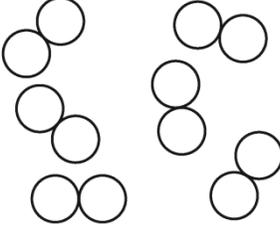
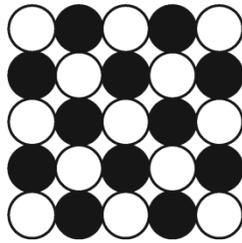


Elements, compounds and mixtures

- Substances can be broken down into elements.
- Element cannot be further broken into simple substance by any chemical or physical means.
- There are 118 elements known.
- Each element is given a unique chemical symbol (one or two letters). N-nitrogen, Na-sodium
- Each elements has its own special properties.
- When elements combine to make a compound, the compound has different properties from the elements from which it is made.

Homework

Use the letters in the boxes below to answer the questions that follow.

<p>A</p> <p>all the atoms are the same</p>	<p>B</p> 	<p>C</p> <p>contains more than one kind of atom joined together</p>
<p>D</p> 	<p>E</p> <p>smallest particle of an element</p>	<p>F</p> 
<p>G</p> <p>small group of atoms held together by bonds</p>	<p>H</p> 	<p>I</p> <p>examples are found in the Periodic Table</p>

- 1 Which box or boxes describe or show a pure element?
- 2 Which box or boxes describe or show a pure compound?
- 3 Which box or boxes describe or show a molecule?
- 4 Which box shows molecules that contain three atoms?
- 5 Which box shows a diagram of a compound that is not made up of molecules?
- 6 Oxygen gas has the formula O_2 . Which box shows a diagram of molecules of oxygen gas?