

Term 1 Lesson 1 Main Concepts

1. Disclosure document

see document or website

2. Safety

see document or website

3. Classroom procedure

see website

4. Basic science review

Science must be provable, measurable, and repeatable.

The scientific method

Observations – learn as much as you can about the topic

State the problem – word it in the form of a question

Hypothesis – guess at what the answer to the problem may be

Experiment – well-planned to determine answers

Record Results – carefully write down data from experiments

Theory – this is the answer to the question

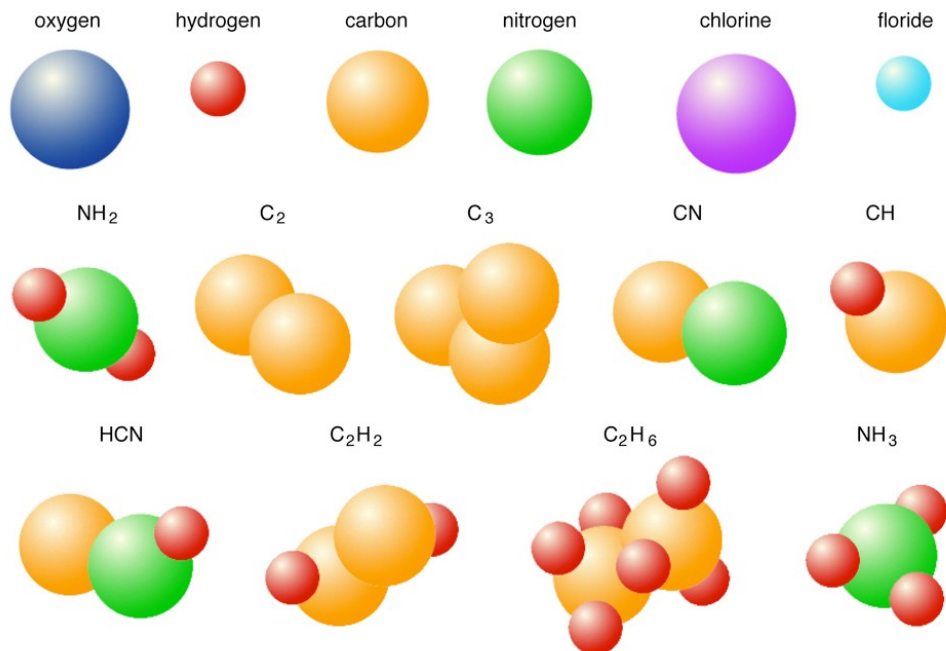
Evaluate your work – determine good, bad, and curious

5. Chemistry and math

Chemistry is the study of matter, which is made of atoms and molecules. As a science, it involves both quantitative data and qualitative. Quantitative data is data that can be recorded in terms of numbers and measurements... quantities. Qualitative data includes observations and qualities that cannot be recorded as numbers. Because quantitative information is used, it will be necessary to use math in chemistry. Most is nothing more than adding, subtracting, multiplying, and dividing. A calculator is recommended.

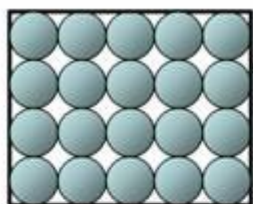
6. Matter, atoms, and molecules

Chemistry is the science of matter. Matter is made of molecules and atoms. Atoms are the smallest part of an element which can still be called an element. Two or more atoms together make a molecule. Most matter on earth is made of molecules



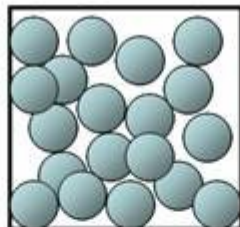
7. States of matter

There are three primary states of matter: solid, liquid, and gas. The state is determined by how close the molecules are to each other, which is determined by temperature. By adding more energy, a substance changes state. The changes are called melting (or freezing), and boiling (or condensing). The melting and boiling points are physical properties of a substance.



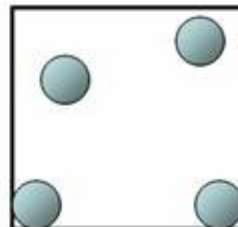
Solid State

Ordered and dense
Has a definite shape and volume.
Solids are very slightly compressible.



Liquid State

Disordered and usually slightly less dense.
Has a definite volume and takes the shape of the container.
Liquids are slightly compressible.



Gas State

Disordered and much lower density than crystal or liquid.
Does not have definite shape and volume.
Gases are highly compressible.

8. Classifying matter

Matter can be classified as either pure substances, or mixtures. Pure substances have constant properties and a specific formula. Pure substances can be divided into elements and compounds. Elements are made of only one type of atom, while compounds are made of more than one. Mixtures can either be homogeneous or heterogeneous. Homogeneous mixtures are consistent throughout, and no part looks different from any other part. A heterogeneous mixture will have parts that appear different.

EXAMPLES

Pure substances

Elements: Helium, silver, nitrogen, sulfur (see periodic table)

Compounds: Water (H_2O), salt (NaCl), glucose sugar ($\text{C}_6\text{H}_{12}\text{O}_6$)

Mixtures

Homogeneous: air, seawater, tar, vanilla ice cream, Jolly Rancher

Heterogeneous: you, chocolate chip ice cream, pencil, veggie soup

9. Physical and chemical properties

Any characteristic that can be used to describe matter is called a property. Physical properties are those characteristics that can be measured without changing the identity of a substance. Chemical properties do involve a change in identity. Burning and change of formula are sure signs of chemical change.