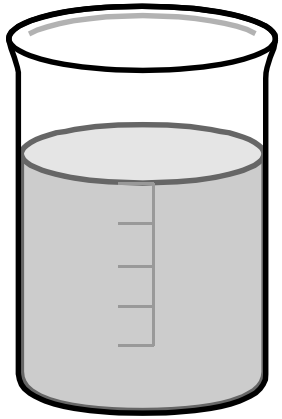
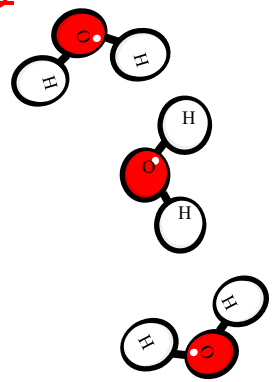
Property	Metal	Nonmetal	Metalloid
Lustre	**shiny**	**dull**	**shiny***
Malleable	✓	✗	✗*
Ductile	✓	✗	✗*
State (Rm Tp)	**solid***	**solid / gas***	**solid**
Conduct heat	✓	✗	✗*
Conduct electricity	✓	✗	***semi***

(*) – there are exceptions to these properties

Physical Change

- A **change** in **shape** or **state** of a substance
- ***No*** *evidence of a* ***new*** *material forming*
- *Examples*
  - *crushing, melting, boiling, cutting…*





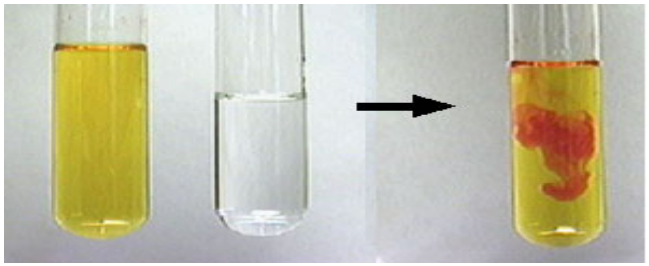
Anything that changes what it "***looks*** like"
NOT "what it ***is***"

Chemical change

- A **change** in **chemical properties** of a substance
- **Means a **new substance** is formed
  - *a chemical reaction has happened!*

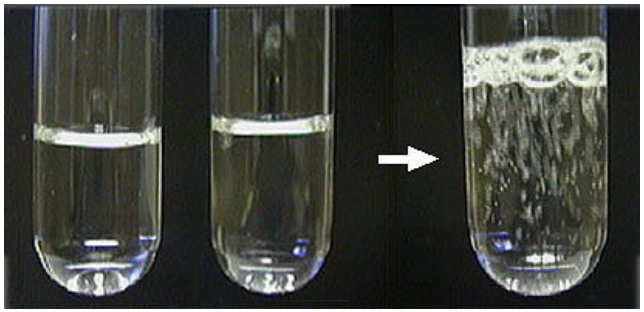
Evidence of a chemical reaction *(and chemical change)*:

1. A ***change*** in **colour**



2. A ***change*** in **smell**

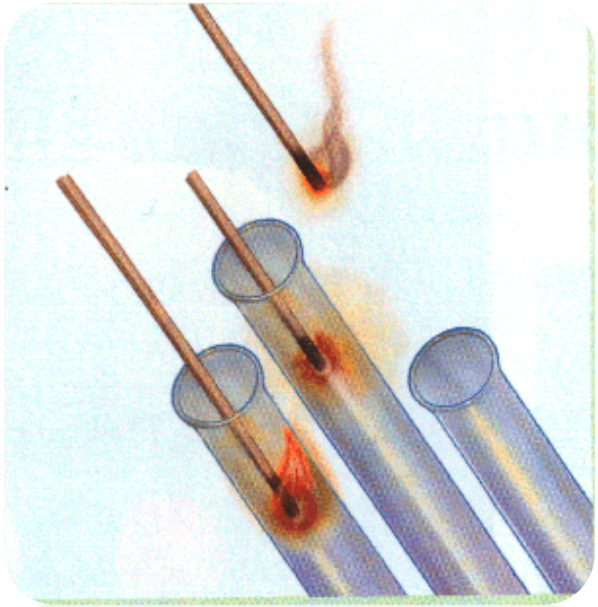
3. Fizzing or bubbling
   (new gas being made)



Testing for Gases

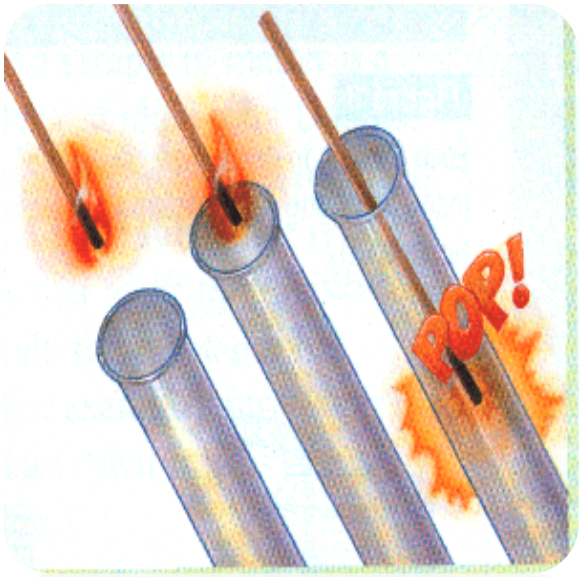
Oxygen

- flame re-ignites or *glows brighter*



Hydrogen

- gas *explodes* with a *"pop"*

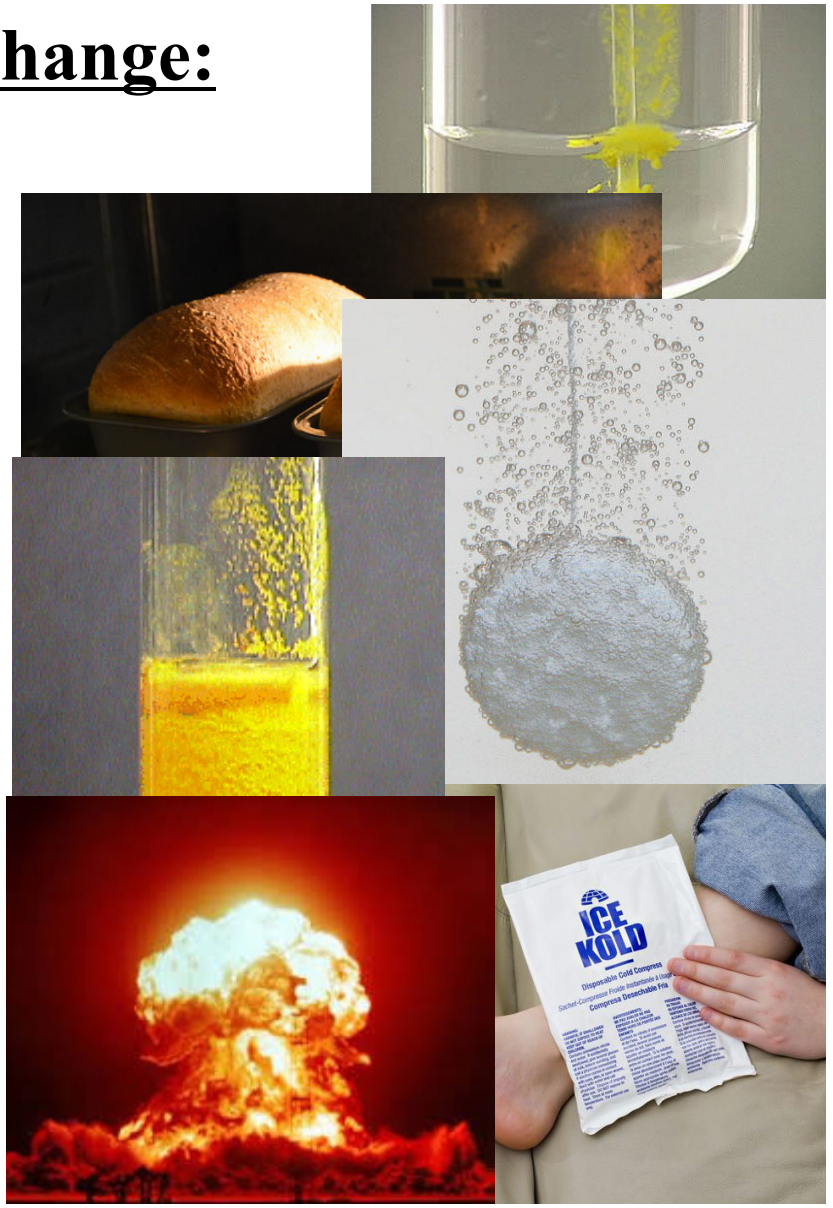


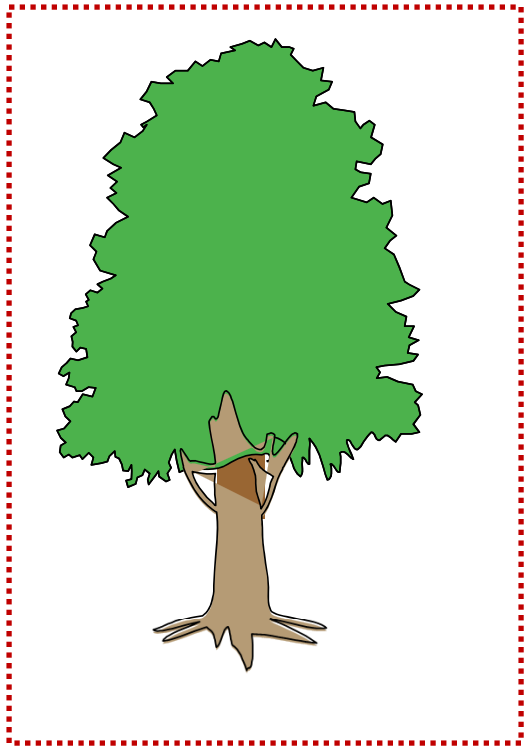
4. A **new solid forms** from a mixture of liquids or the mixture goes cloudy
   - *This new solid is called a **precipitate***

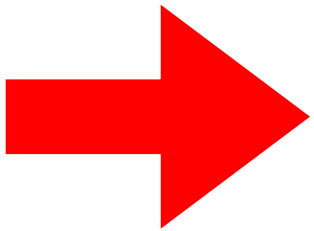
5. A ***change*** in **energy**
   - "Energy" could be **light, heat, sound** – think of the most obvious change in energy reaction – an **EXPLOSION**!

5 Signs of a Chemical Change:

1. Change in COLOUR
2. Change in SMELL
3. New GAS formed (*bubbles* or *fizzing*)
4. New SOLID formed (called *precipitate*)
5. Change in ENERGY (*hot* or *cold*)







1000 kg

1000 kg

Would the tree and the by-products weigh the same?

Early *Scientists*

1. Lavoisier (1750)

- Defined **element:**

Pure substance that *cannot be broken down* into simpler parts.

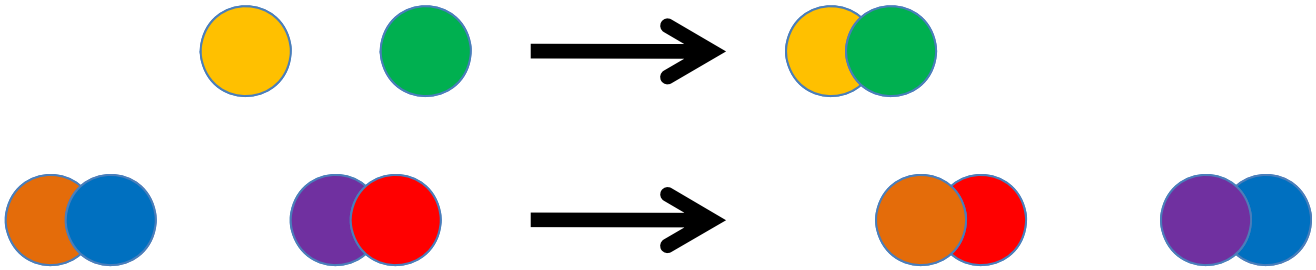
At the time there were only 17 "substances"

- ***Experimented*** to prove *Aristotle's* water and air were **mixtures** of elements

- ***Experimented*** to prove elements *can't be created or destroyed*

Law of Conservation of Matter:

In any chemical reaction matter cannot be created or destroyed.



Atoms will ***rearrange*** to form ***new*** compounds – with **new properties**, but the ***number and type*** of atoms will ***not change*** during the reaction