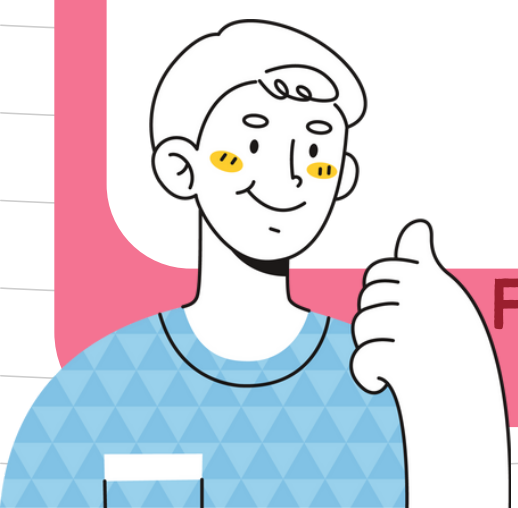
Chemical Tests:

Indicators	Acid	Neutral	Alkali
Litmus Paper	Red	No Change	Blue
Universal Indicator	Red	Green	Purple
Methyl Orange	Red	Orange	Yellow
Phenolphthalein	Colourless	Colourless	Pink

Tests for Gases:

Ammonia	• Damp litmus paper ○ Red to blue
Carbon Dioxide	• Limewater ○ Cloudly
Chlorine	• Damp litmus paper ○ Bleached
Hydrogen	• Lighted wooden splinter ○ 'Pop' sound is produced
Oxygen	• Glowing wooden splinter ○ Relight
Sulfur Dioxide	• Acidified potassium manganate (VII) solution ○ Purple to colourless
Alkene	• Bromine water ○ Orange to colourless



Basic oxide

- **Metal oxide**
- K_2O, Na_2O, CaO, MgO, CuO

Acidic oxide

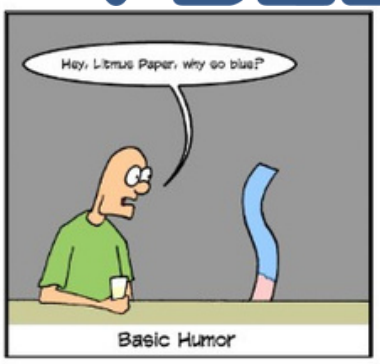
- **Non-metal oxide**
- SO_2, CO_2, NO, NO_2

Amphoteric oxide

- Show both properties of acid and alkali
- Can react with both acid and alkali
- **Al_2O_3, ZnO,** PbO

Neutral oxide

- Cannot react with both acid and alkali
- **CO**, H_2O



Chemical Reactions:

Acid + Metal → Salt + Hydrogen Gas
$2HCl + Zn \rightarrow ZnCl_2 + H_2$

Acid + Metal Oxide → Salt + Water
$2HCl + ZnO \rightarrow ZnCl_2 + H_2O$

Acid + Metal Hydroxide → Salt + Water
$2HCl + Zn(OH)_2 \rightarrow ZnCl_2 + 2H_2O$

Acid + Metal Carbonate → Salt + Water + Carbon Dioxide
$2HCl + ZnCO_3 \rightarrow ZnCl_2 + H_2O + CO_2$

Acid + Ammonia → Ammonium Salt
$HCl + NH_3 \rightarrow NH_4Cl$
$H_2SO_4 + 2NH_3 \rightarrow (NH_4)_2SO_4$

Alkali + Ammonium Salt → Salt + Water + Ammonia
$NaOH + NH_4Cl \rightarrow NaCl + H_2O + NH_3$

Observation when O_2/CO_2/H_2/NH_3 is formed:

- Colourless gas bubbles formed
- Effervescence

Solvent
The liquid in which the solute dissolves to form a solution.

Saturated Solution
No more solute can be dissolved at that given temperature

Atomic number/Proton number
The total number of protons in an atom

Mass number/Nucleon number
The sum of the protons and neutrons in the nucleus

Isotope
Atoms of the same element with the same number of proton but different number of neutrons

Atom
Elements are made up of atoms, which contain protons, neutrons and electrons

Nucleus
The centre of the atom which contains protons and neutrons

Element
Made of only one type of atom and cannot be broken down anymore

Compound
Made of two or more different atoms chemically joined together

Mixture
Made of two or more different components which are not chemically joined together

Group
The columns in the Periodic Table. The Group Number equals the number of electrons in the outer shell

Period
The rows of the Periodic Table. The Period Number equals the number of shells used by the electrons of the atom.

Ionic Bonding
The electrostatic forces of attractions formed by ions of opposite charges

Covalent Bonding
Two or more atoms join together by sharing a pair of electrons

Ion
A charged particle. The number of electrons are not equal to the number of protons.