ATHERTON HIGH SCHOOL

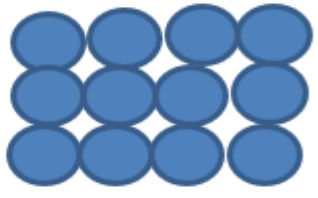
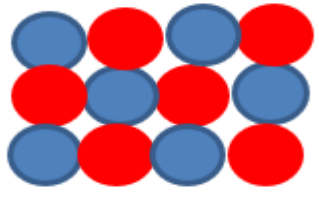
# Science: Alchemy

## 1. Key words

| | |
|---|---|
| Atom | Basic single unit of matter. |
| Element | Substance containing only one type of atom. |
| Compound | Substance containing 2 or more types of atoms that are chemically combined. |

## 2. Particle diagrams

Particle diagrams can be used to represent the atoms in a substance using a single circle to represent each atom.

| Element | Compound |
|---|---|
|  |  |

## 3. Chemical Reactions

| | |
|---|---|
| **Chemical reaction** | A change in which atoms are rearranged to create new substances. |

Signs of a chemical reaction:

- change in colour
- change in temperature
- gas given off

## 4. Reactions with metals

| Reactions | Products |
|---|---|
| **Metals and oxygen** | Metal oxide e.g. magnesium oxide |

When a metal burns in air, it reacts with oxygen. This often produces a change in colour of the metal and or a bright flame when burning.

Magnesium + Oxygen → Magnesium Oxide

**For Example: Magnesium**

| Before burning | During burning | After burning |
|---|---|---|
|  |  |  |

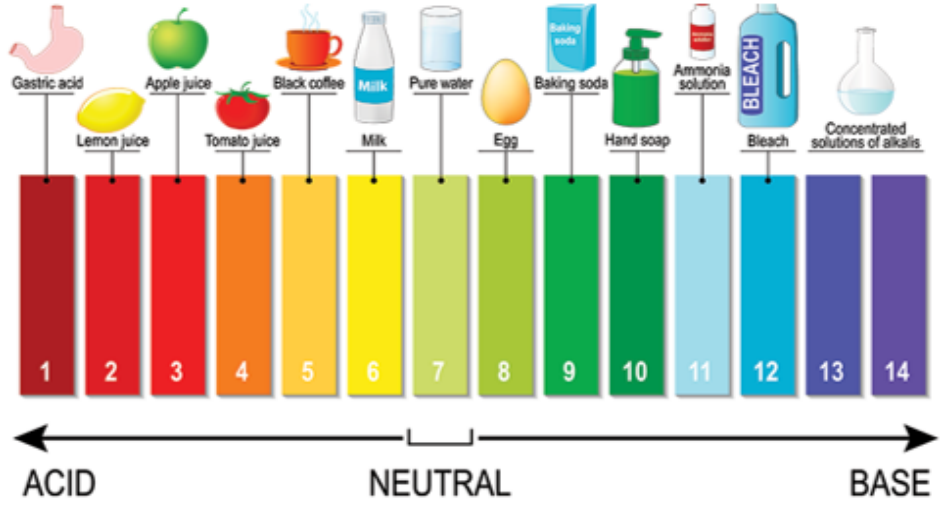
## 5. Acids and alkali

| | |
|---|---|
| Acid | A solution with a pH value less than 7. |
| Alkali | A soluble base with a pH value more than 7 |
| Neutral | A solution with a pH of 7 |
| pH Scale | A measure of how acidic or alkaline a solution is. |
| Indicator | A solution that can show whether a substance is acidic, alkaline, or neutral by changing colour. |

# Science: Alchemy

## 6. pH Scale

Universal Indicator




## 7. Neutralisation

Reactions in which acids react with a base (or alkali) to form a neutral solution with a pH of 7

Acid + Alkali → Salt + Water

E.g.

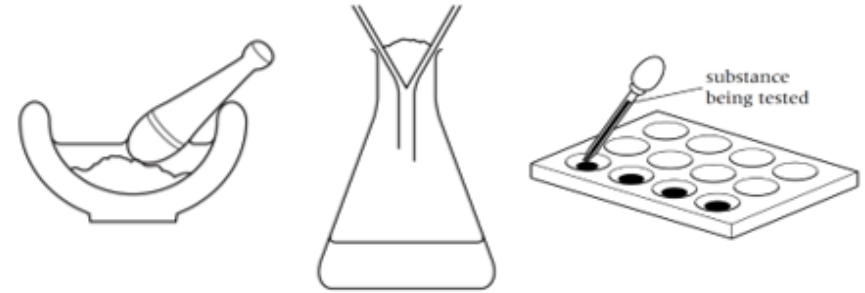
Hydrochloric acid + sodium hydroxide → sodium chloride + water

## 8. Types of indicators

| Indicator | Colour in acid | Colour in neutral | Colour in Alkali |
|---|---|---|---|
| Universal indicator | Red to yellow | Green | Dark green to Purple |
| Methyl orange | Red | Yellow | Yellow |
| Litmus blue | Red | Blue | Blue |
| Phenolphthalein | Colourless | Colourless | Pink |
| Red cabbage juice | Red | Purple | Green-Yellow |

## 9. Making red cabbage indicator

| Step | Instruction |
|---|---|
| 1 | Cut 2 leaves of red cabbage in to small pieces |
| 2 | Use a pestle and mortar to grind the cabbage and release the purple pigment |
| 3 | Add the ground up cabbage to 150ml of boiling water |
| 4 | Stir until the water turns a deep purple |
| 5 | Filter the mixture to remove the solid cabbage |
| 6 | Add 5 drops of the filtrate to a range of solutions and record the colour changes |

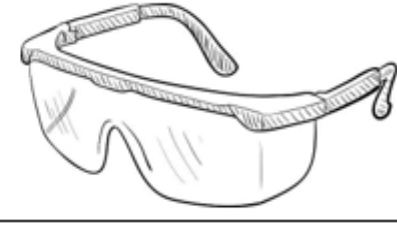


# Science: Alchemy

## 10. Safety in the lab

| Safety Rules | |
|---|---|
| 1 | DO NOT eat or drink in the laboratory. |
| 2 | Wear safety glasses during practicals. |
| 3 | Stand up and tuck the stool under when carrying out practicals. |
| 4 | All coats and bags should be stored neatly under the desk. |
| 5 | DO NOT smell any chemicals in the laboratory. |
| 6 | All broken glassware should be reported immediately to the teacher who will safely clear it away. |
| 7 | Hands should be washed after using chemicals. |
| 8 | Electrical sockets should be turned off when not in use. |
| 9 | All hair should be tied up. |
| 10 | No running in the laboratory. |

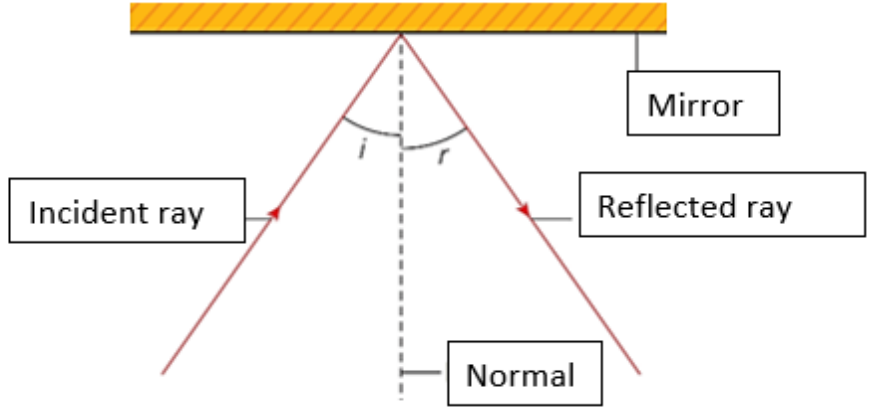
## 11. Equipment

| Conical Flask | Tongs |
|---|---|
|  |  |
| **Pipette** | **Bunsen Burner** |
|  |  |
| **Safety Glasses** | **Test tube** |
|  |  |

# Science: Media

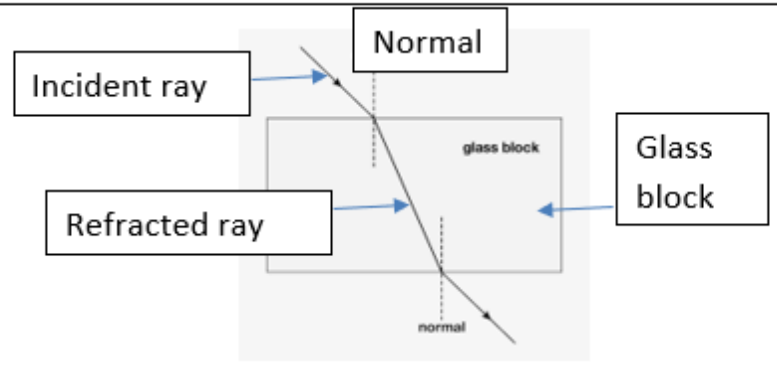
## 1. Reflection

Law of reflection - Light is reflected at equal angles: the angle of incidence (i) is equal to the angle of reflection (r).




## 2. Refraction

Refraction happens whenever light travels from one medium to another.



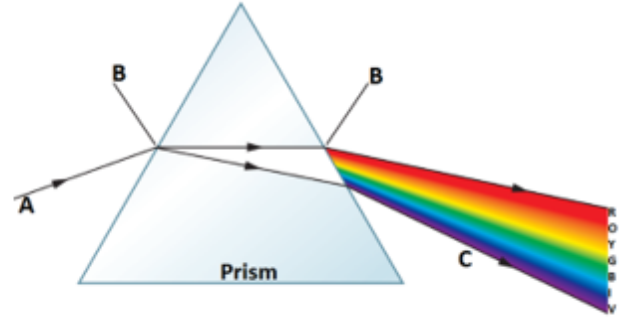

When light enters the block the light is refracted (bent) towards the normal line because the block is more dense so the particles are closer together.

## 3. Key words

| | |
|---|---|
| Transparent | A material that allows **all** light to pass through it. |
| Translucent | A material that allows **some** light to pass through it. |
| Opaque | A material that allows **no** light to pass through it. |

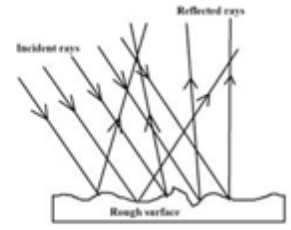
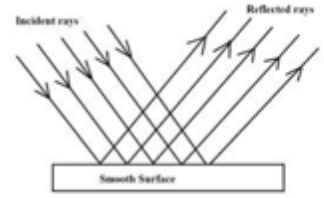
## 4. Dispersion

Dispersion - The splitting up of a ray of light of mixed wavelengths by refraction into its components.




Spectrum:
**Red**
**Orange**
**Yellow**
**Green**
**Blue**
**Indigo**
**Violet**

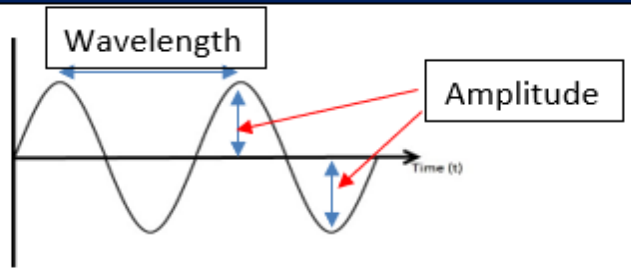
## 5. Scattering and Reflection

| Scattering | Reflection |
|---|---|
| When light rays are reflected in all different directions off a rough surface. | When light rays are reflected in the same direction off a shiny, smooth surface. |
|  |  |

## 6. Key words

| | |
|---|---|
| Vacuum | A space with no particles of matter in it. |
| Frequency | The number of waves passing a fixed point in one second. |
| Decibel | Unit used to measure sound intensity or loudness (dB). |
| Hertz | Units used to measure frequency. |

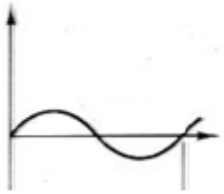
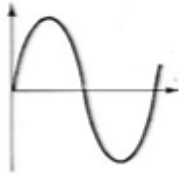
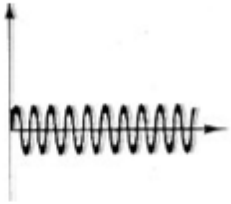
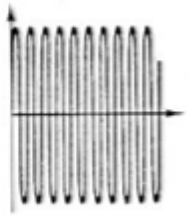
## 7. Waves



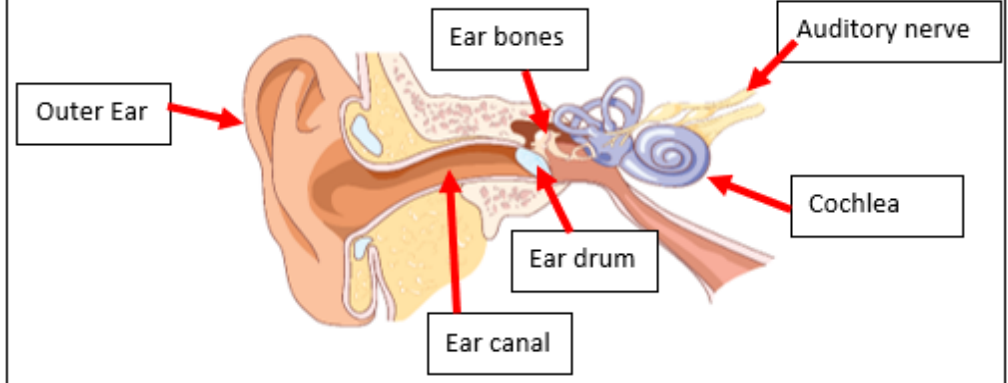

Wavelength – the length of one full wave.

Amplitude – the height of the wave.

**Relationships**

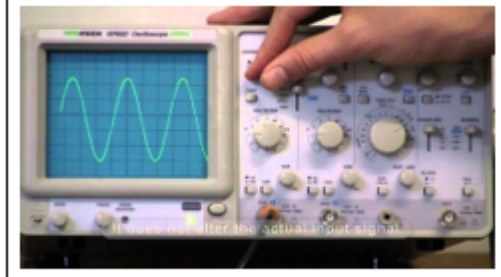
| | |
|---|---|
| High frequency = high pitch | Large amplitude = louder sound |
| Low pitch and quiet  | Low pitch and loud  |
| High pitch and quiet  | High pitch and loud  |

## 8. The ear




| | |
|---|---|
| Outer Ear | Funnels vibrations into the ear canal. |
| Ear canal | The passage in the ear from the outer ear to the ear drum. |
| Eardrum | A membrane that transmits sound vibrations from the outer ear to the middle ear. |
| Ear bones | Vibrates are amplified through the bone. |
| Cochlea | Snail-shaped tube in the inner ear with the sensory cells that detect sound. |
| Auditory nerve | Transmits an electrical impulse to the brain. |

## 9. Equipment

| | |
|---|---|
|  |  |
| Ray Box | Oscilloscope |