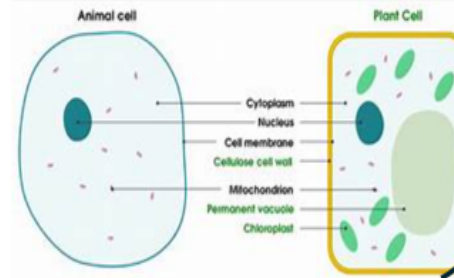


KS3 Biology: Cells

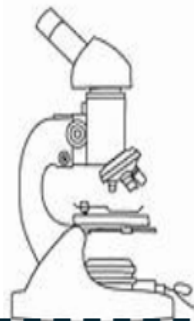
Diffusion is the movement of a fluid (a gas or a liquid) from a high to a low concentration along a concentration gradient.



Cells. There are 2 types: 1 with a nucleus (eukaryotic, our cells), 1 without a nucleus (prokaryotic). Common components of eukaryotic cells are: cell membrane, nucleus, cytoplasm, mitochondria. Plant cells also have a cell wall, vacuole and chloroplasts.

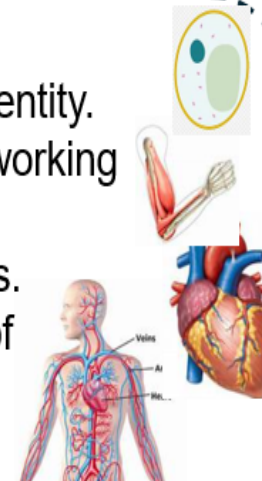


Microscopes are used to view objects much smaller than we would be able to see with our eyes. They use 2 lenses – the eyepiece and the objective lens. We **focus** on the specimen we are looking at.



Hierarchy of organisms

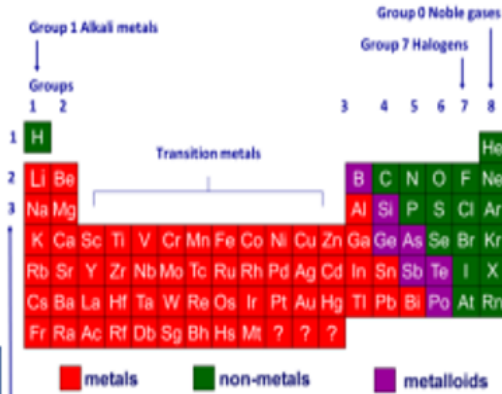
Cells are the smallest living entity. Tissues are groups of cells working together. Organs are groups of tissues. Organ systems are groups of organs. Complex organisms need these structures to allow for diffusion.



Keywords

- Diffusion
- Concentration
- Eukaryotic cell
- Prokaryotic cell
- Cell membrane
- Cytoplasm
- Nucleus
- Mitochondria
- Cell wall
- Vacuole
- Chloroplast
- Multicellular
- Tissue
- Organ
- Organ system
- Focus

KS3 Atoms, Elements and Periodic Table



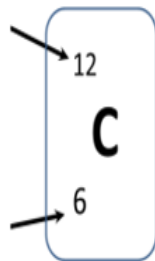
The modern periodic table is arranged according to increasing atomic number

- Columns of elements are called groups
- Groups of elements have similar properties
- Rows of elements are called periods

An **atom** is the smallest part of an element that cannot be broken down chemically. It is comprised of sub-atomic particles: protons, neutrons, and electrons.

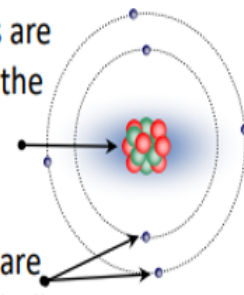
Mass number =
Number of
protons + neutrons

Atomic number or
proton number =
Number of
protons



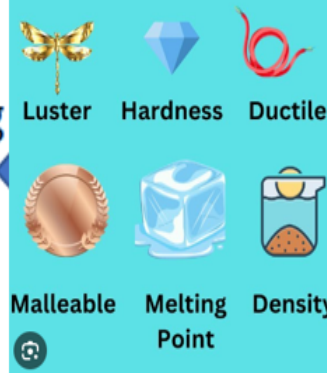
Protons and neutrons are found in the nucleus

Electrons are found in shells

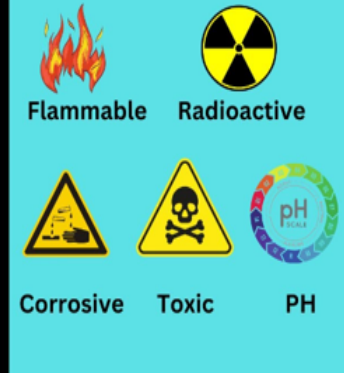


Particle	Mass	Charge
proton	1	+1
neutron	1	0
electron	almost 0	-1

Physical Properties



Chemical Properties



Metals

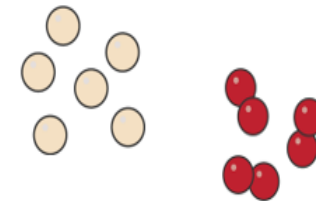
- normally good **conductors of heat and electricity**
- **shiny** when cut
- **Malleable**
- **dense and sonorous**
- most have **high melting points**

Non-Metals

- often have properties the opposite of metals
- **low boiling points**, so are gases at room temperature
 - **poor conductors of electricity and heat**
 - **dull** in appearance
 - **low density**
 - **brittle and not sonorous**

Keywords

- Periodic Table
- Element
- Groups
- Periods
- Alkali Metals
- Transition Metals
- Halogens
- Noble Gases
- Atoms
- Electrons
- Protons
- Neutrons
- Nucleus
- Electron Shells



KS3 Energy

8 Energy Stores



Chemical



Elastic



Gravitational potential



Nuclear



Kinetic



Magnetic



Thermal



Electrostatic

Energies that are always transferred:
Light and Sound

Conservation of Energy

Energy cannot be created or destroyed. Energy can only be **stored**, usefully **transferred**, or **dissipated**.

The total energy before and after a change in a **system** is constant.

A **system** is an object or group of objects where the net energy change is 0J.

Keywords

- Energy store
- Transfer
- System
- Dissipated
- Kilocalories
- Carbohydrates
- Biomass
- Geothermal
- Energy
- Fuel
- Fossil Fuel
- Renewable
- Non-renewable
- Power
- Work done
- Temperature
- Thermometer

Energy in Food

Chemical energy is stored in food and drink.

Energy in food is measured in **kilocalories** (kcal).

Carbohydrates and fats are the main chemical store.

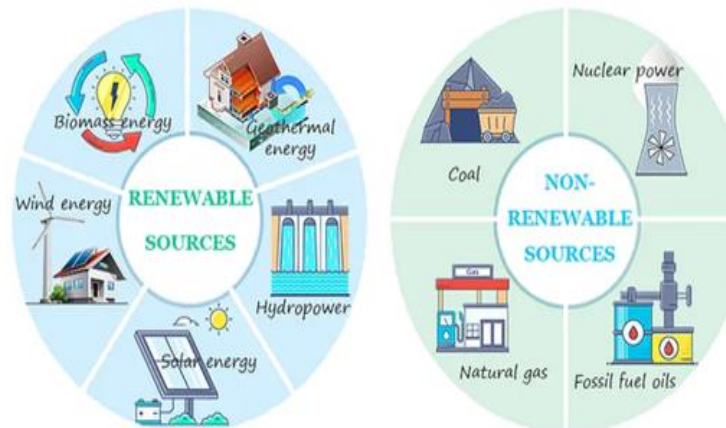
Energy Basics

Energy is measured in **Joules** (J).

Energy transfers when:

- Something moves
- Something is heated
- A waves moves
- Something is distorted
- Chemical reaction happens

SOURCES OF ENERGY



Renewable: replenished as quickly as they are used

Non-renewable: Finite resources, will eventually run out.

KS3 Energy

Renewable energy resources

Advantages:

- Renewable
- No CO₂ gas released
- Not reliant upon Earth's natural resources

Disadvantages:

- Destroy habitats
- Many are weather dependent (wind, solar)
- Expensive to build and run

Non-renewable energy resources

Advantages:

- High energy stored
- Readily available

Disadvantages:

- Releases greenhouse gases (fossil fuels only)
- Finite (will run out)
- Cause acid rain
- Makes Radioactive waste (nuclear only)

Fossil fuels

> Oil



> Coal



> Natural Gas



Made over millions of years from dead living things.

Cost of Energy

Power is the rate of energy transfer. Power is measured in Watts (W). Electrical devices are given a power rating depending on how quickly they transfer energy every second.

Energy companies charge users using this equation:

$$\text{Cost} = \text{power (KW)} \times \text{time (h)} \times \text{cost per KWh}$$

We can reduce energy use or use more efficient methods to reduce cost.

Making Transfers Easy

Work is the amount of energy transferred when an object moves against a frictional force.

Work done is measured in Joules (J).

Reducing the amount of work, makes moving objects easier. This can be done using:

- Levers
- Pulleys
- Lubrication

Temp vs Thermal

Temperature is the measure of how hot something is. A **thermometer** is used.

Thermal energy is the energy that makes something hot.