



THE CSS POINT
Yes We Can Do It!

Everyday Science (Mixed Topics)

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Electronic & Static Electricity

I. Electronic & Static Electricity

Electronic Electricity

- i) This is electricity in motion.
- ii) It involves flow of electrons.
- iii) It has high voltage.

Static Electricity:

- i) This is electricity at rest.
- ii) It does not involve flow of electrons.
- iii) It has low voltage.

Concave & Convex Lens

▶ Concave Lens

- i) It is the lens which is narrower in the centre and broader towards the corners.
- ii) When a beam of light strikes a concave lens all the rays after passing through it diverge.
- iii) It gives mostly virtual image.
- iv) They are also called diverging lenses.

▶ Convex Lens:

- i) It is the lens which is narrower towards the corners and broader towards the centre.
- ii) When a beam of light strikes a convex lens all the rays after passing through it converge at a single point.
- iii) Mostly real images are formed except when the ray of light passes through it when object is placed between optical centre and focus.
- iv) They are also called converging lenses.

Absorption & Adsorption

▶ Absorption

Absorption is a process in which a substance takes up another substance, such as blotting paper (solid) absorbing water (a liquid). Adsorption and absorption are two different things. Absorption is the chemical integration of one chemical into another. When you drink a glass of water, you are absorbing it, as the water becomes part of you.

Adsorption:

Adsorption is a process in which a substance adheres to the surface of another substance. Adsorption is important in some types of catalysis, notably where gases adsorb on metal surfaces. The reaction is then made easier by a consequent lowering of activation energy.

Adsorption occurs when one substance holds another via physical bonds. If you spill a glass of water on your shirt, it is adsorbed as the fibres will hold the water until heat dries out the shirt.

▶ **Hypoglycaemia:**

- i) The fall in sugar level in the blood below the normal physiologic level known as Hypoglycaemia. Normal physiologic range of sugar in blood is 60-90mg% at fasting and 120-140 mg% at random.
- ii) It is treated by giving intravenous glucose.
- iii) It causes mental confusion, visual problem and often coma etc.
- iv) It causes weakness and increases in food desire.

Hyperglycaemia:

- i) Hyperglycaemia is a condition in which blood sugar level rise above its normal range.
- ii) It is treated by exercise, medicine or by intravenous insulin therapy.
- iii) It causes weakness, calf pain, unhealed wounds and kidney problem.
- iv) It causes excessive urination, dryness of lips and increased thirst etc.

▶ **Epidemic:**

- i) If at one place and times a great number of people suffer from a disease is known as epidemic.
- ii) It can travel from one place to another.
- iii) Examples: Influenza, Smallpox, Cholera etc.

Endemic:

- i) If a disease persists in a particular locality, certain area or one region, it is known as endemic disease.
- ii) It cannot travel from one place to another place.
- iii) Example: Goitre in iodine deficient areas.

▶ **Pollination**

- i) It is a process involving transfer of pollens from male reproductive organ to female reproductive organ of plants.
- ii) It occurs in flowering plants.
- iii) The products of pollination are seed.
- iv) It takes place through animals, birds, insects, wind and water.

Fertilization:

- i) In fertilization fusion of egg and sperm occurs.
- ii) It occurs markedly in animals.
- iii) The product of fertilization is zygote.
- iv) It takes place by physical contact and mating of male and female.

▶ **Thermoplastics**

- i) Plastics that can be melted again and again are known as thermoplastics.
- ii) They behave just like wax.
- iii) These plastics can be shaped again and again.
- iv) Examples: Nylon, PVC, Teflon etc.

Thermosetting Plastics:

- i) Plastics that can be melted only once are known as thermosetting plastics.
- ii) They become hard after melting.
- iii) These plastics cannot be shaped again and again.
- iv) Examples: Polyesters and Bakelite.

▶ **Lunar Eclipse**

- i) It occurs when the earth comes between moon and sun.
- ii) Moon goes through series of partial eclipses when moon comes out of umbra region of earth's shadow.
- iii) Earth lies in umbra region at total eclipse when earth lies exactly between moon and sun and its shadow covers the whole moon.

Solar Eclipse

- i) It occurs when moon comes between earth and sun.
- ii) Partial eclipse of sun occurs as in Penumbra can see a part of the sun.
- iii) At the total eclipse of the sun, the shadow of moon which it throws on earth consists of an umbra and penumbra people on earth who are in umbra region cannot see the sun.

▶ **Asteroid:**

- i) The small rocky objects which are orbiting the sun between orbits of Mars and Jupiter are known as asteroids.
- ii) Its origin is concentrated to the remains of planets that fell apart.
- iii) Asteroid means star like but these are known as minor planets.

Meteorite:

- i) Tiny chunk of material floating in space, which can also enter the earth's atmosphere and become meteor are known as meteorites.
- ii) It may originate by the disintegration of comet.
- iii) A falling star (Meteor) is seen as a streak of light in sky.

▶ **Renewable Resources**

- i) Renewable resources are used continuously and can be used again and again.
- ii) Major examples are: air, water, soil, wildlife, forests, fish etc.
- iii) These resources support millions of people all over the world.
- iv) Renewable resources are constantly renewed by bio-geochemical cycles of nature.

Non-renewable Resources

- i) Non-renewable resources cannot be used again and again after their consumption.
- ii) Major examples include: Coal, oil, natural gas etc.
- iii) These resources cannot support millions of people all over the world.
- iv) Non-renewable resources are being exhausted day by day because their demand rises. Due to worldwide demand of fossil fuels, its supplies are declining.

▶ **Star**

- i) Stars are self-luminous heavenly bodies.
- ii) They do not revolve around the sun.
- iii) They are usually stationary.
- iv) Examples: fixed stars, binary stars.

Planet:

- i) Planets are rocky non-luminous bodies.
- ii) They revolve round the sun.
- iii) They usually move.
- iv) Examples: Mercury, Venus, Jupiter etc.

▶ **Fission:**

- i) Lighter atoms are fused together at a very high temperature to form heavier elements.
- ii) It is difficult to carry out on the earth.
- iii) It has no nuclear waste problem.
- iv) It requires cheaper and abundant elements.
- v) Not possible at concerning scale as high temperature is needed to start it.

Fusion:

- i) Heavier unstable atoms are broken down to produce energy.
- ii) It is easy to carry out on the earth.
- iii) It has nuclear waste radioactivity disposal problem.
- iv) It requires expensive and rare elements.
- v) Possible to commercialize under controlled measure.

▶ **Hydrostatics:**

- i) Hydrostatics is a branch of science which deals with physical behaviour of liquids at rest.
- ii) The consideration of liquids at rest, involves problems of buoyancy and flotation, pressure on dams and submerged devices, and hydraulic presses.

Hydrodynamics:

- i) Hydrodynamics is the branch of science which deals with behaviour of liquids in motion.
- ii) The study of liquids in motion is concerned with such matters as friction and turbulence generated in pipes by flowing liquids, the flow of water over weirs and through nozzles, and the use of hydraulic pressure in machinery.

Earthquakes

- ▶ Earthquakes are those movements of the earth crust which make the ground vibrated and shake backwards and forwards or in simple words an earthquake is trembling in the earth.

The shocks waves are generated at a point within the crust called the focus, and the point on the earth's surface vertically above the focus is called the epicentre of the earthquake.

- ▶ The shock waves travel in all directions from the focus.
- ▶ On the earth's surface, the shaking is the strongest near the epicentre.
- ▶ These waves are detected by seismograph.

Occurrence Of Earthquake:

- ▶ i) Earthquakes occur when rocks subjected to great stress suddenly break, releasing the accumulated energy, which shakes the ground.
- ▶ Vibrations spread out from the epicentre like ripples in water.
 - ii) It may also be caused by movements of the plates, resulting from convection currents in the hot mantle of the earth.
 - iii) Earthquakes are also associated with volcanic activity- eruption of magma.
- ▶ Collapse of mines can also produce small earthquakes.

Volcanoes:

- ▶ An opening in the earth's crust through which molten lava, ash, and gases are ejected.

Occurrence Of Volcanoes:

- i) Rocks below the Earth have a very high temperature.
- ii) The great pressure upon these keeps them in a semi-solid state.
- iii) If the pressure weakens, then some of rocks become liquid.
- iv) This liquid is called magma.
- v) The magma forces its way into cracks of the crust and may either reach the surface of the earth where it forms lava and flow out.

Types Of Volcanoes

- ▶ There are three types of volcanoes on the basis of volcanic activity, which are as under.

i) Active Volcanoes:

Volcanoes are said to be active when they frequently erupt or at least when they have erupted within recent time.

ii) Dormant Volcanoes:

The volcanoes that have been known to erupt and show signs of possible eruption in the future are describes as dormant volcanoes.

iii) Extinct Volcanoes:

The volcanoes that have not erupted at all in historic times but retain the features of volcanoes are termed as extinct volcanoes.

Causes of The volcanoes Eruptions:

- i) Seafloor spreading
- ii) Convergence of lithospheric plates
- iii) Percolation of cold water
- iv) Organic Movements
- v) High temperature in the interior of the Earth.



Virus:

- Viruses are the micro-organisms which are strict or obligate parasites of animals or plant cells.
- Many of the viruses are also parasites on bacteria.
- A large number of viruses cause diseases in plants and animals.

Characteristics Of Virus:

- ▶ • A virus consists of two components, a protein coat and a core of nucleic acid which is either DNA or RNA
- ▶ • DNA viruses are called adenoviruses and RNA viruses are called retroviruses.
- ▶ • The shape of a virus is due to its protein coat.
- ▶ • Viruses are of many shapes i.e. rods, spherical, hexagonal or icosahedral.
- ▶ • Sometimes their shape is complicated.
- ▶ • Virus replicate inside a living cell and many viruses are synthesized along with their protein coats and nucleic acid.
- ▶ • The nucleic acid contains instructions for the shape of the virus.

Diseases Caused By viruses:

- i) Polio
- ii) AIDS
- iii) Smallpox
- iv) Measles
- v) Hepatitis

Bacteria:

▶ Characteristics Of Bacteria:

- Bacteria are unicellular prokaryotic organisms which generally divide by transverse binary fission.
- They possess rigid cell walls and act as pathogens
- Nucleus is not well organised
- No definite chloroplast, chlorophyll is dissolved in chromoplasm.
- There are three forms of bacteria which are:
 - i) Round called Cocci
 - ii) Rod like called Bacilli
 - iii) Spiral called Spirilla

Classification Of Bacteria According To Mode Of Nutrition:

- ▶ According to mode of nutrition, there are three types of Bacteria:

a) Parasitic:

- Devoid of chlorophyll
- Are heterotrophic and get food from living animals and plants

b) Saprophytic

- Lack chlorophyll hence cannot prepare their own food.
- Get food from dead organic remains

c) Autotrophic

- Contain chlorophyll
- Can synthesis food by photosynthesis
- Few get their food by chemosynthesis

Reproduction In Bacteria

- i) **Vegetative:** By Binary Fission
- ii) **Asexual:** By Formation of Endospores
- iii) **Sexual:** By Conjugation

Teeth:

- ▶ The humans have two sets of teeth one replaced by the second. The primary set or milk or deciduous teeth are 20 in number while there are 32 permanent teeth in adults.

1. In children there are 20 deciduous or milk teeth. These are

Incisor: 2 pair $\times 2 = 8$

Canine: 1 pair $\times 2 = 4$

Premolars: 2 pair $\times 2 = 8$

2. In adults there are 32 permanent teeth. In each jaw on each side there are:

Incisors: 2 pair $\times 2 = 8$

Canines: 1 pair $\times 2 = 4$

Premolars: 2 pair $\times 2 = 8$

Molars: 3 pair $\times 2 = 12$

▶ **Incisors:**

The central front teeth are called incisors. There are four in upper jaw and four in lower jaw.

Canines:

The pointed, dark teeth on either side of the incisors are canines. 2 in upper jaw and 2 in lower jaw.

Premolars:

These are bi-cusped teeth after the canines. There are 8 premolars. 4 in the upper jaw and 4 in the lower.

Molars:

There are 12 molars, 6 in the upper jaw and 6 in the lower jaw.

Structure Of Teeth:

- ▶ Each tooth consists of a crown which is the visible part and the root, which anchors it in sockets in the jaw.
- ▶ A tooth consists mainly of dentine. The crown is coated with even harder enamel, while the root is covered with cementum to help anchor it in the jaw.
- ▶ Inside each tooth, there is a cavity full of pulp, carrying nerves and the tooth's blood and nutrients through the dentine to the pulp when the decay reaches the pulp, pain and inflammation follows and tooth may die.
- ▶ A nerve, an artery, a vein and lymph duct enters the pulp cavity through the root canal. The nerves give sensation of hot and cold.

Chromosomes:

- ▶ A chromosome is a rod-like portion of the chromatin of a cell nucleus, performing an important part in meiotic cell division, and in the transmission of heredity characteristics.
- ▶ Normally they are constant in number for any species; there are 22 pairs of chromosomes and two sex chromosomes in the human.

Types Of Chromosomes:

- ▶ In higher animals and plants, there are two fundamental types of chromosomes, which are classified on the basis of sex determination these are:
 - i) Autosomes
 - ii) Sex Chromosomes:

Autosomes:

These are paired somatic chromosomes that play no part in sex determination of organisms. These chromosomes are similar in males and females.

Sex Chromosomes:

The chromosomes that determine sex in organisms are called sex chromosomes. There are two types of sex chromosomes.

- a) X- chromosome
- b) Y- Chromosome

