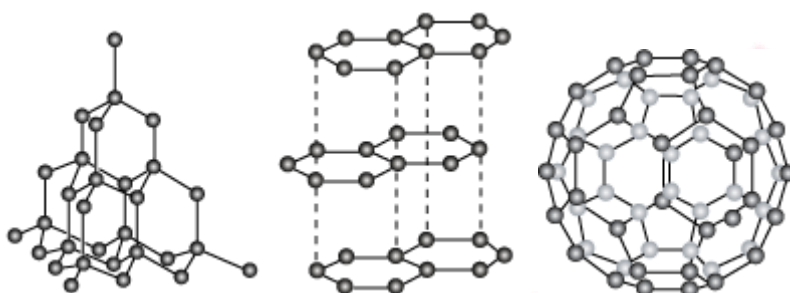


## Synopsis – Grade 10 Science Term II

### Chapter 1: Carbon and Its Compounds

- ❖ **Covalent bonds:** The bonds formed by the sharing of electrons are known as covalent bonds.
- ❖ Carbon contains four electrons in its valence shell. It always forms covalent bonds as it is difficult for it to lose or gain four electrons in order to complete its octet.
- ❖ **Allotropy:** The property of an element to exist in different forms. Example: Diamond, graphite and buckminsterfullerene are the three allotropes of carbon.



- ❖ **Catenation:** The ability of an element to combine with itself through covalent bonds. Carbon can combine with itself to form chain, branched, and ring structures.
- ❖ **Hydrocarbons:** These are compounds of carbon and hydrogen.
- ❖ **Saturated compounds:** The compounds of carbon that contain only single bonds among carbon atoms. Example: alkanes
- ❖ **Unsaturated compounds:** The compounds of carbon having double and/ or triple bonds. Example: alkenes, alkynes
  - **Homologous series:** A series of carbon compounds having different numbers of carbon atoms, but containing the same functional group. Some functional groups in carbon compounds are shown in the given table.

Hetero atom	Name of functional group	Formula of functional group
Chlorine/Bromine	Halo- (Chloro/Bromo)	-Cl, -Br
Oxygen	Alcohol	-OH
	Aldehyde	-CHO
	Ketone	>C=O
	Carboxylic acid	-COOH

- The nomenclature of organic compounds is done by using a set of rules. Names of some common compounds are shown in the given table.

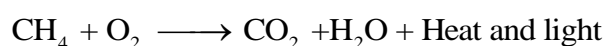
Functional group	Prefix/Suffix	Example
------------------	---------------	---------

1. Halogen	Prefix: chloro, bromo, etc.	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{Cl} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $
		$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{Br} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $
2. Alcohol	Suffix: -ol	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{OH} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $
3. Aldehyde	Suffix: -al	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}=\text{O} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $
4. Ketone	Suffix: -one	$  \begin{array}{c}  \text{H} \quad \quad \text{H} \\    \quad \quad   \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\    \quad    \quad   \\  \text{H} \quad \text{O} \quad \text{H}  \end{array}  $
5. Carboxylic acid	Suffix: -oic acid	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \text{O} \\    \quad   \quad    \\  \text{H}-\text{C}-\text{C}-\text{C}-\text{OH} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $
6. Double bond (alkenes)	Suffix: -ene	$  \begin{array}{c}  \text{H} \quad \text{H} \quad \quad \text{H} \\    \quad   \quad \quad / \\  \text{H}-\text{C}-\text{C}=\text{C} \\    \quad \quad \quad \backslash \\  \text{H} \quad \quad \quad \text{H}  \end{array}  $
7. Triple bond (alkynes)	Suffix: -yne	$  \begin{array}{c}  \text{H} \\    \\  \text{H}-\text{C}-\text{C}\equiv\text{C}-\text{H} \\    \\  \text{H}  \end{array}  $

### ❖ Chemical properties of carbon compounds

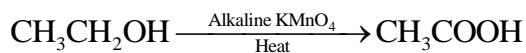
- **Combustion reaction:**

Carbon burns in air to form carbon dioxide and hydrocarbons burn in air to give carbon dioxide and water. Heat and light are also released in these processes.



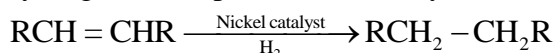
- **Oxidation reaction:**

Combustion of carbon to form carbon dioxide is an oxidation reaction. When alcohols are oxidised, carboxylic acids are obtained.



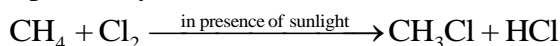
- **Addition reaction:**

Unsaturated hydrocarbons yield saturated hydrocarbons when reacted with hydrogen in the presence of catalysts.



○ **Substitution reaction:**

Under specific conditions, hydrogen atoms present in hydrocarbons can be replaced by atoms of other elements like chlorine and bromine.



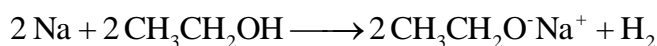
❖ **Ethanol (CH<sub>3</sub>CH<sub>2</sub>OH)**

● **Physical properties**

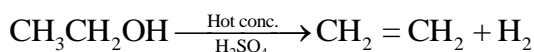
- Liquid at room temperature
- Is a good solvent
- Soluble in water in all proportions

● **Chemical properties**

- Reacts with sodium metal to release hydrogen gas



- Reacts with conc. H<sub>2</sub>SO<sub>4</sub> to form ethene



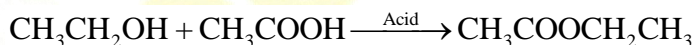
❖ **Ethanoic acid (CH<sub>3</sub>COOH)**

● **Physical properties**

- Has a melting point of 290 K
- 5-8% solution of acetic acid is known as vinegar
- Is a weak acid

● **Chemical properties**

- **Esterification reaction**



Ethanol      Ethanoic acid                      Ester

The reaction reverses itself in the presence of a base and is called saponification reaction.

- ❖ The two ends of molecules of soaps and detergents are different. Their one end is hydrophilic and the other is hydrophobic. Presence of these two types of ends is responsible for the cleansing action of soaps.

## Chapter 2: Periodic Classification of Elements

- ❖ The earliest classification was based on grouping the known elements as metals and non-metals.
- ❖ **Law of Triads:** Given by Dobereiner. He was the first person to illustrate the relationship between the atomic masses of elements and their properties. A set of elements showing triads is as under:

Li	Ca	Cl
Na	Sr	Br
K	Ba	I

- ❖ **Law of Octaves:** Given by Newlands. He arranged the known elements in the increasing order of their atomic masses. The law is applicable only to the elements having low atomic masses.

Notes of music	sa	re	ga	ma	pa	dha	ni
	H	Li	Be	B	C	N	O
	F	Na	Mg	Al	Si	P	S
Arrangement of elements	Cl	K	Ca	Cr	Ti	Mn	Fe
	Co and Ni	Cu	Zn	Y	In	As	Se
	Br	Rb	Sr	Ce and La	Zr	—	—

- ❖ **Mendeleev's periodic law:** Mendeleev gave a periodic law which states that the properties of elements are a periodic function of their atomic masses.
  - **Achievements of Mendeleev's periodic table:**
    - Mendeleev left some gaps in his periodic table so that the undiscovered elements could get a place in it without disturbing the positions of the other elements.
    - Noble metals were not discovered at that time. When they were discovered later, they got a place in Mendeleev's table without disturbing the positions of the other elements.
  - **Limitations of Mendeleev's periodic table:**
    - It failed to explain the position of hydrogen.
    - It was not able to explain the position of isotopes.
    - In the table some elements having higher mass were kept before the elements having lesser atomic mass.
- ❖ **Modern periodic law:** It states that the properties of elements are a periodic function of their atomic numbers, not their atomic masses.
  - The modern periodic table consists of 7 periods and 18 groups.
  - Elements having the same valence shell are present in the same period. Elements having the same number of valence electrons are present in the same group.
  - The Metals are present on the right-hand side of the periodic table, whereas non-metals are present on the left-hand side of the periodic table.

		GROUP NUMBER															
		1											18				
P E R I O D S	1	1 H Hydrogen 1.0											2 He Helium 4.0				
	2	3 Li Lithium 6.9	4 Be Beryllium 9.0	5 B Boron 10.8	6 C Carbon 12.0	7 N Nitrogen 14.0	8 O Oxygen 16.0	9 F Fluorine 19.0	10 Ne Neon 20.2								
	3	11 Na Sodium 23.0	12 Mg Magnesium 24.3	13 Al Aluminium 27.0	14 Si Silicon 28.1	15 P Phosphorus 31.0	16 S Sulphur 32.1	17 Cl Chlorine 35.5	18 Ar Argon 39.9								
	4	19 K Potassium 39.1	20 Ca Calcium 40.1	31 Ga Gallium 69.7	32 Ge Germanium 72.6	33 As Arsenic 74.9	34 Se Selenium 79.0	35 Br Bromine 79.9	36 Kr Krypton 83.8								
	5	37 Rb Rubidium 85.5	38 Sr Strontium 87.6	49 In Indium 114.8	50 Sn Tin 118.7	51 Sb Antimony 121.8	52 Te Tellurium 127.6	53 I Iodine 126.9	54 Xe Xenon 131.3								
	6	55 Cs Caesium 132.9	56 Ba Barium 137.3	81 Tl Thallium 204.4	82 Pb Lead 207.2	83 Bi Bismuth 208.9	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)								
	7	87 Fr Francium (223)	88 Ra Radium (226)	-	114 Uuq	-	Uuh	-	-								

- The atomic size as well as metallic character of elements increases on moving down the group and decreases on moving from left to right in a period.

### Chapter 3: How Do Organisms Reproduce

#### ❖ Reproduction

- Biological process by which a living organism produces an offspring similar to itself
- Information transferred from the parents to the offspring in the form of DNA
- DNA (Deoxyribonucleic acid)- a genetic material found in chromosomes present in the nucleus of a cell
- Two types of reproduction—sexual and asexual

#### ❖ Asexual reproduction

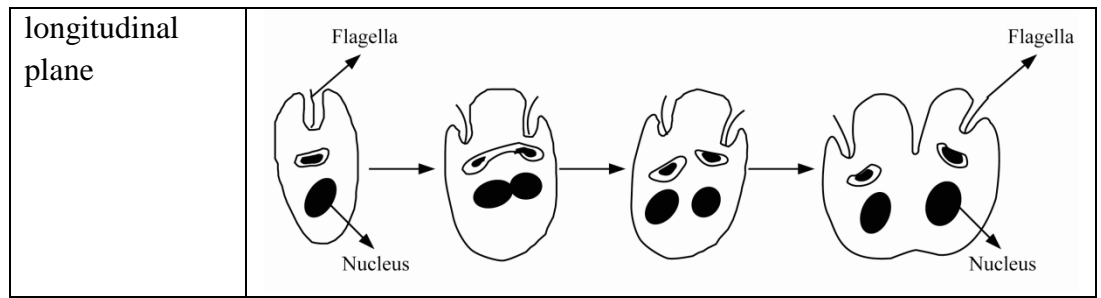
- Does not involve the fusion of gametes
- Requires only one parent
- Offspring's produced are exact copies of their parents

#### • Modes of asexual reproduction

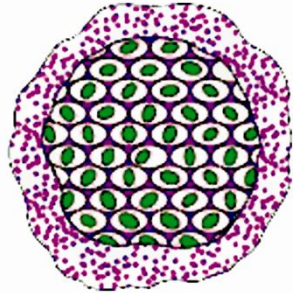
- Fission- involves cell division or splitting of cells
- Is of two types:

#### ▪ Binary fission

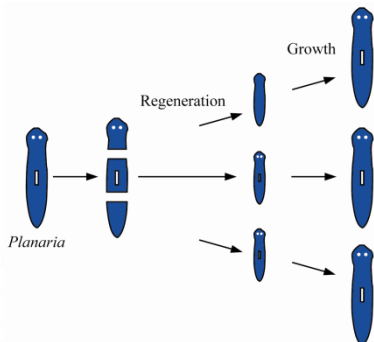
Along any plane	<p>e.g., <i>Amoeba</i></p>
Along single	e.g., <i>Leishmania</i>



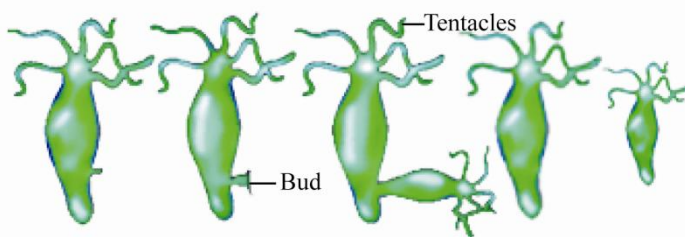
- **Multiple fission:** e.g., *Plasmodium*



- **Fragmentation-** New organisms are formed from fragments of parents. e.g., lichens
- **Regeneration-** New organisms are formed from body parts. e.g., *Planaria*



- **Budding-** New individuals form protrusion called buds. e.g., *Hydra*

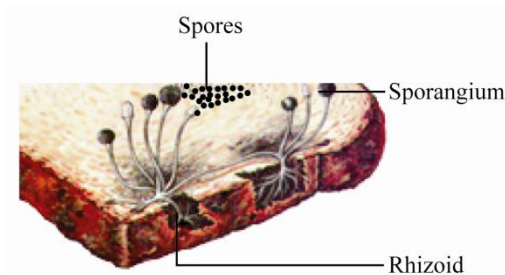


- **Vegetative propagation-** New plants are formed from the vegetative parts .e.g., *Bryophyllum*



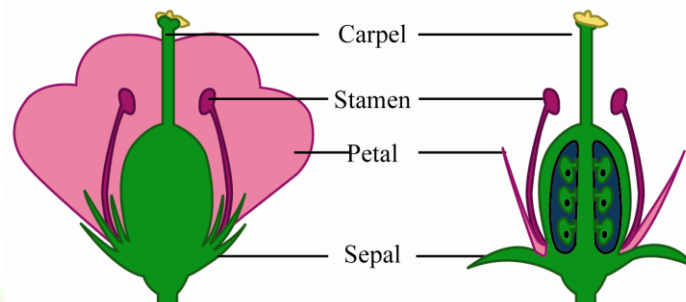


- **Spore formation**- Large number of spores produced in sporangia. e.g., *Rhizopus*



### ❖ Sexual reproduction

- Involves fusion of male and female gametes
- Requires two parents
- Allows more variations in offsprings
- **Sexual reproduction in plants**
  - **Angiosperms**- flowering plants
  - **Parts of flowers**– sepals, petals, stamens, and carpels/pistils



- **Stamens**: Male reproductive parts of flowers and consists of anther and filament
- **Carpels**: Female reproductive parts of flowers and consists of style, stigma, and ovary
- **Bisexual flowers**: Both stamens and carpels are present e.g., *hibiscus*
- **Unisexual flowers**: Either stamen or carpel is present e.g., corn
- Pollen released from the bursting of anther, which contains male gametes
- Each ovule contains one egg cell or female gamete
- **Pollination**: transfer of pollen from the anther of one flower to the stigma of the same or different flower
- **Fertilization**: Process of fusion of male and female gametes
- After fertilization: zygote = embryo, ovule = seed, ovary = fruit

- **Sexual reproduction in animals**
  - **Puberty:** A period of physical change by which a child's body becomes an adult's body and capable of reproduction
  - **Secondary sex characteristics:** The body changes during puberty
  - **Male reproductive organs:** Pair of testes, vas deferens, prostate gland, seminal vesicles
  - **Testes:** Produce sperms and hormone testosterone
  - **Sperms:** Contain male gametes
  - **Female reproductive organs:** Pair of ovaries, pair of oviducts, uterus, and vagina
  - Ovaries contain thousands of eggs
  - Sperms enter the female body through the vagina
  - **Fertilization:** The process of fusion of the nucleus of the sperm with the ovum to form a zygote
  - Zygote divides to form an embryo
  - Embryo implanted in the uterus
  - Foetus develops inside the mother's body for nine months
  - **Menstruation:** If the egg is not fertilized, then the uterus lining breaks down and is released in the form of blood and mucous through the vagina
  - **Sexually transmitted diseases:** Infections that get transferred through sexual contact e.g., herpes, HIV-AIDS, syphilis, gonorrhoea etc.
  - **Contraceptive methods help avoid pregnancy:** These include natural methods, barrier methods, oral contraceptives, implants, and surgical methods

## Chapter 4: Heredity and Evolution

- ❖ **Heredity:** Transmission of characteristics or traits from parents to offsprings
- ❖ **Variations:** Difference among individuals of a species and also, among offsprings of same parents. Variations are of two types- heritable and non-heritable
- ❖ **Basis of heredity:** each trait is influenced by both maternal and paternal DNA
- ❖ **Mendel's work**
  - Proposed that heredity controlled by genes
  - Performed experiments on garden peas (*Pisum sativum*)
  - Used seven contrasting pairs of characters or traits
  - **Dominant trait:** able to express itself over another contrasting trait
  - **Recessive trait:** unable to express its effect in the presence of a dominant trait
  - Mendel represented- dominant trait as upper case (e.g., T for tallness) and recessive trait as lower case (e.g., t for shortness)
  - **Homozygous:** when the factors or genes of a trait are similar e.g., TT or tt
  - **Heterozygous:** when the factors or genes of a trait are different e.g., Tt
  - **Genotype:** genetic constitution of an organism e.g., pure tall- TT
  - **Phenotype:** observable traits or characteristics of an organism e.g., tallness, shortness etc.



- **Genotypic ratio:** expected ratio of genotypes produced by a particular cross
- **Phenotypic ratio:** expected ratio of phenotypes produced by a particular cross
- **Monohybrid cross:** involves only one pair of contrasting characters
- **Dihybrid cross:** involves two pairs of contrasting characters
- **Stages of Mendel's experiment**
  - **Selection of parents-** true breeding with contrasting pairs of traits e.g., pure tall (TT) and pure dwarf (tt) pea plants were selected
  - **Obtaining F<sub>1</sub> plants-** F<sub>1</sub> generation is the first filial generation, formed after crossing desirable parents e.g., crossing pure tall (TT) and dwarf (tt) plants gives heterozygous tall (Tt) F<sub>1</sub> plants
  - **Self-pollination of F<sub>1</sub> plants-** involves crossing F<sub>1</sub> plants to obtain F<sub>2</sub> plants
- **Conclusions of Mendel's experiment**
  - Each characteristic in an organism is represented by two factors
  - Two factors are- dominant and recessive
  - Two contrasting factors when present in an individual do not blend
  - When more than two factors are involved, they are independently inherited
- ❖ **Heredity at cellular level**
  - DNA associates with proteins to form chromosomes
  - Every somatic (body) cell of the human body has 23 pairs (46) of chromosomes
  - **Autosomes-** first 22 pairs of chromosomes that do not determine the sex of an individual
  - **Sex chromosomes-** last pair of chromosomes, represented as X and Y
  - Females have two X chromosomes, XX
  - Males have one X and one Y chromosome, XY
- ❖ **Sex determination in humans**
  - Gametes receive half of the chromosomes
  - Male gametes have 22 autosomes and either X or Y sex chromosome
  - Male gametes can be of two types, 22+X or 22+Y
  - Female gametes can be of only one type, 22+X
  - Sex of a baby is determined by the type of the male gamete (X or Y) that fuses with the female gamete
- ❖ **Evolution**
  - Changes in inherited traits from one generation to the next in a species
  - Variations leads to evolution
  - **Speciation-** formation of new species
  - **Causes of evolution**
    - **Natural selection:** a process that results in an increased survival and reproductive success of individuals that are well adjusted to the environment
    - **Genetic drift:** accidental change in the frequency of genes in a small population
    - **Acquired traits:** a trait that an individual experiences during his lifetime a) involves changes in non-reproductive tissues b) cannot be passed on to the progeny

- **Inherited traits:** distinguishing qualities or characteristics that one acquires from ancestors (i) involves changes in DNA (ii) transmitted to progeny

❖ **Evolutionary relationships**

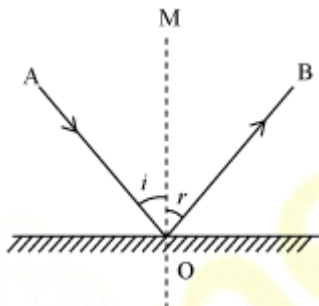
- **Homologous organs:** similar in origin, but perform different functions e.g., forelimbs of humans and wings of birds
- **Analogous organs:** different origins, but perform similar functions e.g., wings of birds and bats
- **Fossils:** remains of organisms that once existed on the Earth
- **Palaeontology:** science dealing with the study of fossils
- **Vestigial organs:** organs present in the reduced form, having no function
- Human beings (*Homo sapiens*): evolved from primates in Africa

## Chapter 5: Light, reflection and refraction

- ❖ **Reflection of light** is the change in the path of a light ray upon collision with an interface of two medium.

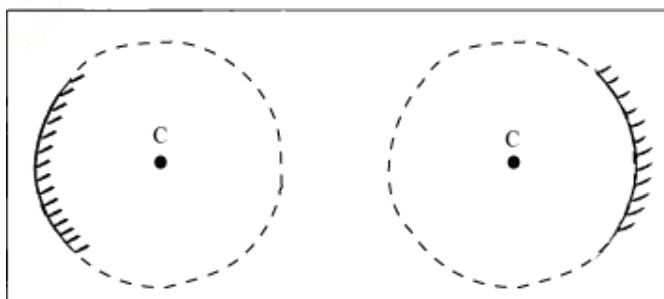
❖ **Laws of reflection:**

- $i$  (Angle of incidence) =  $r$  (angle of reflection)
- Rays AO, OM and OB lie in the same plane.

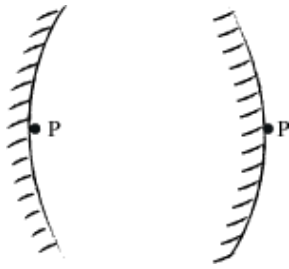


❖ **Terms related to spherical mirrors**

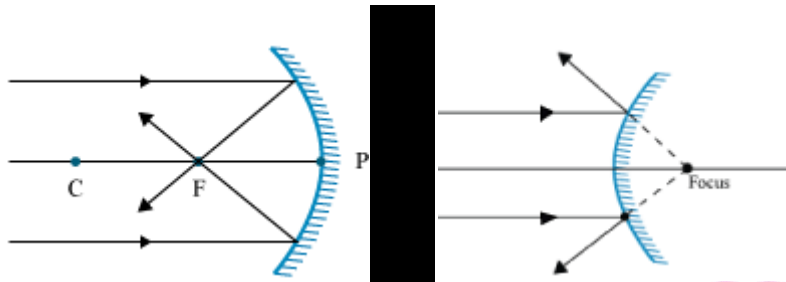
- **Centre of curvature** is the centre of the sphere of which the spherical mirror is a part



- **Pole** is the centre of mirror

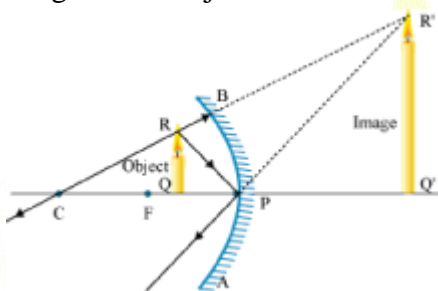


- **Focus** is a point where parallel rays (parallel to the principal axis) meet or appear to meet after reflection



❖ Concave mirror and nature of image formed

- All images are real and inverted, except when the object is between the focus and the pole.
- Image size = object size when the object is at the centre of curvature



- **Uses:**
  - Torch reflector
  - Dentist's mirror
  - Search light
  - Shaving mirror
  - Vehicle headlight

❖ Convex mirror and nature of image formed

- Virtual image
- Erect image
- All images are diminished
- Uses:
  - Rear-view mirror
  - Security mirror

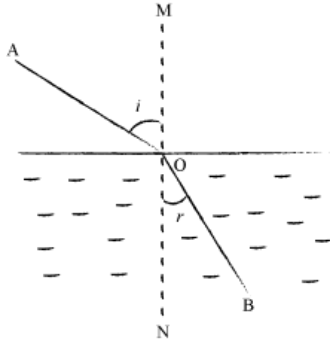
❖ Mirror formula:  $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

For concave,  $f \rightarrow -ve$ , for convex,  $f \rightarrow +ve$

$$\text{Magnification} = \frac{\text{Image height}}{\text{Object height}} = -\frac{v}{u}$$

### ❖ Laws of refraction

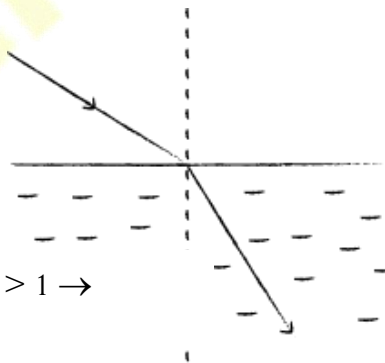
- AO (incident ray), OB (refracted ray), and MON (normal to the interface) are coplanar.
- $\frac{\sin i}{\sin r} = \text{constant}$  (Snell's law)

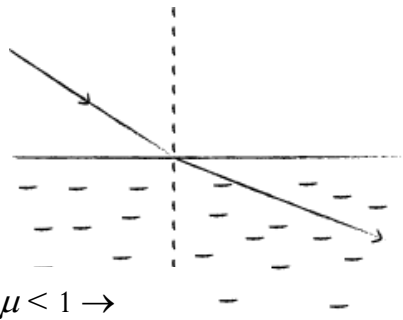


### ❖ Refractive index (R.I.)

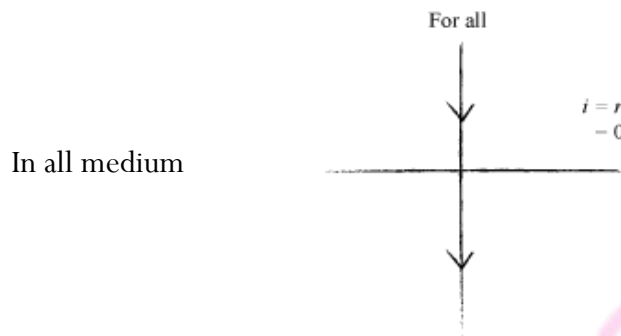
- ${}_1^2\mu$  ( $\mu$  of 2 w.r.t. 1) =  $\frac{\text{velocity of light in medium I}}{\text{velocity of light in medium II}} = \frac{v_1}{v_2}$
- Absolute RI when medium I = Vacuum or air
- Speed of light {vacuum} =  $3 \times 10^8$  m/s

Medium (Optically denser) =  $\mu > 1 \rightarrow$





Optically rarer =  $\mu < 1 \rightarrow$



❖ **Terms related to spherical mirrors**

- Centre of curvature = Centre of the sphere of which the lens surfaces is a part of (Same as Spherical mirror)
- Focus = Where parallel rays meet after refraction (On principal axis = principal focus)

❖ **Convex lens and nature of image formed**

- Virtual and erect images – when the object is placed between focus and the optical centre (Magnifying glass)
- Real and inverted image at all po
- Image size = object size when object is at centre of curvature

❖ **Concave lens and nature of image formed**

- Virtual and erect at all object positions

❖ **Lens Formula:**  $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

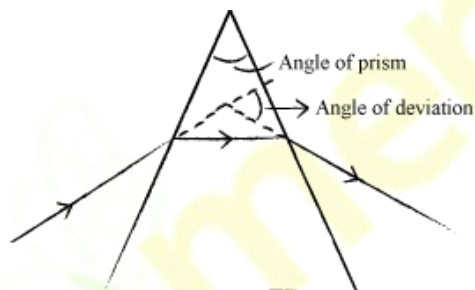
For concave lens  $f = -ve$ , convex lens  $f = +ve$

❖ **Magnification,  $m = \frac{\text{Image height}}{\text{Object height}} = \frac{v}{u}$**

❖ **Lens power  $P$  (Unit dipotre) =  $\frac{1}{f(\text{in.})}$**

**Chapter 6: Human Eye and the Colorful World**

- ❖ Important components of the human eye
  - Image forms on the **retina**
  - **Iris** controls the size of the pupil
  - **Pupil** controls the amount of light
  - **Lens** can adjust its focal length. It is called power of accommodation.
  - Thickness of the eye can be controlled by **ciliary muscles**.
- ❖ Nearest focal distance of lens = 25 cm
- ❖ Common defects in eye
  - **Myopia/near-sightedness**  
 Problem: Distant objects cannot be seen clearly  
 Image is formed in front of the retina  
 Correction – concave lens
  - **Hypermetropia/far-sightedness**  
 Problem: Near objects are not seen clearly  
 Image formed beyond the retina  
 Correction – convex lens
  - **Presbyopia**  
 Problem: Near-focus distance increases with age  
 Power of accommodation decreases  
 Correction– bi-focal lens
- ❖ **Prism**



### ❖ Dispersion



Red → Disperses least

Violet → Disperses most

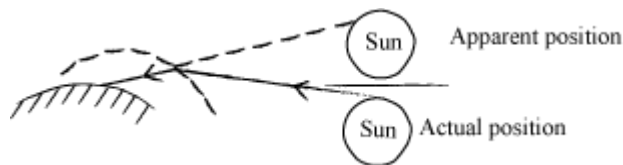
Yellow → Average of all lights

### ❖ Atmospheric refraction

- Twinkling of stars – caused by changing air density in the atmosphere



- Early sunrise and delayed sunset – caused by refraction of light through the atmosphere



#### ❖ **Scattering: Tyndall effect**

Atmospheric particles, smoke, tiny water droplets, suspended particles of dust, and air molecules scatter sunlight. Therefore, the path of light becomes visible.

- Sky is blue- because light near blue wavelength scatters most
- Danger signs are red in colour- because red light scatters least

## Chapter 7: Our Environment

- ❖ **Environment:** natural surroundings and external conditions of an organism, which include all living and non-living factors that affect the organism
- ❖ **Organism:** is the basic unit of an ecological hierarchy, can be unicellular such as *Amoeba* and *Paramecium* or multicellular such as humans
- ❖ **Population:** a group of individuals of the same species inhabiting a given geographical area at a particular time and functioning as a unit
- ❖ **Community:** includes all individuals of different species living within a certain geographical area
- ❖ **Ecosystem:** includes both living and non-living components of an area
  - **Components of an ecosystem**
    - **Abiotic factors:** light, temperature, water, air etc.
    - **Biotic factors:** living organisms
    - **Autotrophs:** organisms that can manufacture their own food from inorganic raw materials, also known as producers
    - **Heterotrophs:** cannot synthesize their own food, are dependent on other organisms
    - **Herbivores:** feed only on plants e.g., deer, horse, sheep etc.
    - **Carnivores:** eat other animals e.g., frog, cat, spider etc.
    - **Omnivores:** feed on both plants and animals e.g. bear, monkey, man etc.
    - **Decomposers:** obtain nutrients by breaking down remains of dead plants and animals, includes some bacteria and fungi
  - **Functions of an ecosystem**
    - **Productivity:** rate of production of organic matter (food) by producers
    - **Decomposition:** breakdown of organic matter or biomass with the help of decomposers
  - **Energy flow through an ecosystem**

- **Trophic level:** level of species in an ecosystem on the basis of the source of nutrition
- **Producers:** form the first trophic level, they manufacture food
- trophic levels are connected through food chains
- **Food chain:** a linear sequence of organisms in which each organism is eaten by the next member in the sequence e.g., plants→grasshopper→frog→snake→eagle
- **Food web:** interconnected network of food chains
- **10% law of energy transfer:** only 10% energy is transferred from a lower trophic level to a higher trophic level, which means that energy keeps on decreasing as one moves up different trophic levels
- **Biomagnification:** increase in the concentration of pollutants or harmful chemicals with each step up in the food chain
- **Human influence on the environment**
  - **Global warming:** increase in the average temperature of the Earth's surface
  - **Greenhouse gases:** CO<sub>2</sub>, CH<sub>4</sub>, O<sub>3</sub>, CFCs etc.
  - **Ozone layer:** present in the stratosphere, absorbs ultraviolet radiations. It gets depleted due to an increased concentration of chlorine in the atmosphere-  
Cl + O<sub>3</sub> → ClO + O<sub>2</sub>
  - **Biodegradable wastes:** produced mainly from plant and animal sources that can be broken down by living organisms
  - **Non-biodegradable wastes:** includes wastes such as plastic, metals etc., that cannot be broken down by living organisms

## Chapter 8: Management of Natural Resources

### ❖ Natural resources

- These are the natural substances provided by nature that are considered economically important. Example: soil, air, water etc.

### ❖ 3R principle to save environment

#### ● Reduce

- It refers to the reduction in the consumption of resources.
- Example - Repairing taps to check water leakages

#### ● Recycle

- It means to synthesise or extract useful materials from wastes.
- Example - Plastic, paper, glass, and metals can be extracted from the waste scrap

#### ● Reuse

- It means using a product again and again.
- Example - Plastic bottles containing jams can be used to store pulses in the kitchen

### ❖ Need to manage resources

- Resources are in limited supply

- Human population is increasing, so the demand for these resources is also increasing exponentially
- Management of resources should be done with a long-term perspective, so that they can be exploited by the future generations
- The damage caused to the environment while extracting resources should be reduced

#### ❖ **Type of Natural Resources**

- Forests are biodiversity hotspots as they are homes to large number of plants, animals, and microbes.

#### ❖ **Stakeholders in forest resources**

- The tribal people living inside and around forests depend on forest resources
  - Traditional people played important role in the past in protecting forests. Example - Amrita Devi Bishnoi sacrificed her life along with 363 other people in 1731 to protect 'Khjiri' trees from being cut down in Khejrali village near Jodhpur.
  - Products of forests
    - Fire wood
    - Lumber
    - Lac
    - Herbs
    - Honey
    - Fruits
- **The forest department of the government**
  - Owns the land and controls forest resources
  - Forest department ignores local knowledge and traditional management practices of the forest
  - Vast tracts of the forest is converted into plantations of teak, pine and eucalyptus, which supports little biodiversity.
- **The industrialists**
  - Use forest resources in unsustainable manner
  - Power lobby which pushes the government, ignoring the local people, for the use of forest resources
- **The wildlife enthusiasts**
  - Not dependent on forests
  - Considerable say in forest conservation

#### ❖ **Water resources**

- Basic need of life
- Most of the Indian agriculture is dependent on monsoons
- Local people have adopted traditional methods to conserve water
- **Traditional water-harvesting systems**
  - Khadins and nadis in Rajasthan
  - Bandharas and tals in Maharashtra
  - Bundhis in Madhya Pradesh and Uttar Pradesh
  - Ahars and Pynes in Bihar
  - Kulhs in Himachal Pradesh

- Ponds in Jammu
- Eris in Tamil Nadu
- Surangamo in Kerala
- Kattas in Karnataka

❖ **Coal and petroleum**

- They are non-renewable sources of energy.
- Burning of coal and petroleum releases toxic gases such as carbon monoxide, sulphur dioxide, nitrogen dioxide, and greenhouse gases such as carbon dioxide and methane.
- Use of coal and petroleum can be reduced by using alternate sources of energy and switching over to cleaner biofuels.

❖ **Sustainable Management**

- Interests of all the stakeholders should be given a proper say.
- Benefits of development should reach each and every individual and all generations.