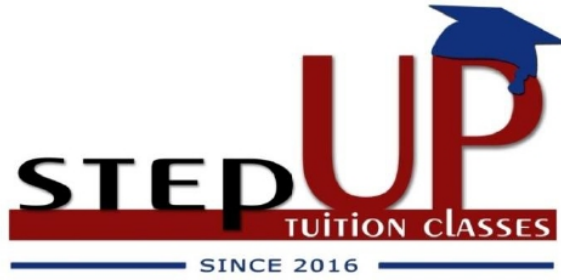




BASED ON NCERT CURRICULUM



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Subject – Science & Maths

By Er.Romit Patel

Std – 5<sup>th</sup> to 10<sup>th</sup>, Computer Science, B.C.A-Maths

Subject - All

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Dear students,

I want to take a moment to remind you of your incredible potential and the amazing possibilities that lie ahead of you. Whether you are in elementary school, middle school, or high school, you have the power to make a difference in the world and to shape your own future.

Remember that every day is an opportunity to learn, grow, and make progress towards your goals. You may encounter challenges along the way, but don't let them discourage you. Instead, use them as opportunities to learn and to become stronger.

You are the future of our world, and we need your creativity, your intelligence, and your unique perspectives to help make it a better place. So keep dreaming big, keep working hard, and never give up on yourself.

Believe in yourself and your abilities, and know that you are capable of achieving great things. With determination, dedication, and a positive attitude, you can accomplish anything you set your mind to.

Remember that you are not alone on this journey. There are teachers, mentors, and loved ones who believe in you and want to see you succeed. So don't be afraid to ask for help or support when you need it.

Stay focused, stay motivated, and stay inspired. The future is yours, and I can't wait to see all the amazing things you will accomplish.

**Er. Romit Patel**  
**(B.E. Mech)**  
**(Founder, StepUP Tuition, Bardoli)**

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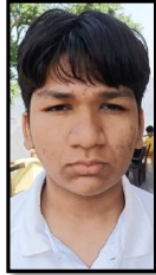
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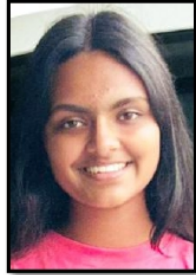


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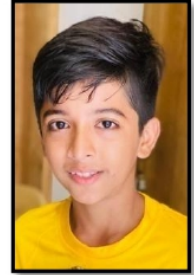
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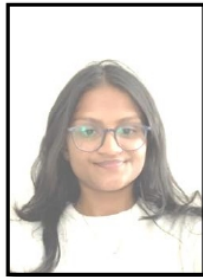
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**For  
Other  
Study  
Material**



# 1. Chemical Formula

N.	Name of Chemical Compound	Chemical Formula
1	Aluminium Chloride	$\text{AlCl}_3$
2	Aluminium Oxide	$\text{Al}_2\text{O}_3$
3	Aluminium Sulphate	$\text{Al}_2(\text{SO}_4)_3$
4	Ammonia	$\text{NH}_3$
5	Ammonium Chloride	$\text{NH}_4\text{Cl}$
6	Ammonium Hydroxide	$\text{NH}_4\text{OH}$
7	Barium Bromide	$\text{BaBr}_2$
8	Barium Chloride	$\text{BaCl}_2$
9	Barium Hydroxide	$\text{Ba}(\text{OH})_2$
10	Barium Iodide	$\text{BaI}_2$
11	Barium Sulphate	$\text{BaSO}_4$
12	Calcium carbonate (Limestone / Chalk / Marble )	$\text{CaCO}_3$
13	Calcium hydroxide (Slaked lime / Lime water )	$\text{Ca}(\text{OH})_2$
14	Calcium hypochlorite (Bleaching powder )	$\text{CaOCl}_2$
15	Calcium oxide (Quick lime )	$\text{CaO}$
16	Calcium Phosphate	$\text{Ca}_3(\text{PO}_4)_2$
17	Calcium Sulphate	$\text{CaSO}_4$
18	Calcium sulphate hemihydrate (Plaster of Paris )	$\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$
19	Carbon Dioxide	$\text{CO}_2$
20	Chloroform	$\text{CHCl}_3$
21	Copper	$\text{Cu}$
22	Copper Carbonate	$\text{CuCO}_3$
23	Copper(ii) Chloride	$\text{CuCl}_2$
24	Copper(i) oxide	$\text{Cu}_2\text{O}$
25	Copper(ii) Oxide	$\text{CuO}$
26	Copper(ii) Sulphate	$\text{CuSO}_4$
27	Ethanoic acid (Acetic acid )	$\text{CH}_3\text{COOH}$
28	Ferric Chloride (Iron Chloride)	$\text{FeCl}_3$
29	Ferric Hydroxide (Iron(ii) Hydroxide)	$\text{Fe}(\text{OH})_2$
30	Ferric Oxide	$\text{Fe}_2\text{O}_3$
31	Ferrous Sulphate (Iron Sulphate)	$\text{FeSO}_4$
32	Glucose	$\text{C}_6\text{H}_{12}\text{O}_6$
33	Gypsum	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

34	Hydrated Copper Sulphate	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
35	Hydrochloric Acid (Hydrogen Chloride)	$\text{HCl}$
36	Hydrogen Sulphide	$\text{H}_2\text{S}$
37	Lead Chloride	$\text{PbCl}_2$
38	Lead Nitrate	$\text{Pb}(\text{NO}_3)_2$
39	Lead Oxide	$\text{PbO}$
40	Magnesium Chloride	$\text{MgCl}_2$
41	Magnesium hydroxide (Milk of magnesia )	$\text{Mg}(\text{OH})_2$
42	Magnesium Oxide	$\text{MgO}$
43	Magnesium Sulphate	$\text{MgSO}_4$
44	Manganese Oxide	$\text{MnO}_2$
45	Mercuric Oxide	$\text{HgO}$
46	Mercuric Sulphide/cinnabar	$\text{HgS}$
47	Methane (Natural gas)	$\text{CH}_4$
48	Nitric acid	$\text{HNO}_3$
49	Nitrogen Dioxide	$\text{NO}_2$
50	Potassium Bromide	$\text{KBr}$
51	Potassium Chloride	$\text{KCl}$
52	Potassium Dichromate	$\text{K}_2\text{Cr}_2\text{O}_7$
53	Potassium Hydroxide	$\text{KOH}$
54	Potassium Iodide	$\text{KI}$
55	Potassium Nitrate	$\text{KNO}_3$
56	Potassium Oxide	$\text{K}_2\text{O}$
57	Potassium Permanganate	$\text{KMnO}_4$
58	Potassium Sulphate	$\text{K}_2\text{SO}_4$
59	recrystallisation of sodium carbonate (Washing soda )	$\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
60	Silver Bromide	$\text{AgBr}$
61	Silver Chloride	$\text{AgCl}$
62	Silver Nitrate	$\text{AgNO}_3$
63	Silver Sulphide	$\text{Ag}_2\text{S}$
64	Sodium Acetate	$\text{CH}_3\text{COONa}$
65	Sodium Aluminate	$\text{NaAlO}_3$
66	Sodium Carbonate	$\text{Na}_2\text{CO}_3$
67	Sodium Chloride (Common / Cooking Salt )	$\text{NaCl}$

68	Sodium Ethoxide	$\text{CH}_3\text{CH}_2\text{ONa}$
69	Sodium hydrogencarbonate (Baking soda)	$\text{NaHCO}_3$
70	Sodium Hydroxide	$\text{NaOH}$
71	Sodium Nitrate	$\text{NaNO}_3$
72	Sodium Oxide	$\text{Na}_2\text{O}$
73	Sodium Sulphate	$\text{Na}_2\text{SO}_4$
74	Sodium Zincate	$\text{Na}_2\text{ZnO}_2$
75	Sulphur Dioxide	$\text{SO}_2$
76	Sulphur Trioxide	$\text{SO}_3$
77	Sulphuric acid	$\text{H}_2\text{SO}_4$
78	Water	$\text{H}_2\text{O}$
79	Zinc Carbonate	$\text{ZnCO}_3$
80	Zinc Nitrate	$\text{Zn}(\text{NO}_3)_2$
81	Zinc Oxide	$\text{ZnO}$
82	Zinc Sulphate	$\text{ZnSO}_4$
83	Zinc Sulphide	$\text{ZnS}$

Atomic No.	Element	Valency
1	Hydrogen	$\text{H}^{1+}$
6	Carbon	$\text{C}^{4+}$
7	Nitrogen	$\text{N}^{3-}$
8	Oxygen	$\text{O}^{2-}$
11	Sodium	$\text{Na}^{1+}$
12	Magnesium	$\text{Mg}^{2+}$
13	Aluminum	$\text{Al}^{3+}$
16	Sulphur	$\text{S}^{2-}$
17	Chlorine	$\text{Cl}^{1-}$
19	Potassium	$\text{K}^{1+}$

Atomic No.	Element	Valency
20	Calcium	$\text{Ca}^{2+}$
25	Manganese	$\text{Mn}^{4+}$
26	Iron / Ferrous	$\text{Fe}^{2+}, \text{Fe}^{3+}$
29	Copper	$\text{Cu}^{1+}, \text{Cu}^{2+}$
30	Zinc	$\text{Zn}^{2+}$
35	Bromine	$\text{Br}^{1-}$
47	Silver	$\text{Ag}^{1+}$
53	Iodine	$\text{I}^{1-}$
56	Barium	$\text{Ba}^{2+}$
82	Lead	$\text{Pb}^{2+}$

Non-metallic Element	Symbol	Polyatomic ions	Symbol
Hydride	$\text{H}^{-1}$	Ammonium	$\text{NH}_4^{+1}$
Chloride	$\text{Cl}^{-1}$	Hydroxide	$\text{OH}^{-1}$
Bromide	$\text{Br}^{-1}$	Nitrate	$\text{NO}_3^{-1}$
Iodide	$\text{I}^{-1}$	Hydrogen Carbonate	$\text{HCO}_3^{-1}$
Oxide	$\text{O}^{-2}$	Carbonate	$\text{CO}_3^{-2}$
Sulphide	$\text{S}^{-2}$	Sulphite	$\text{SO}_3^{-2}$
Nitride	$\text{N}^{-3}$	Sulphate	$\text{SO}_4^{-2}$
		Phosphate	$\text{PO}_4^{-3}$



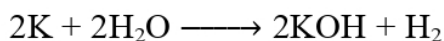
## 2. Balancing of Chemical Equation

### A. Based on Chemical Formula

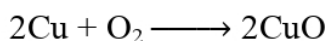
- 1)  $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$
- 2)  $\text{CO} + 2\text{H}_2 \longrightarrow \text{CH}_3\text{OH}$
- 3)  $2\text{FeSO}_4 \longrightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$
- 4)  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$
- 5)  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{HCl}$
- 6)  $2\text{NaOH} + \text{Zn} \longrightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$
- 7)  $\text{Ca} + 2\text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- 8)  $\text{Na}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{NaOH}$
- 9)  $\text{K}_2\text{O} + \text{H}_2\text{O} \longrightarrow 2\text{KOH}$
- 10)  $2\text{NaHCO}_3 \longrightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$
- 11)  $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O} \longrightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
- 12)  $4\text{Na} + \text{O}_2 \longrightarrow 2\text{Na}_2\text{O}$
- 13)  $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
- 14)  $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \longrightarrow 6\text{CO}_2 + \text{H}_2\text{O}$
- 15)  $2\text{AgCl} \longrightarrow 2\text{Ag} + \text{Cl}_2$
- 16)  $2\text{AgBr} \longrightarrow 2\text{Ag} + \text{Br}_2$
- 17)  $2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}$
- 18)  $2\text{Pb}(\text{NO}_3)_2 \longrightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2$
- 19)  $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
- 20)  $2\text{HNO}_3 + \text{Ca}(\text{OH})_2 \longrightarrow \text{Ca}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$
- 21)  $2\text{NaOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- 22)  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$
- 23)  $2\text{HgO} \longrightarrow 2\text{Hg} + \text{O}_2$
- 24)  $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3$
- 25)  $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \longrightarrow 6\text{Cu} + \text{SO}_2$
- 26)  $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
- 27)  $6\text{CO}_2 + 12\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$
- 28)  $\text{Na}_2\text{CO}_3 + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
- 29)  $2\text{NaCl} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$
- 30)  $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O} \longrightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- 31)  $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$
- 32)  $\text{Al}_2\text{O}_3 + 6\text{HCl} \longrightarrow 2\text{AlCl}_3 + 3\text{H}_2\text{O}$
- 33)  $\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$
- 34)  $2\text{K} + 2\text{H}_2\text{O} \longrightarrow 2\text{KOH} + \text{H}_2$
- 35)  $2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$
- 36)  $2\text{Al} + 3\text{H}_2\text{O} \longrightarrow \text{Al}_2\text{O}_3 + 3\text{H}_2$
- 37)  $3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
- 38)  $2\text{HgS} + 3\text{O}_2 \longrightarrow \text{HgO} + 2\text{SO}_2$
- 39)  $2\text{Cu}_2\text{S} + 3\text{O}_2 \longrightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$
- 40)  $2\text{ZnS} + 3\text{O}_2 \longrightarrow \text{ZnO} + 2\text{SO}_2$
- 41)  $3\text{MnO}_2 + 4\text{Al} \longrightarrow 3\text{Mn} + 2\text{Al}_2\text{O}_3$

## B. Based on Word-Chemical reaction

- 1) Hydrogen + Chlorine  $\longrightarrow$  Hydrogen chloride  
$$\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$$
- 2) Barium chloride + Aluminium sulphate  $\longrightarrow$  Barium sulphate + Aluminium chloride  
$$3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \longrightarrow 3\text{BaSO}_4 + 2\text{AlCl}_3$$
- 3) Sodium + Water  $\longrightarrow$  Sodium hydroxide + Hydrogen  
$$2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$$
- 4) Calcium hydroxide + Carbon dioxide  $\longrightarrow$  Calcium carbonate + Water  
$$2\text{Ca}(\text{OH})_2 + 2\text{CO}_2 \longrightarrow 2\text{CaCO}_3 + 2\text{H}_2\text{O}$$
- 5) Zinc + Silver nitrate  $\longrightarrow$  Zinc nitrate + Silver  
$$\text{Zn} + 2\text{AgNO}_3 \longrightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$$
- 6) Aluminium + Copper chloride  $\longrightarrow$  Aluminium chloride + Copper  
$$2\text{Al} + 3\text{CuCl}_2 \longrightarrow 2\text{AlCl}_3 + 3\text{Cu}$$
- 7) Barium chloride + Potassium sulphate  $\longrightarrow$  Barium sulphate + Potassium chloride  
$$\text{BaCl}_2 + \text{K}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{KCl}$$
- 8) Potassium bromide + Barium iodide  $\longrightarrow$  Potassium iodide + Barium bromide  
$$2\text{KBr} + \text{BaI}_2 \longrightarrow 2\text{KI} + \text{BaBr}_2$$
- 9) Zinc carbonate  $\longrightarrow$  Zinc oxide + Carbon dioxide  
$$\text{ZnCO}_3 \longrightarrow \text{ZnO} + \text{CO}_2$$
- 10) Hydrogen + Chlorine  $\longrightarrow$  Hydrogen chloride  
$$\text{H}_2 + \text{Cl} \longrightarrow 2\text{HCl}$$
- 11) Magnesium + Hydrochloric acid  $\longrightarrow$  Magnesium chloride + Hydrogen  
$$\text{Mg} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2$$
- 12) Solutions of barium chloride and sodium sulphate in water react to give insoluble barium sulphate and the solution of sodium chloride.  
$$\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$$
- 13) Sodium hydroxide solution (in water) reacts with hydrochloric acid solution (in water) to produce sodium chloride solution and water.  
$$\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$$
- 14) Hydrogen gas combines with nitrogen to form ammonia.  
$$3\text{H}_2 + \text{N}_2 \longrightarrow 2\text{NH}_3$$
- 15) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.  
$$2\text{H}_2\text{S} + 3\text{O}_2 \longrightarrow 2\text{H}_2\text{O} + 2\text{SO}_2$$
- 16) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.  
$$3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \longrightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$$
- 17) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.



18) Copper is heated in air, it combines with oxygen to form copper(ii) oxide.



### 3. Metal-Rust and their colours

Metal	Colour of Rust	Rust
Iron	Reddish Brown	Ferric Oxide
Copper	Green	Copper Carbonate
Silver	Black	Silver Sulphide

### 4. Alloy and their property

Alloy	Primary metal	Other element	Property Change
	Iron	Carbon (about 0.05 %)	It becomes hard and strong.
Stainless steel	Iron	Nickel and Chromium	It is hard and does not rust.
Brass	Copper	Zinc	It has a low electrical conductivity and melting point.
Bronze	Copper	Tin	It has a low electrical conductivity and melting point.
Solder	Lead	Tin	It has a low melting point.

### 5. Indicators

Types	Indicator	Acidic Solution	Basic Solution
Natural	Blue Litmus	Red	No change
	Red Litmus	No Change	Blue
	Turmeric	No Change	Red
Artificial	Phenolphthalein	Colourless	Pink
	Methyl Orange	Red	Yellow
Olfactory	Onion Juice	No effect	Smell Change
	Clove Oil	No effect	Smell Change
	Vanilla Essence	No effect	Smell Change

## 6. Chemical Reaction

Types of reaction	General Form
Combination Reaction	$A + B \longrightarrow C$
Decomposition Reaction	$A \longrightarrow B + C$
Displacement Reaction	$AB + C \longrightarrow AC + B$
Double Displacement Reaction	$AB + CD \longrightarrow AD + CB$
Acids react with metals	Acid + Metal $\longrightarrow$ Salt + Hydrogen
Bases react with some metals	Base + Metal $\longrightarrow$ Salt + Hydrogen
Metal Carbonates react with acids	Metal carbonate + Acid $\longrightarrow$ Salt + Carbon dioxide + Water
Metal hydrogen carbonates react with acids	Metal hydrogencarbonate + Acid $\longrightarrow$ Salt + Carbon dioxide + Water
Acids and Bases React with each other	Base + Acid $\longrightarrow$ Salt + Water
Metallic Oxides react with Acids	Metal oxide + Acid $\longrightarrow$ Salt + Water
Non Metallic Oxides react with Bases	NonMetal oxide + Base $\longrightarrow$ Salt + Water
Metals are burnt in Air	Metal + Oxygen $\longrightarrow$ Metallic oxide
Metal react with water	Metal + Water $\longrightarrow$ Metal oxide + Hydrogen
Metal oxide react with water	Metal oxide + Water $\longrightarrow$ Metal hydroxide
Metals react with Solutions of other Metal Salts	Metal A + Salt solution of B $\longrightarrow$ Salt solution of A + Metal B

## 7. Natural source & Acid

Natural source	Acid
Vinegar	Acetic acid
Orange	Citric acid
Lemon	Citric acid
Tamarind	Tartaric acid
Tomato	Oxalic acid
Sour milk (Curd)	Lactic acid
Ant sting	Methanoic acid
Nettle sting	Methanoic acid

## 8. pH Value & Colour

Substances	pH Value	Colour on pH Paper
Gastric Juice	1.2	Red
Lemon Juice	2.2	Orange
Pure water, Blood	7.4	Green
Milk of Magnesia	10	Blue
Sodium Hydroxide Solution	14	Dark Blue

## 9. Chemical Compound & Their Color

Name of Chemical Compound	Chemical Formula	Colour
Barium Sulphate	BaSO <sub>4</sub>	White
Copper	Cu	Brown
Copper Carbonate	CuCO <sub>3</sub>	Green
Copper(ii) Chloride	CuCl <sub>2</sub>	Blue-Green
Copper(ii) Oxide	CuO	Black
Copper(ii) Sulphate	CuSO <sub>4</sub>	Blue
Ferric Oxide	Fe <sub>2</sub> O <sub>3</sub>	Reddish Brown
Ferrous Sulphate (Iron Sulphate)	FeSO <sub>4</sub>	Green
Lead Nitrate	Pb(NO <sub>3</sub> ) <sub>2</sub>	Yellow
Magnesium Oxide	MgO	White
Nitrogen Dioxide	NO <sub>2</sub>	Brown
Silver Chloride	AgCl	White
Silver Sulphide	Ag <sub>2</sub> S	Black

**For  
Other  
Study  
Material**






## 10. Some Metal Property

Properties	Metals
Most Ductile Metal	Gold
Best Conductors of Heat	Silver, Copper
poor conductors of heat	Lead and mercury
Non-metals is a liquid at room temperature.	Bromine
Metals is a liquid at room temperature.	Mercury
Metals have very low melting points.	Gallium, Caesium
Lustrous Non-metal	Iodine
Hardest natural substance	Diamond
Metal Which can be easily cut with a knife	Lithium, Sodium, Potassium

## 11. Activity series : Relative reactivities of metals

K	Potassium	 <p>Most reactive</p> <p>Reactivity decreases</p> <p>Least reactive</p>
Na	Sodium	
Ca	Calcium	
Mg	Magnesium	
Al	Aluminium	
Zn	Zinc	
Fe	Iron	
Pb	Lead	
[H]	[Hydrogen]	
Cu	Copper	
Hg	Mercury	
Ag	Silver	
Au	Gold	

## 12. Tropism- Effect

No.	Tropism	Effect
1.	Chemotropism	the growth of pollen tubes towards ovules
2.	Geotropism	Movement towards/away from gravity.
3.	Hydrotropism	respond towards water
4.	Phototropism	Movement towards light.

## 13. Carbon Compound

Alkane (General Formula :- $C_nH_{2n+2}$ ) (Suffix – ane)		
C – C		
Carbon	Name	Structure
1	Methane	
2	Ethane	
3	Propane	
4	Butane	
5	Pentane	
6	Hexane	

**Alkene (General Formula :-  $C_nH_{2n}$ ) (Suffix – ene)**

<b>Carbon</b>	<b>Name</b>	<b>Structure</b>
2	Ethene	
3	Propene	
4	Butene	
5	Pentene	
6	Hexene	

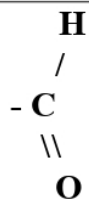
Alkyne (General Formula :- $C_nH_{2n-2}$ ) (Suffix – yne)		
$C \equiv C$		
Carbon	Name	Structure
2	Ethyne	
3	Propyne	
4	Butyne	
5	Pentyne	
6	Hexyne	

**Alcohol (General Formula :-  $C_nH_{2n+2}O$ ) (Suffix – ol)****-OH**

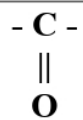
<b>Carbon</b>	<b>Name</b>	<b>Structure</b>
1	Methanol	
2	Ethanol	
3	Propanol	
4	Butanol	
5	Pentanol	
6	Hexanol	



**Aldehyde (General Formula :-  $C_nH_{2n}O$ ) (Suffix – al)**



Carbon	Name	Structure
1	Methanal	
2	Ethanal	
3	Propanal	
4	Butanal	
5	Pentanal	
6	Hexanal	

**Ketone (General Formula :-  $C_nH_{2n}O$ ) (Suffix – one)**

Carbon	Name	Structure
3	Propanone	
4	Butanone	
5	Pentanone	
6	Hexanone	

**Carboxylic acid (General Formula :-  $C_nH_{2n}O_2$ ) (Suffix – oic acid)****-COOH**

<b>Carbon</b>	<b>Name</b>	<b>Structure</b>
1	Methanoic acid	
2	Ethanoic acid	
3	Propanoic acid	
4	Butanoic acid	
5	Pentanoic acid	
6	Hexanoic acid	

<b>Halo alkane (X= Cl, Br etc.) (General Formula :- C<sub>n</sub>H<sub>2n+1</sub>X)</b>		
<b>(Prefix – halo (eg. Chloro, Bromo)</b>		
<b>-Cl</b>		
<b>Carbon</b>	<b>Name</b>	<b>Structure</b>
1	Chloromethane	
2	Chloroethane	
3	Chloropropane	
4	Chlorobutane	
5	Chloropentane	
6	Chlorohexane	

<b>Halo alkane (X= Cl, Br etc.) (General Formula :- <math>C_nH_{2n+1}X</math>)</b>		
<b>(Prefix – halo (eg.Chloro, Bromo)</b>		
<b>-Br</b>		
<b>Carbon</b>	<b>Name</b>	<b>Structure</b>
1	Bromomethane	
2	Bromoethane	
3	Bromopropane	
4	Bromobutane	
5	Bromopentane	
6	Bromohexane	



## 14. Plant hormones and their functions

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No.	Hormone	Functions
1	Auxin	helps the cells to grow longer
2	Gibberellins	help in the growth of the stem
3	Cytokinins	promote cell division
4	Abscisic acid	inhibits growth

## 15. Animals hormones and their functions

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No.	Hormone	Endocrine Gland	Functions
1	Growth hormone	Pituitary gland	Stimulates growth in all organs
2	Thyroxin	Thyroid gland	Regulates metabolism for body growth
3	Insulin	Pancreas	Regulates blood sugar level
4	Testosterone	Testes	Development of male sex organs
5	Oestrogen	Ovaries	Development of female sex organs, regulates menstrual cycle, etc.
6	Adrenaline	Adrenal gland	Response to stress, emergency
7	Releasing hormones	Hypothalamus	Stimulates pituitary gland to release hormones

## 16. Abbreviation - Full form

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Ch.	Abbreviation	Full form
6	ATP	Adenosine Triphosphate
7	CNS	Central Nervous System
7	PNS	Peripheral Nervous System
8	HIV	Human Immunodeficiency Virus
8	AIDS	Acquired Immune Deficiency Syndrome
9	DNA	Deoxyribonucleic Acid
15	CFCs	Chlorofluorocarbons
15	UNEP	United Nations Environment Programme
15	UV	Ultra Violet rays

## 17. Modes of Asexual Reproduction- Example

*	Modes of Asexual Reproduction		Example
A)	<b><u>Natural Method:</u></b>		
1	<b>Fission</b>	Binary fission	Amoeba , Leishmania
		Multiple fission	Plasmodium , Malarial Parasite
2	<b>Fragmentation</b>		Spirogyra
3	<b>Regeneration</b>		Planaria , Hydra
4	<b>Budding</b>		Hydra
5	<b>Vegetative Propagation</b>	By roots	Dahlias , Sweet potato
		By stem	Potato, Ginger
		By leaves	Bryophyllum
6	<b>Spore Formation</b>		Rhizopus
B)	<b><u>Artificial method:</u></b>		
1	Grafting / Layering		Mango , sugarcane , roses , grapes

## 18. Quantity- Units- Measuring device

Ch.	Quantity (ରାଶି)	Units	Measuring device
10	Optical Power (P)	Dioptre (D)	
11	Electric charge (Q)	coulomb (C)	Ammeter
	Electric current (I)	ampere (A)	
		milliampere (mA)	
		microampere ( $\mu$ A)	
	Electric potential difference (V)	volt (V)	Voltmeter
	Resistance (R)	ohm ( $\Omega$ )	
	Resistivity ( $\rho$ )	ohm metre ( $\Omega$ m)	
	Electric power (P)	watt (W)	
kilowatt (kW)			
Electric energy	watt hour (W h)		
	kilowatt hour (kW h) ( = unit)		
	joule (J)		

## 19. Organ & Its Function

Organ	Function
Anus	Unabsorbed food removed from the body
Arteries	Carry oxygenated blood away from the heart to each and every cell.
Bile	Bile salt breakdown large globules to small globules
Blood	It is the transport medium. It is made up of: Plasma, RBC, WBC, Platelets.
Chlorophyll	Absorption of light energy
Cornea	Light enters the eye through it
crystalline lens	provides the finer adjustment of focal length
Gastric gland	release gastric juice (hydrochloric acid, pepsin, and mucus)
Guard Cell	Closing and opening of Stomata
Heart	It acts as a pumping organ.
Hydrochloric acid	Creates an acidic medium, To kill germ
Intestinal juice	Convert proteins to amino acids, carbohydrates to glucose and fats to fatty acids and glycerol.
Iris	controls the size of the pupil
Lipase	Breaking down emulsified fats
Liver	Secrete Bile juice
Mouth	Intake of whole food
Mucus	Protects the inner lining of the stomach
Oesophagus (food-pipe)	Taking food from the mouth to the stomach
Optic nerves	signals are sent from retina to the brain
Pancreas	secretes pancreatic juice
Pancreatic juice	Contains enzymes trypsin and lipase
Pepsin	Digestion of protein
Plasma	It transport food, nitrogenous wastes, carbon dioxide, salt etc. in a dissolved form.
Platelets	Helps in the clotting of blood.
Pupil	regulates and controls the amount of light entering the eye.
RBC	Consists of haemoglobin and transports oxygen.
Retina	Lens forms an image on it.
Salivary amylase	Breaks down starch to sugar
Salivary gland	Secrete Saliva
Sphincter muscle	Regulated the exit of food from the stomach to small intestine

Stomata	(a) Exchange of gases O <sub>2</sub> /CO <sub>2</sub> . (b) Loses large amount of water (water vapour) during transpiration.
Teeth	Chewing/ Grinding of food
Trypsin	Digestion of proteins
Veins	Bring de-oxygenated blood to heart for purification.
Villi	Increase the surface area for absorption
WBC	Helps to fight infection.

## 20. Sign Convention for Spherical Mirrors-Lens

Types		Concave Mirror	Convex Mirror	Concave Lens	Convex Lens
Object Distance (u)		—	—	—	—
Image Distance (v)	Real & Inverted	—			+
	Virtual & Erect	+	+	—	—
Focal Length (f)		—	+	—	+
Radius of curvature (R)		—	+	—	+
Height of Object (h <sub>o</sub> )		+	+	+	+
Height of Image (h <sub>i</sub> )	Real & Inverted	—			—
	Virtual & Erect	+	+	+	+
Magnification (m)	Real & Inverted	—			—
	Virtual & Erect	+	+	+	+

For  
Other  
Study  
Material



## 21. Formula

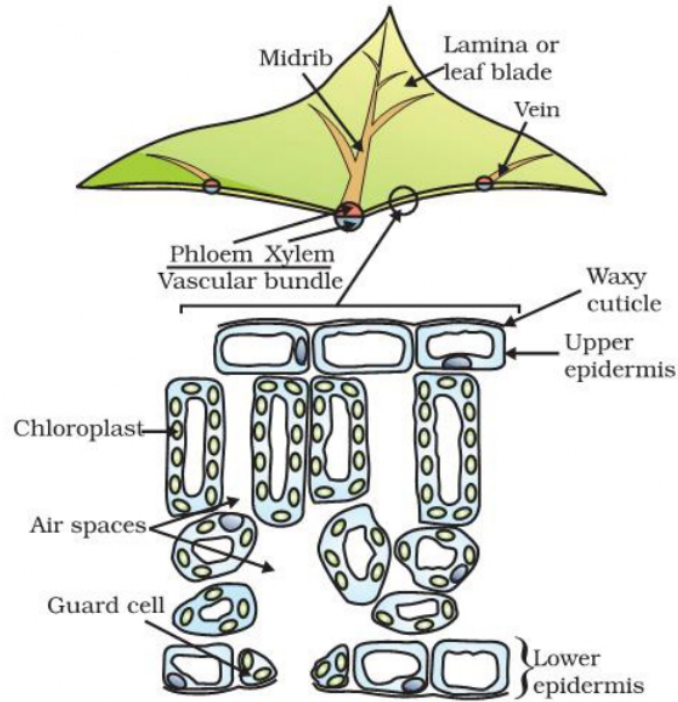
Quantity	Formula	Where,
Radius of curvature (R)	$R = 2 \times f$	v = Image distance u = Object distance f = Focal length h' = Height of image h = Height of object
Mirror formula	$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$	
Lens formula	$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$	
Magnification (mirror) (m)	$m = \frac{h'}{h} = -\frac{v}{u}$	
Magnification (lens) (m)	$m = \frac{h'}{h} = \frac{v}{u}$	
Power of lens (P)	$P = \frac{1}{f}$	
The Refractive Index ( $n_{21}$ )	$n_{21} = \frac{v_1}{v_2}$	v <sub>1</sub> = Speed of light in medium 1 v <sub>2</sub> = Speed of light in medium 2
Electric Current (I)	$I = \frac{Q}{t}$	Q = net charge t = time W = workdone V = Potential difference I = Electric Current R = Electrical resistance A = Cross sectional area l = length of wire
Potential difference (V)	$V = \frac{W}{Q}$	
Electrical resistance (R)	$R = \frac{V}{I}$	
Electrical resistivity ( $\rho$ )	$\rho = \frac{R \times A}{l}$	
Power (P)	$P = V \times I$	
Heat energy (H)	$H = V \times I \times t$	
Equivalent resistance (Series) ( $R_s$ )	$R_s = R_1 + R_2 + \dots + R_n$	
Equivalent resistance (Parallel) ( $R_p$ )	$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$	

For  
Other  
Study  
Material

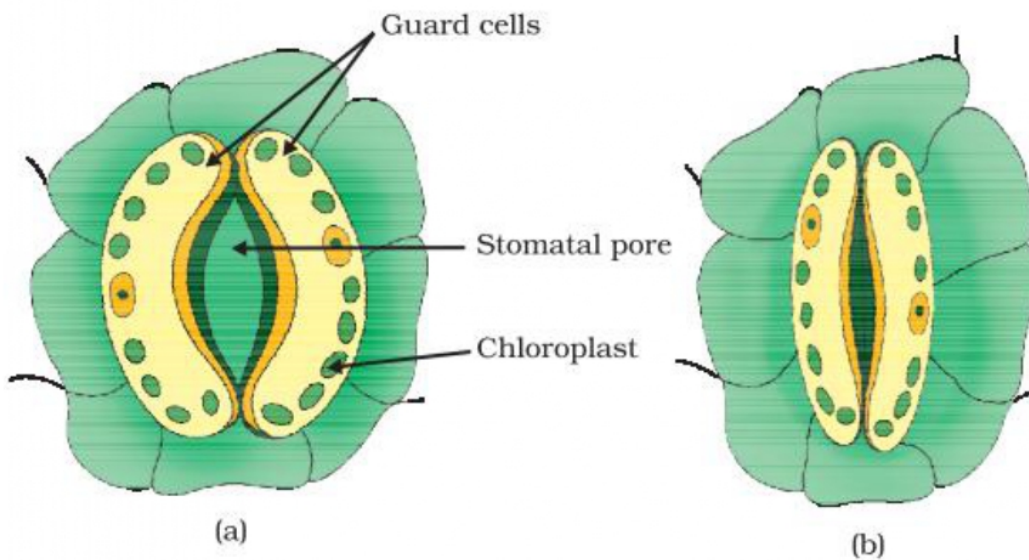


## 22. Diagram

### 5.1) Cross-section of a leaf

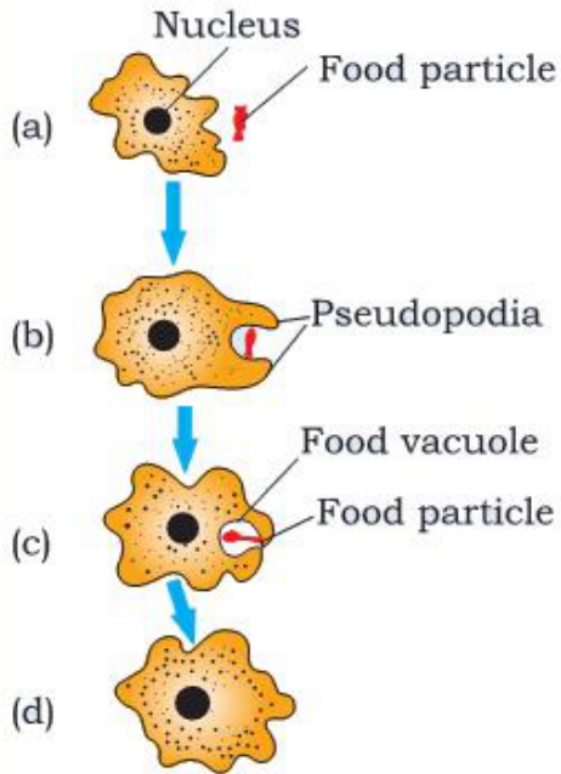


### 5.2) a) Open and (b) closed stomatal pore

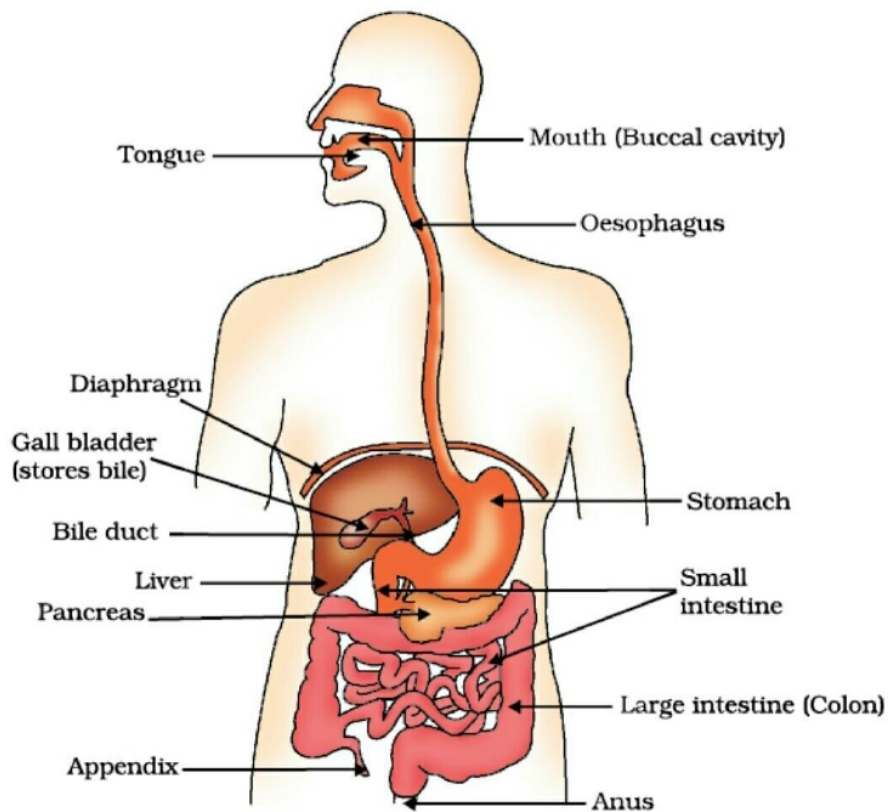




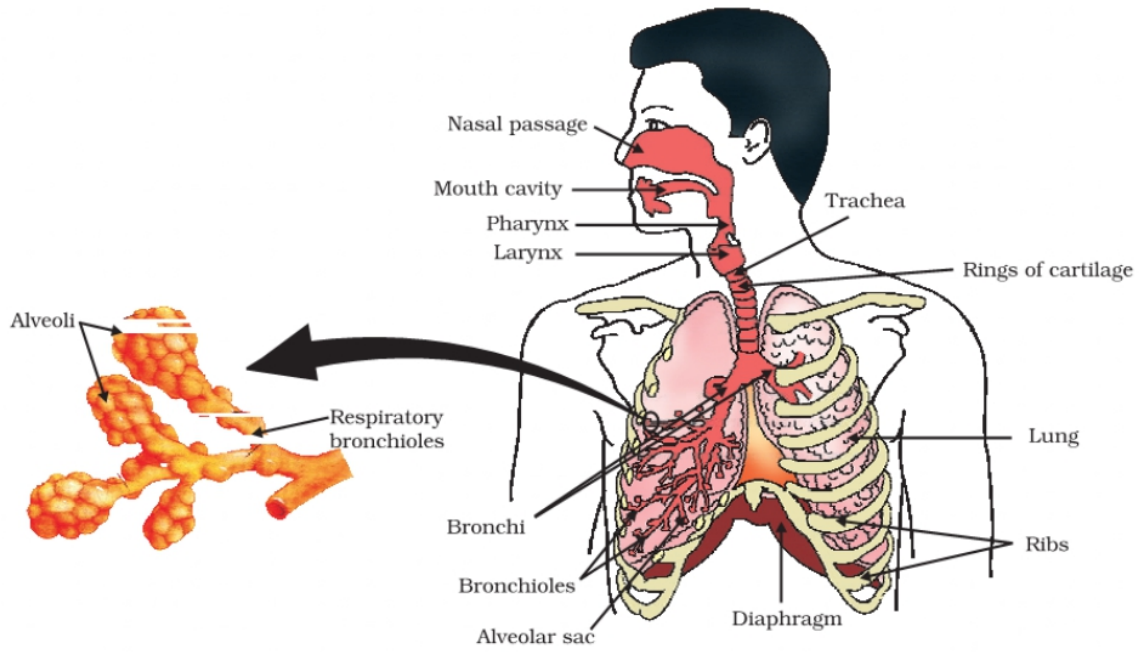
### 5.3) Nutrition in Amoeba



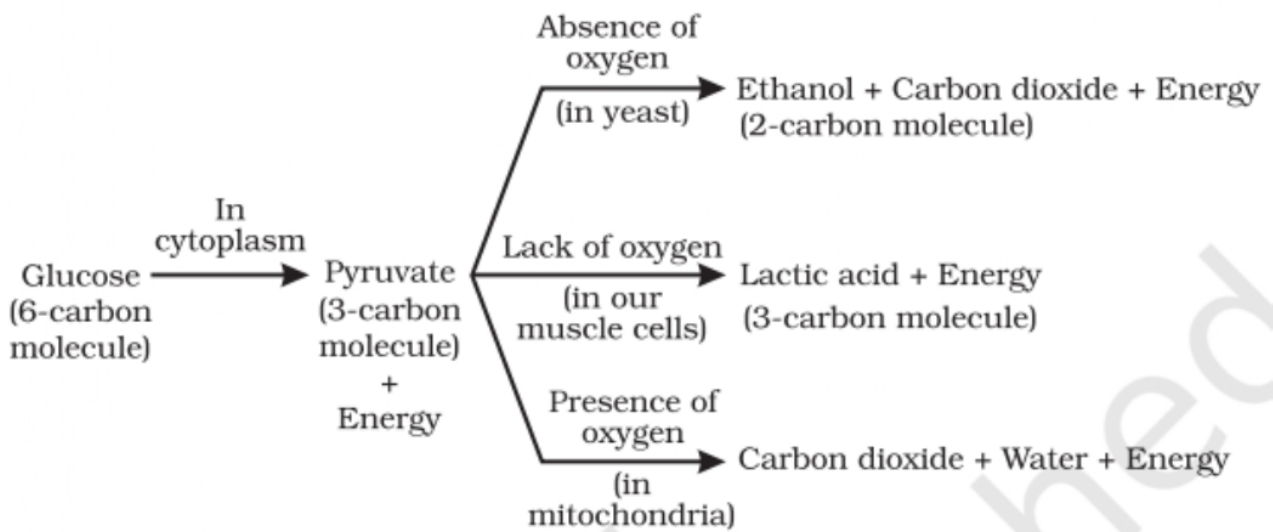
### 5.4) Human alimentary canal



## 5.5) Human respiratory system

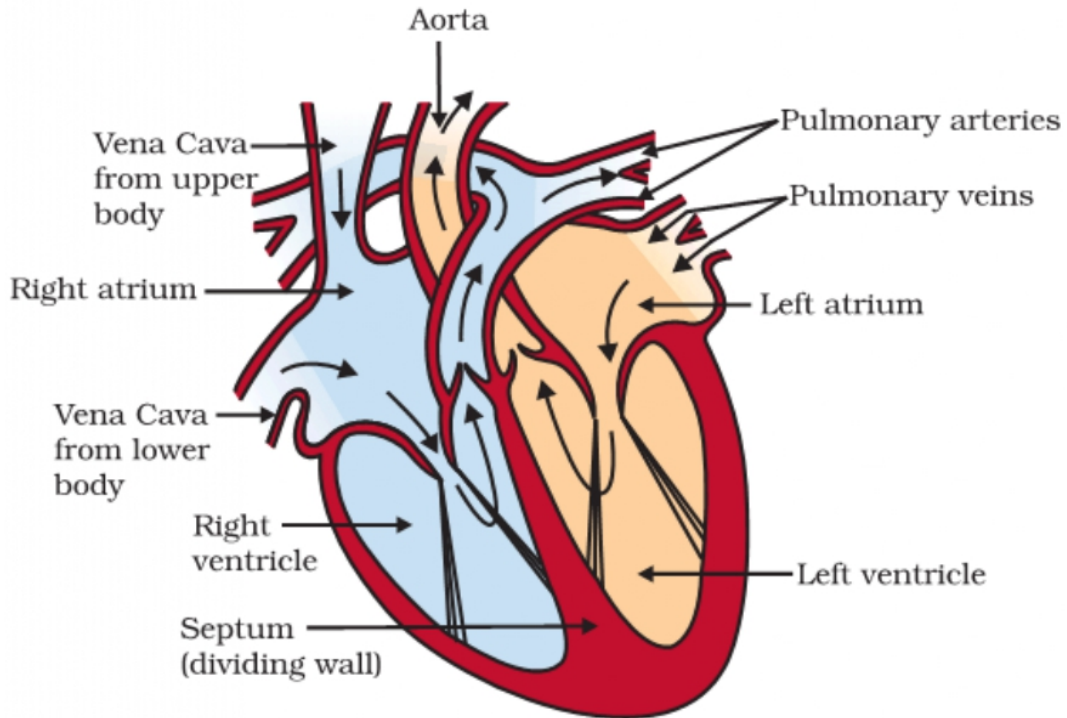


## 5.6) Break-down of glucose by various pathways

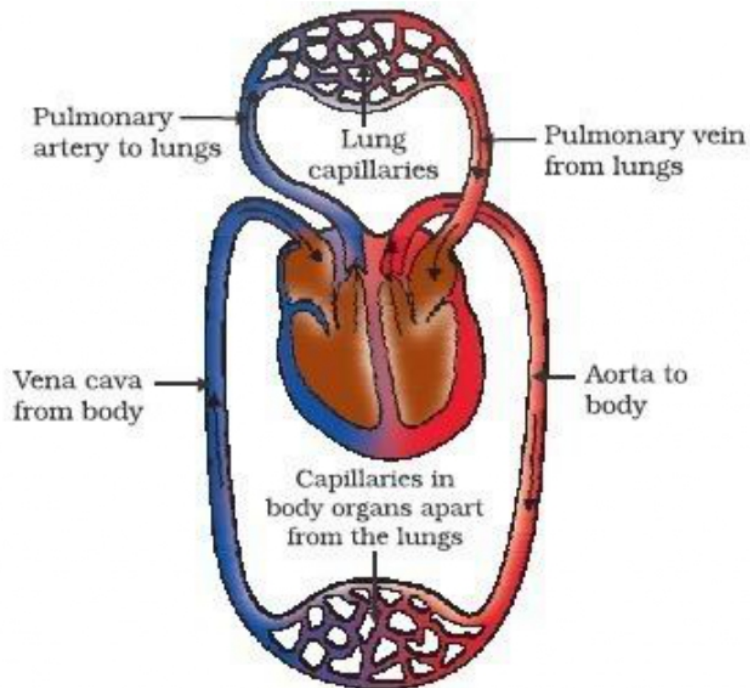




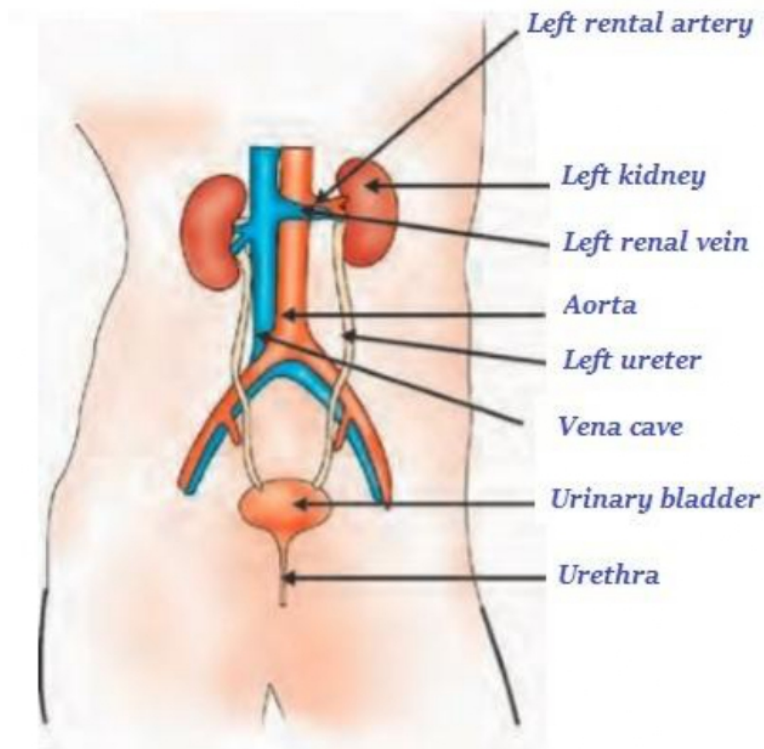
### 5.7) Schematic sectional view of the human heart



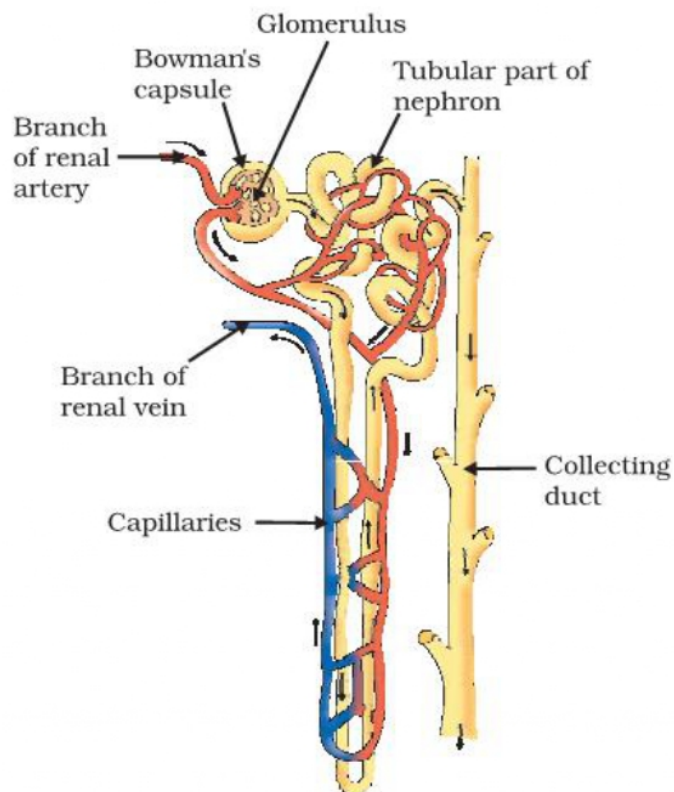
### 5.8) Schematic representation of transport and exchange of oxygen and carbon dioxide



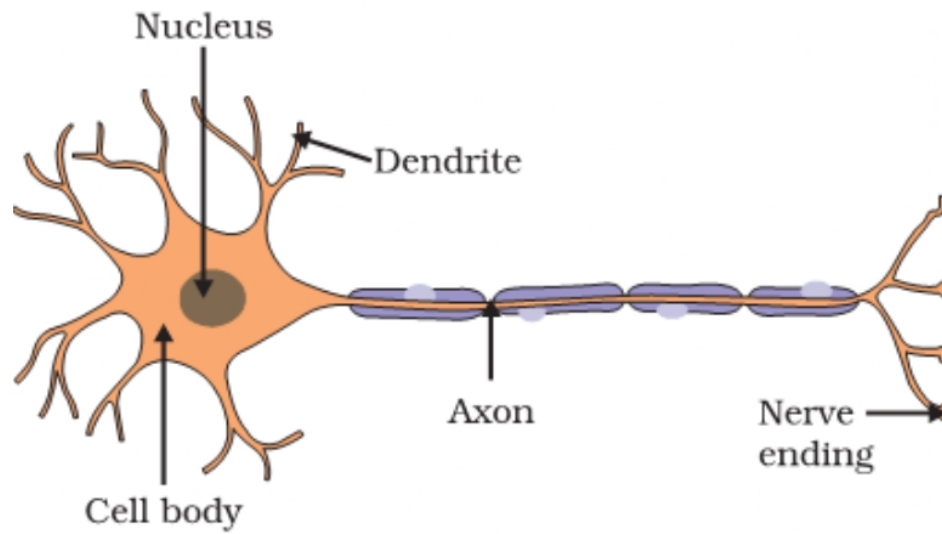
## 5.9) Excretory system in human beings



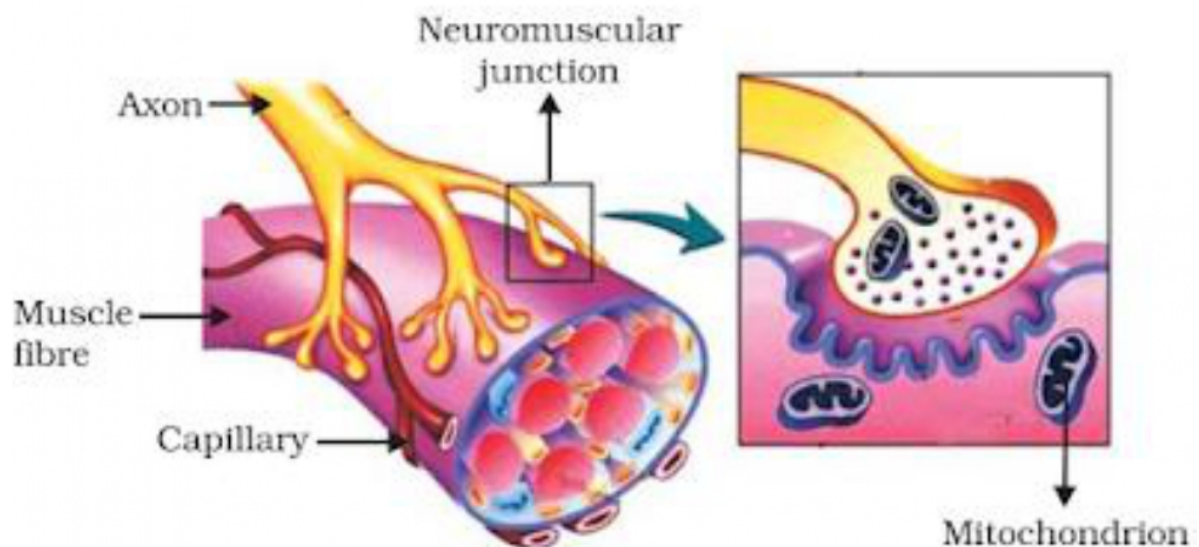
## 5.10) Structure of a Nephron



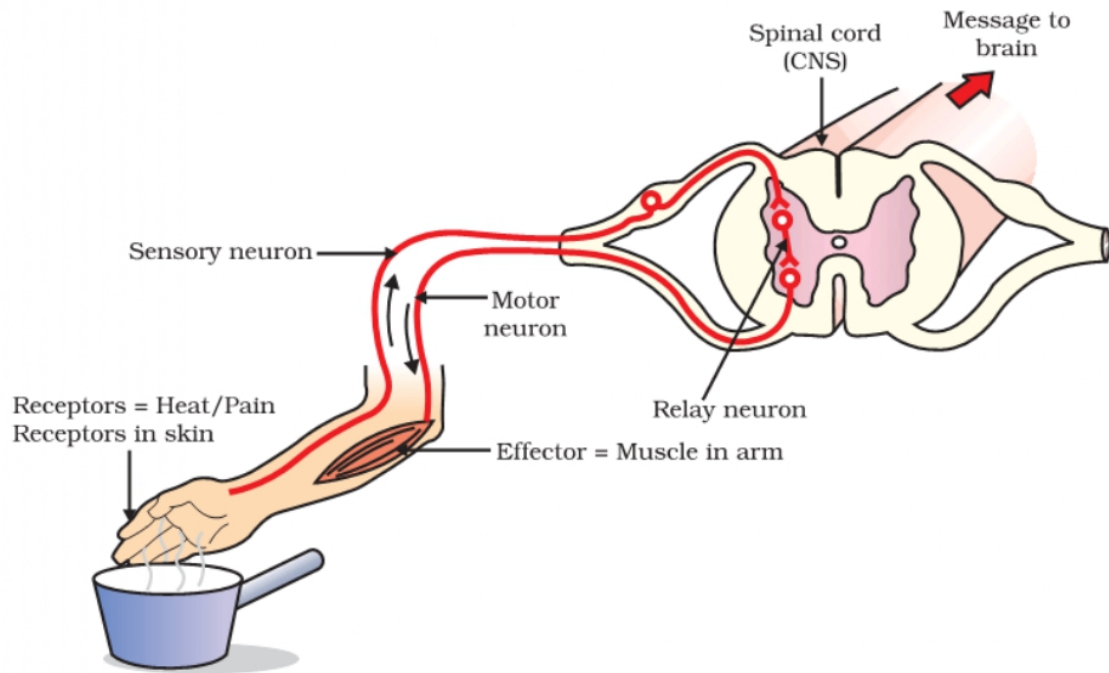
## 6.1) Structure of neuron



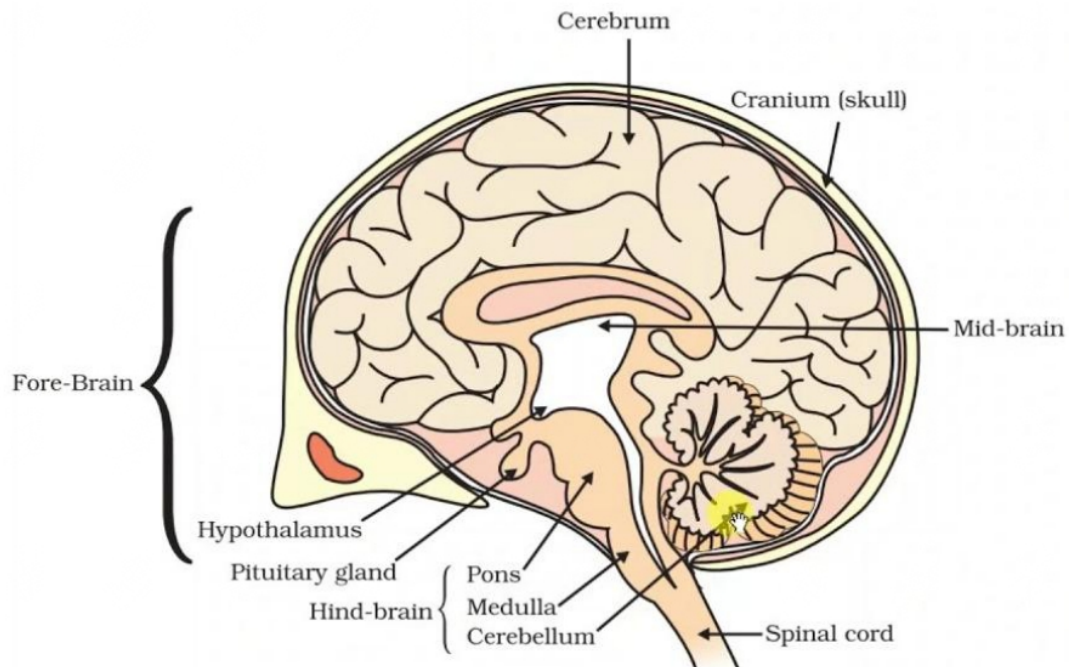
## 6.2) Neuromuscular junction



### 6.3) Reflex arc

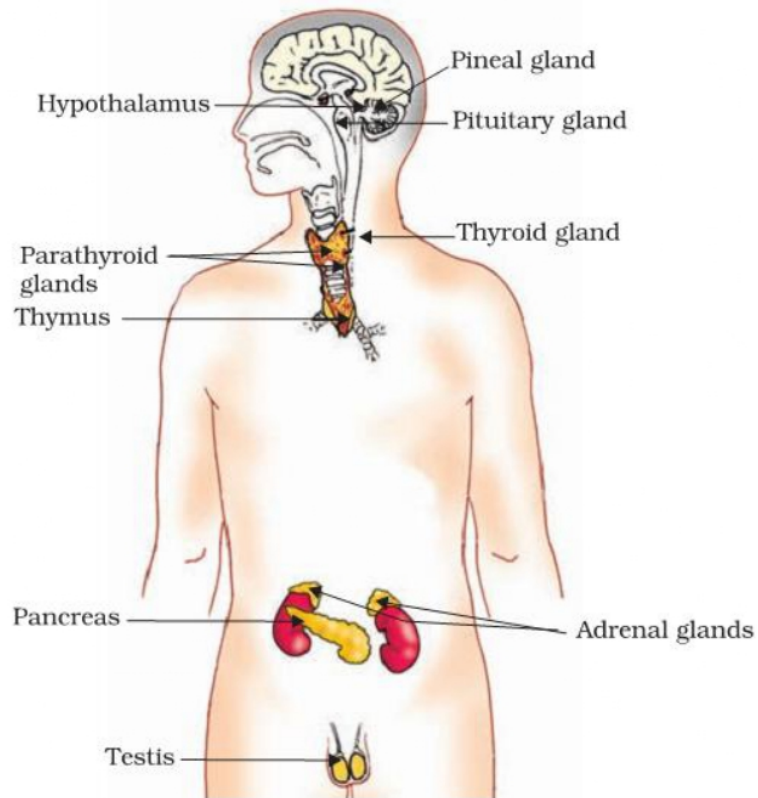


### 6.4) Human Brain

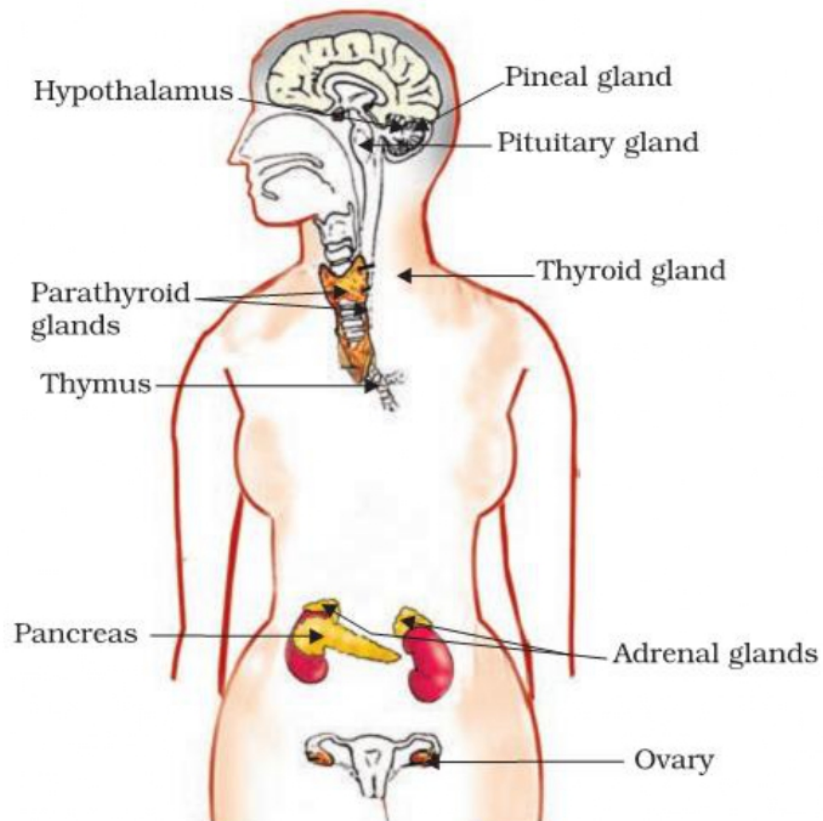




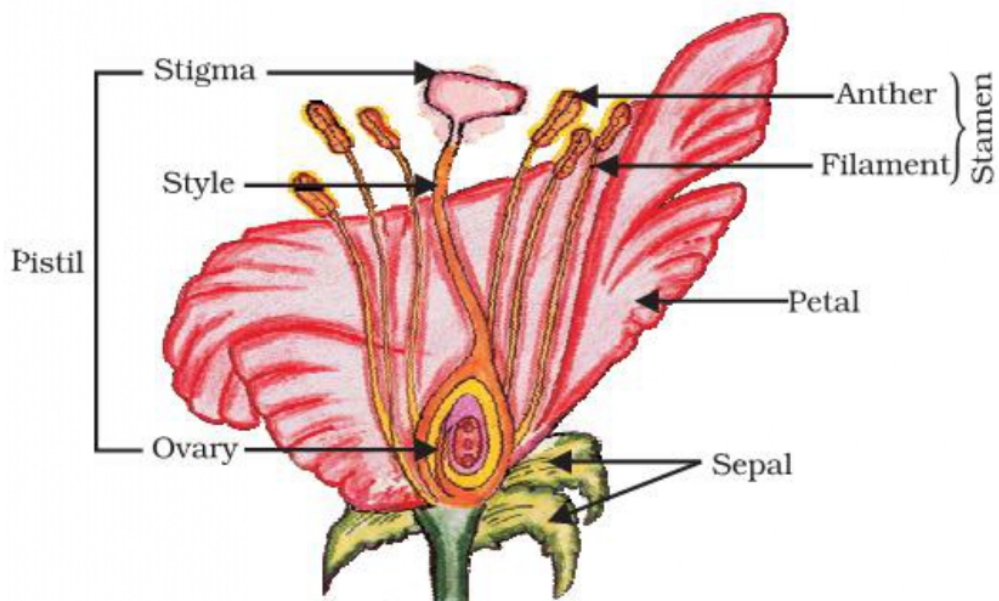
### 6.5) Endocrine Gland-male



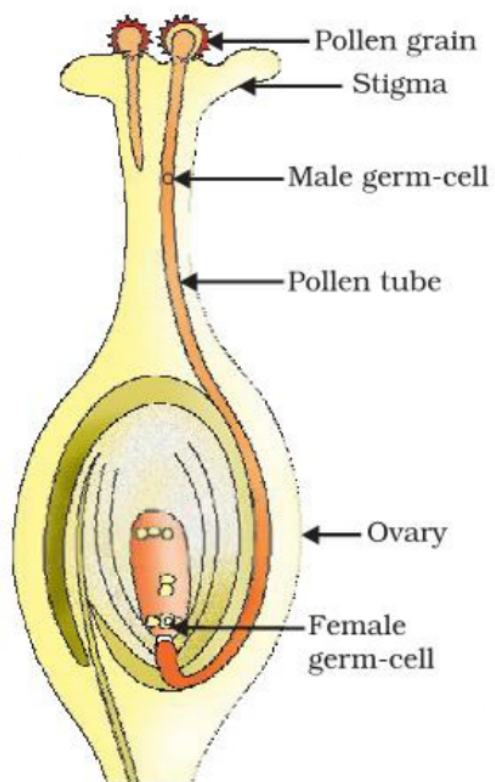
### 6.6) Endocrine Gland-Female



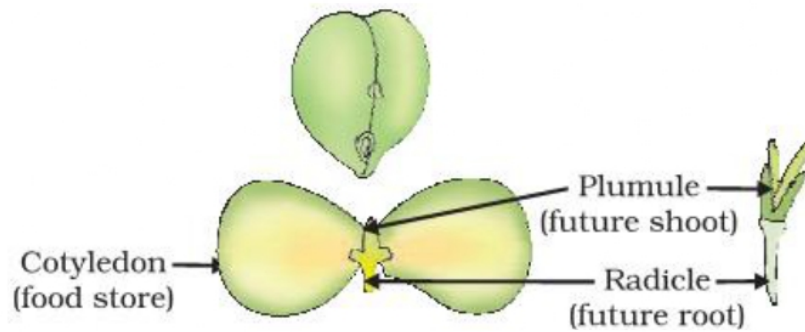
### 7.1) Longitudinal section of flower



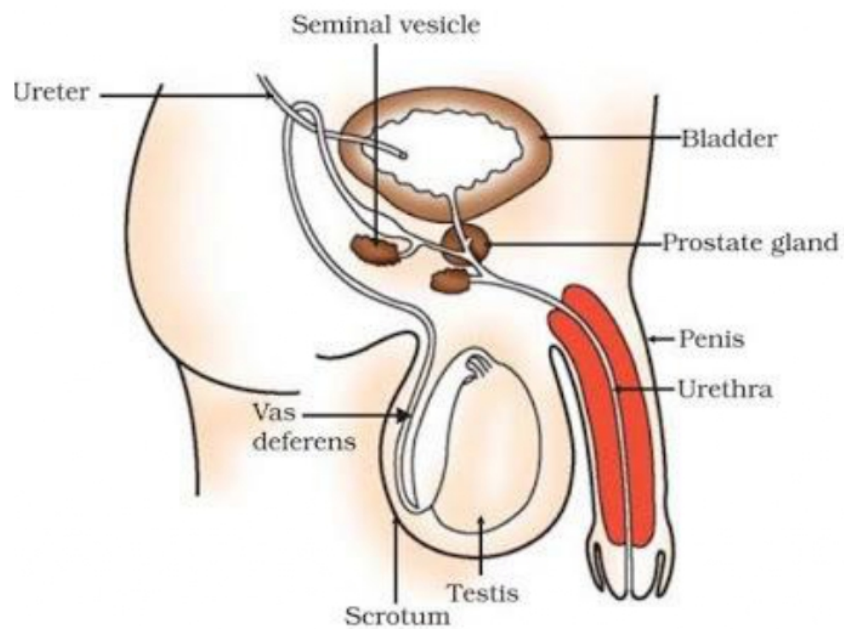
### 7.2) Germination of pollen on stigma



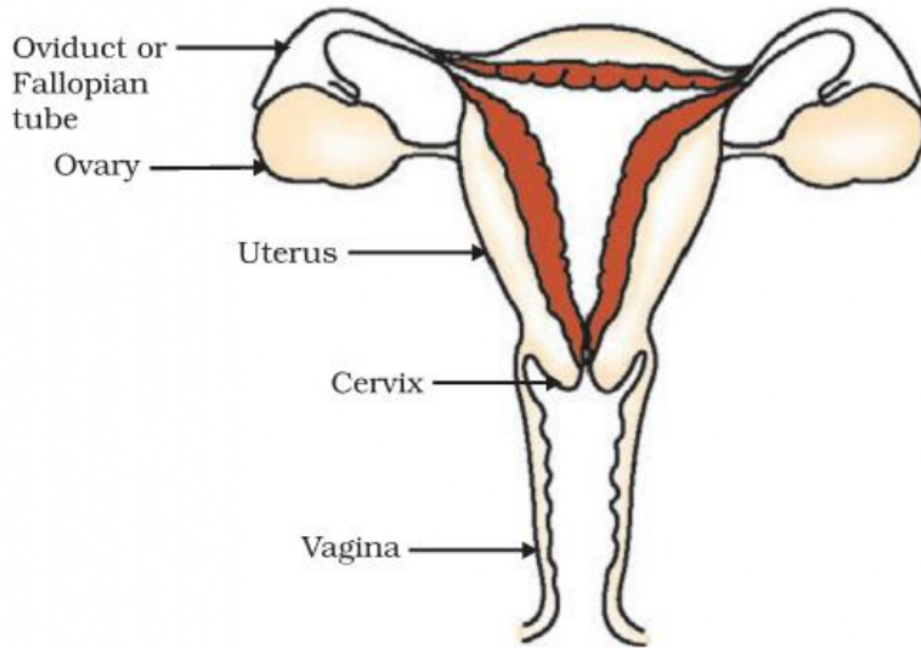
### 7.3) Germination



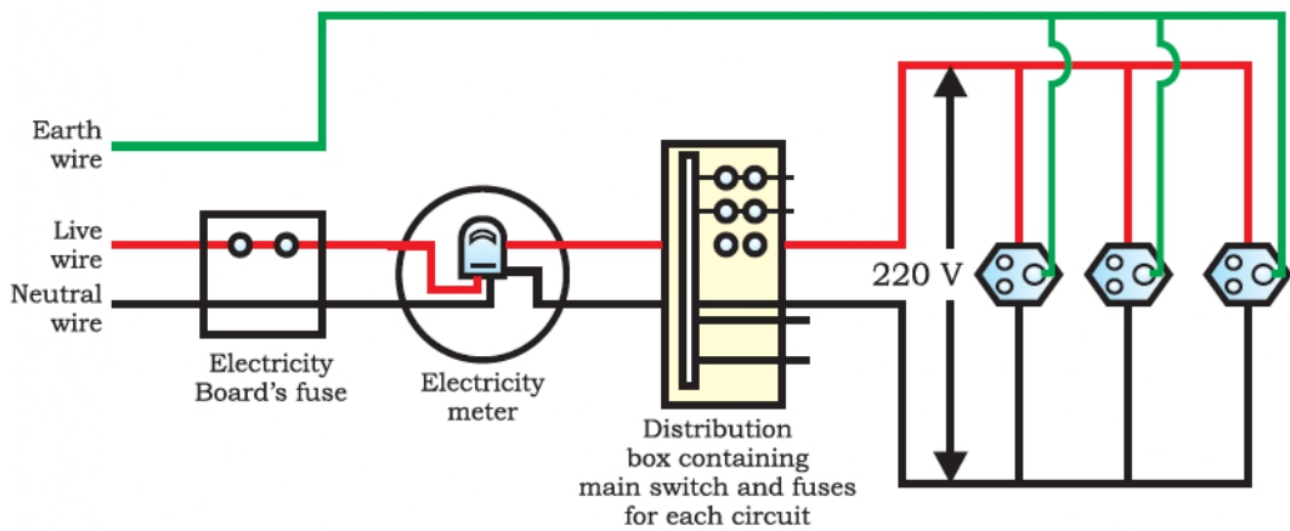
### 7.4) Human–male reproductive system



## 7.5) Human–female reproductive system



## 12.1) A schematic diagram of one of the common domestic circuits





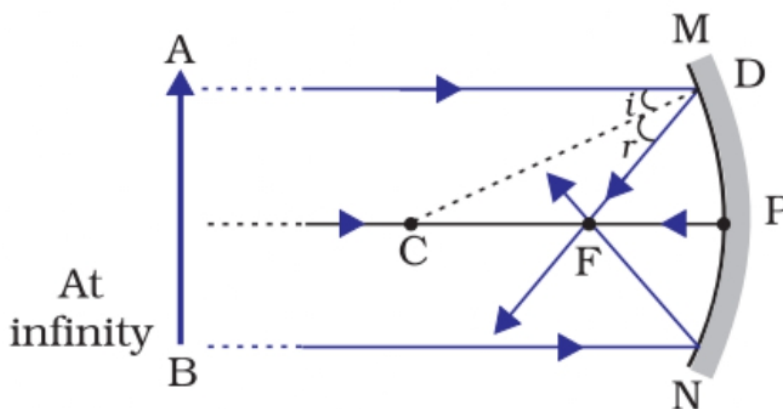
No.	Components	Symbols
1	An electric cell	
2	A battery or a combination of cells	
3	Plug key or switch (open)	
4	Plug key or switch (closed)	
5	A wire joint	
6	Wires crossing without joining	
7	Electric bulb	
8	A resistor of resistance R	
9	Variable resistance or rheostat	
10	Ammeter	
11	Voltmeter	

**For  
Other  
Study  
Material**

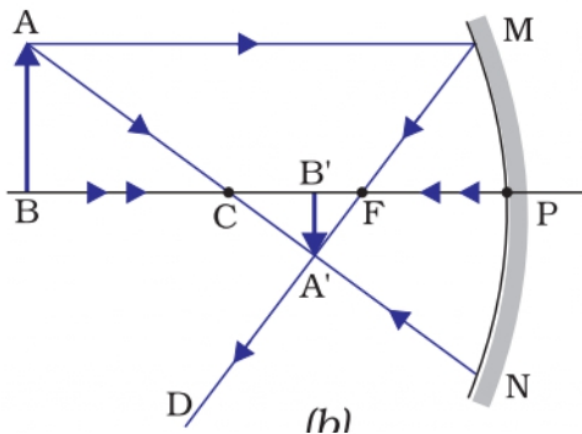


**a) Ray diagrams for the image formation by a concave mirror**

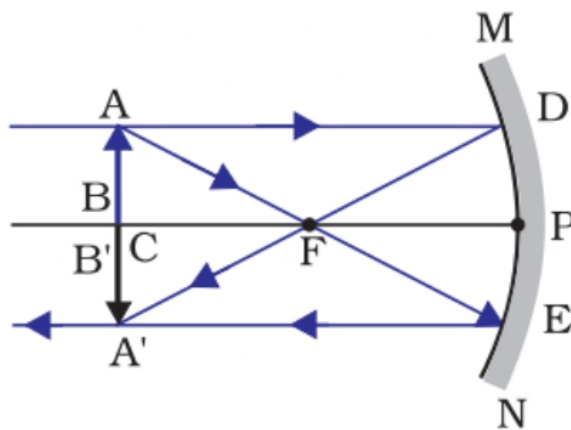
<b>Position of the object:</b>	<b>Size of the image:</b>
Infinite	Very small
<b>Position of the image:</b>	<b>Nature of the image:</b>
At F	Real and inverted



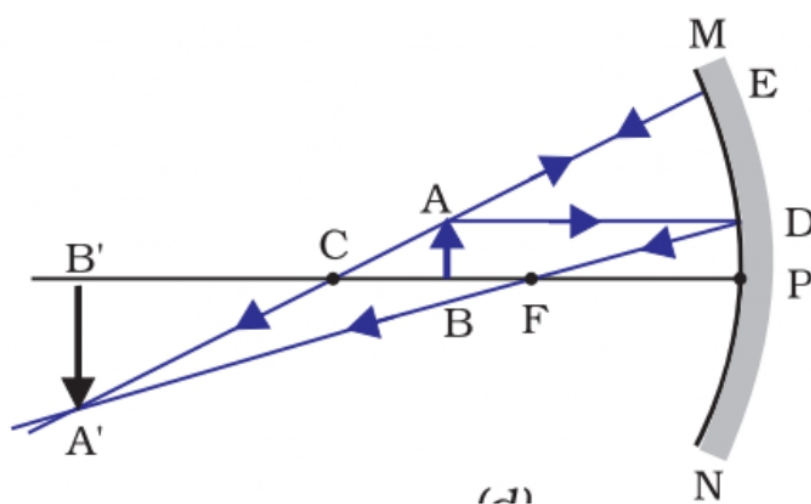
<b>Position of the object:</b>	<b>Size of the image:</b>
Beyond C	Small
<b>Position of the image:</b>	<b>Nature of the image:</b>
Between F and C	Real and inverted



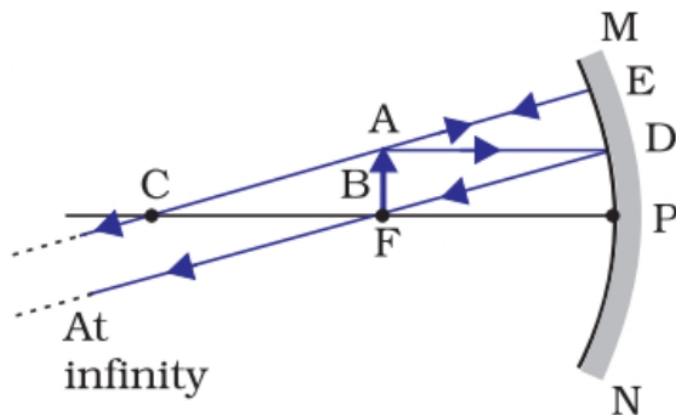
<b>Position of the object:</b>	<b>Size of the image:</b>
At C	Same
<b>Position of the image:</b>	<b>Nature of the image:</b>
At C	Real and inverted



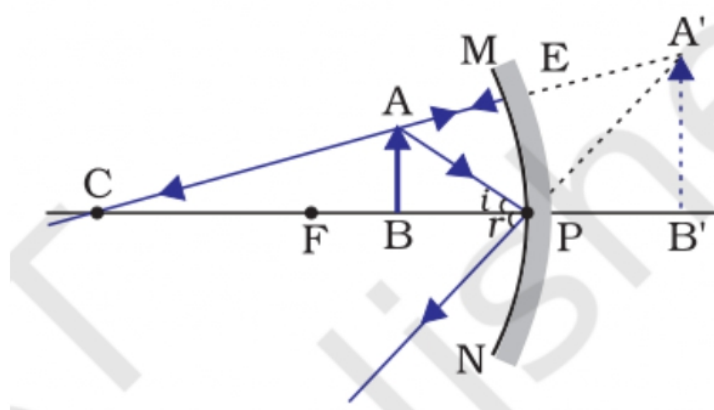
<b>Position of the object:</b>	<b>Size of the image:</b>
Between C and F	Large
<b>Position of the image:</b>	<b>Nature of the image:</b>
Beyond C	Real and inverted



<b>Position of the object:</b>	<b>Size of the image:</b>
At F	Very Large
<b>Position of the image:</b>	<b>Nature of the image:</b>
Infinite	Real and inverted



<b>Position of the object:</b>	<b>Size of the image:</b>
Between P and F	Large
<b>Position of the image:</b>	<b>Nature of the image:</b>
Behind the mirror	Virtual and erect



**b) Ray diagrams for the image formation by a convex lens**

**Position of the object:**

**Size of the image:**

Infinite

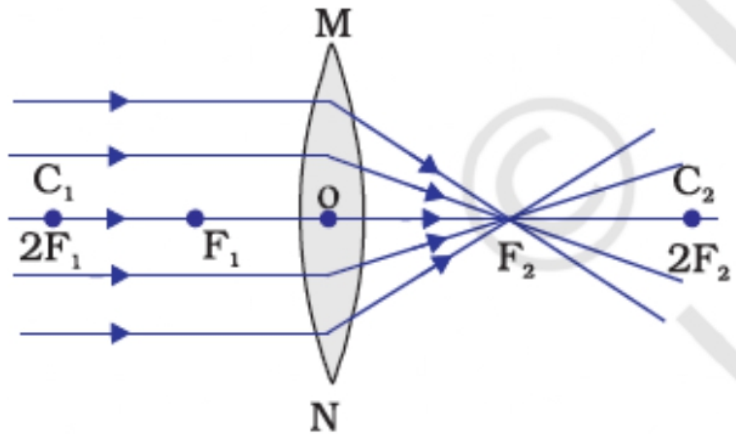
Very small

**Position of the image:**

**Nature of the image:**

At  $F_2$

Real and inverted



**Position of the object:**

**Size of the image:**

Beyond  $C_1(2F_1)$

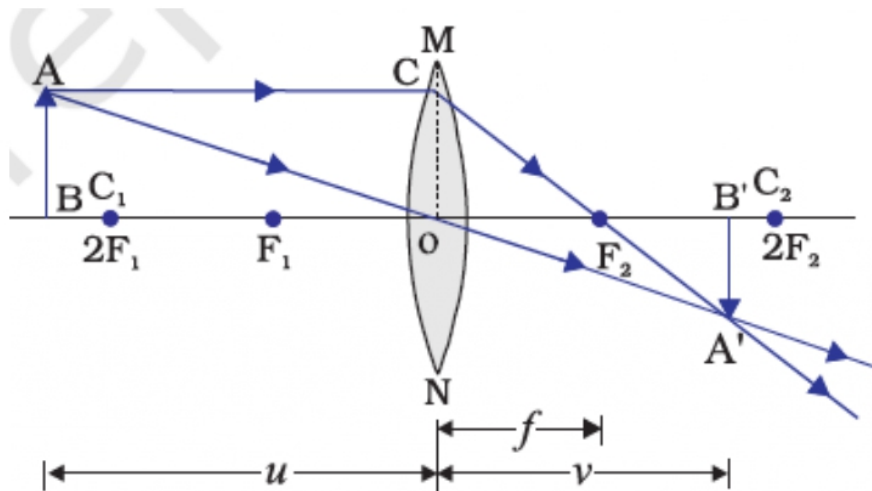
Small

**Position of the image:**

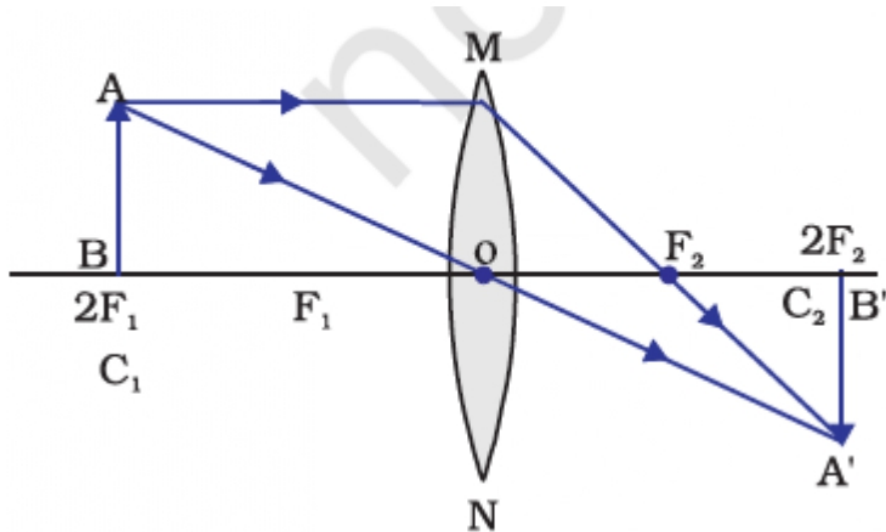
**Nature of the image:**

Between  $F_2$  and  $C_2(2F_2)$

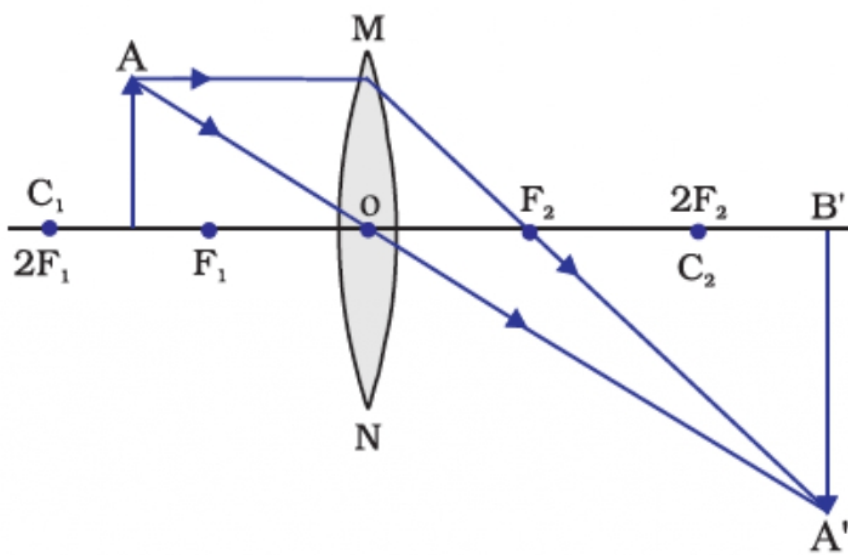
Real and inverted



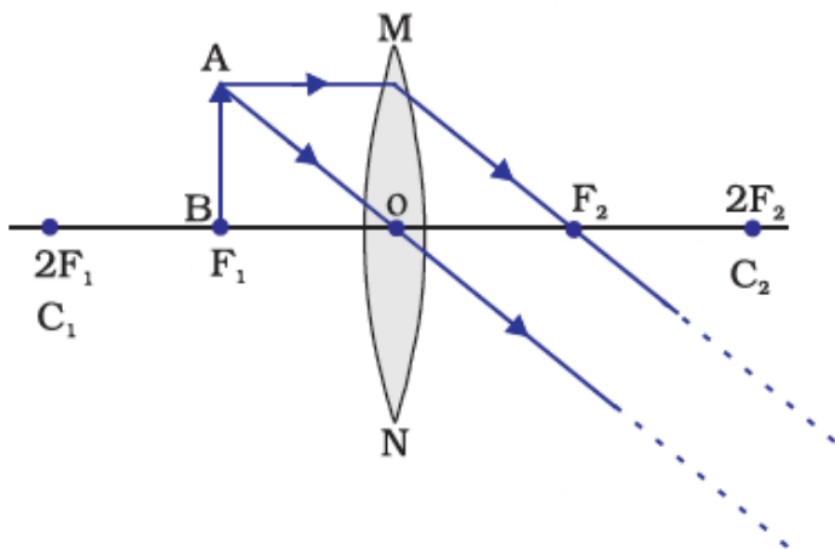
<b>Position of the object:</b>	<b>Size of the image:</b>
At $C_1(2F_1)$	Same
<b>Position of the image:</b>	<b>Nature of the image:</b>
At $C_2(2F_2)$	Real and inverted



<b>Position of the object:</b>	<b>Size of the image:</b>
Between $C_1(2F_1)$ and $F_1$	Large
<b>Position of the image:</b>	<b>Nature of the image:</b>
Beyond $C_2(2F_2)$	Real and inverted



<b>Position of the object:</b>	<b>Size of the image:</b>
At $F_1$	Very Large
<b>Position of the image:</b>	<b>Nature of the image:</b>
Infinite	Real and inverted



<b>Position of the object:</b>	<b>Size of the image:</b>
Between O and $F_1$	Large
<b>Position of the image:</b>	<b>Nature of the image</b>
On the same side of the lens as the object	Virtual and erect

