



SSC

MTS/HAVALDAR

Staff Selection Commission (SSC)

Volume - 4

General Science and English



INDEX

S No.	Chapter Title	Page No.
1	Biology	1
2	Chemistry	30
3	Physics	49
4	Environment Issue	59
5	Golden Rules of English Grammar	94
6	Subject Verb Agreement	112
7	Fill in the blanks	115
8	Spelling Correction	120
9	Important Synonyms and Antonyms	124
10	One Word Substitution	129
11	Idioms and Phrase	133
12	Cloze Test	138

1

CHAPTER

Biology

The Cell

- **Simplest and most basic unit** of life.
- **Discovered:** Robert Hooke (1665)
- All living things made up of cells- **structural, functional, and biological unit of life.**
- Has the **ability to duplicate itself** on its own.
- aka "**building blocks of life.**"

Cell Structure and its components

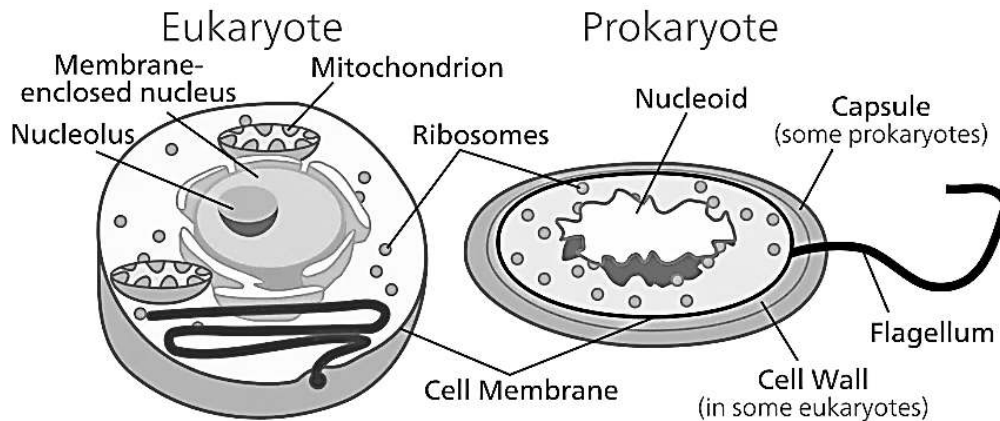
Cell Organelles

- Present within a cell & **perform certain specific functions to carry out life's processes.**

Plasma / Cell Membrane	• Outermost covering of the cell • Separates contents of cell from its external environment. • A selectively permeable membrane as it allows entry and exit of some materials in and out of the cell.
Cell Wall	• ONLY in plants • Outside the plasma membrane. • Mainly composed of cellulose. ○ Cellulose: A complex substance - provides structural strength to plants.
Cytoplasm	• Jelly-like substance present between cell membrane & nucleus. • Fluid content inside plasma membrane. • Contains many specialised cell organelles (mitochondria, golgi bodies, ribosomes, etc)
Nucleus	• Contains chromosomes that contain information for inheritance of features from parents to next generation in form of DNA • Plays a central role in cellular reproduction. • Nuclear membrane- a double-layered covering on nucleus. ○ Allows transfer of material from inside nucleus to its outside, i.e., to cytoplasm.
Nucleolus	• Ribosome synthesis site regulating cellular activity and reproduction.
Gene	• Unit of inheritance in living organisms.
Protoplasm	• Entire content of a living cell [cytoplasm + nucleus]. • aka living substance of the cell.
Chromosomes	• Rod-shaped structures • Visible only when the cell is about to divide. • Contain information for inheritance of features from parents to next generation in the form of DNA (deoxyribo nucleic acid) • Composed of DNA and Protein.
DNA molecules	• Contains information necessary for constructing and organising cells. • Functional segments of DNA - genes.

Vacuoles	● Empty structure in cytoplasm ● Act as storage sacs for solid or liquid contents. ● Common in plant cells. ● Smaller in animal cells. ● Substances stored- amino acids, sugars, various organic acids and some proteins.
Endoplasmic Reticulum	● A large network of membrane-bound tubes and sheets. ● 2 types : 1. Rough endoplasmic reticulum [RER] ○ Has ribosomes attached to its surface. ○ Ribosomes - sites of protein manufacture. 2. Smooth endoplasmic reticulum ○ Helps in the manufacture of fat molecules, or lipids, important for cell function. ○ Some of these proteins and lipids help in building the cell membrane k/a membrane biogenesis. ● Serve as channels for transport of materials between various regions of cytoplasm or between the cytoplasm and the nucleus. ● Also functions as a cytoplasmic framework providing a surface for some biochemical activities of cells.
Golgi Apparatus/ Complex	● A system of membrane-bound vesicles arranged parallel to each other in stacks called cisterns. ● Packages and dispatches material synthesised near ER to various targets inside and outside the cell. ● Stores, modifies and packages products in vesicles. ● Involved in the formation of lysosomes. ○ Membrane-bound sacs filled with digestive enzymes. ○ Kind of waste disposal system of the cell. ○ Help to keep the cell clean by digesting any foreign material as well as worn-out cell organelles.
Mitochondria	● Aka powerhouse of the cell. ● Energy required for various chemical activities is released by mitochondria in the form of ATP (Adenosine Triphosphate) molecules. ● 2 membranes: ○ Outer membrane- porous ○ Inner membrane - deeply folded. ■ Folds create a large surface area for ATP-generating chemical reactions.
ATP	● aka energy currency of the cell. ● Body uses energy stored in ATP for making new chemical compounds and for mechanical work.
Ribosomes	● Site of protein synthesis. ● Polyribosomes or Polysomes: Several ribosomes may attach to a single mRNA and form a chain. ● Prokaryotes- ribosomes are associated with the plasma membrane of the cell.
Cilia and Flagella	● Hair-like outgrowths of the cell membrane. ● Cilia - small structures which work like oars, causing the movement of either the cell or the surrounding fluid. ● Flagella - comparatively longer and responsible for cell movement. ● Prokaryotic bacteria have flagella but structurally different from eukaryotic flagella.
Centrosome and Centrioles	● Centrosome- an organelle usually containing 2 cylindrical structures called centrioles. ● Surrounded by amorphous pericentriolar materials. ● Both the centrioles in a centrosome lie perpendicular to each other

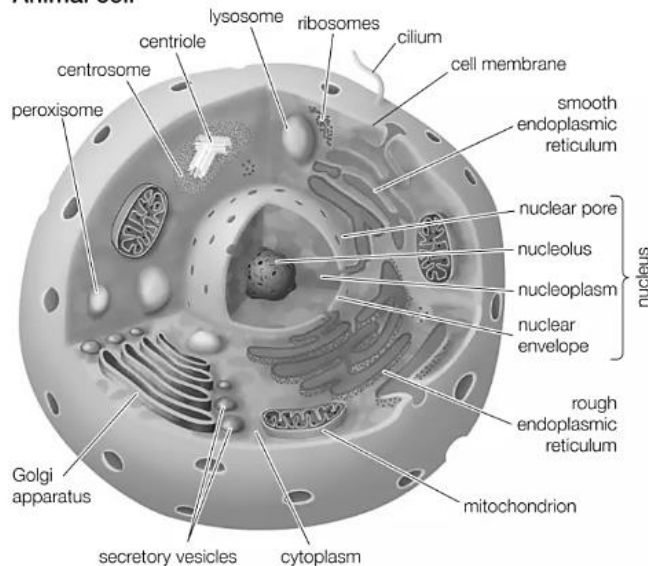
Types of Cells



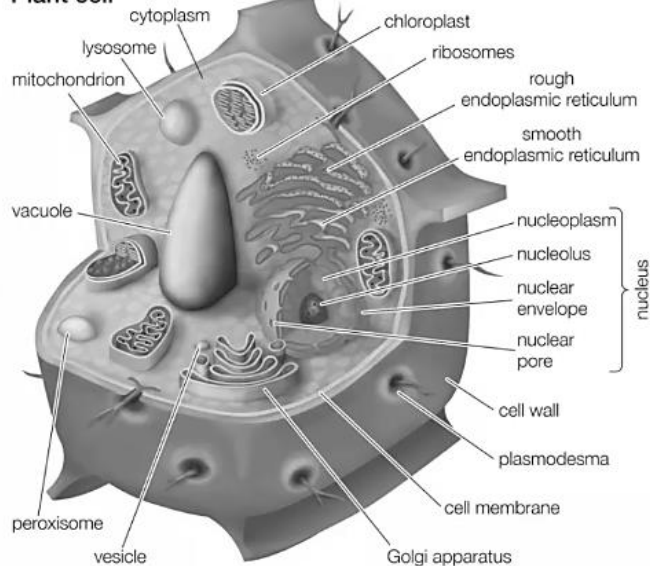
Prokaryotic Cell	Eukaryotic Cell
• Primitive/undeveloped nucleus.	• Has true or developed nucleus
• Size - 0.2 - 2.0 micrometers	• Size- 10- 100 micrometers.
• Simpler in structure	• More complex
• Organelles not membrane-bound	• Organelles membrane bound & specific in function.
• DNA arranged in circular shape	• DNA linear in shape
• Cytoplasm present, but lacks in most cell organelles.	• Consists of both cytoplasm and organelles
• Cell wall present. • Made of mucopeptide or peptidoglycan	• Usually, absence of cell wall here. • Made of cellulose
• Cell division - binary fission, transduction, conjugation, and transformation	• Cell division - mitosis
• Mitochondria absent	• Mitochondria present.
• Endoplasmic reticulum not present.	• Endoplasmic reticulum present.
• Ribosome present	• Ribosome present
• Plasmids commonly found. ○ A small, circular, double-stranded DNA molecule distinct from a cell's chromosomal DNA. ○ Naturally exist in bacterial cells.	• Plasmids very rarely found
• Only asexual reproduction.	• Both sexual and asexual reproduction.
• Have a single origin of replication	• Have multiple origins of replication
• Only 1 chromosome.	• Many chromosomes present
• Eg. Bacteria and Archaea.	• Eg. Plant and animal cells.

Plant and Animal Cells

Animal cell



Plant cell



	Animal Cell	Plant Cell
Nucleus	Present	Present
Cilia	Present	Very rare
Shape	Round (irregular shape)	Rectangular (fixed shape)
Chloroplast	NO chloroplasts	Chloroplasts present
Cytoplasm	Present	Present
Endoplasmic Reticulum	Present	Present
Ribosomes	Present	Present
Mitochondria	Present	Present
Vacuole	One or more small vacuoles (much smaller than plant cells).	One large central vacuole taking up 90% of cell volume.

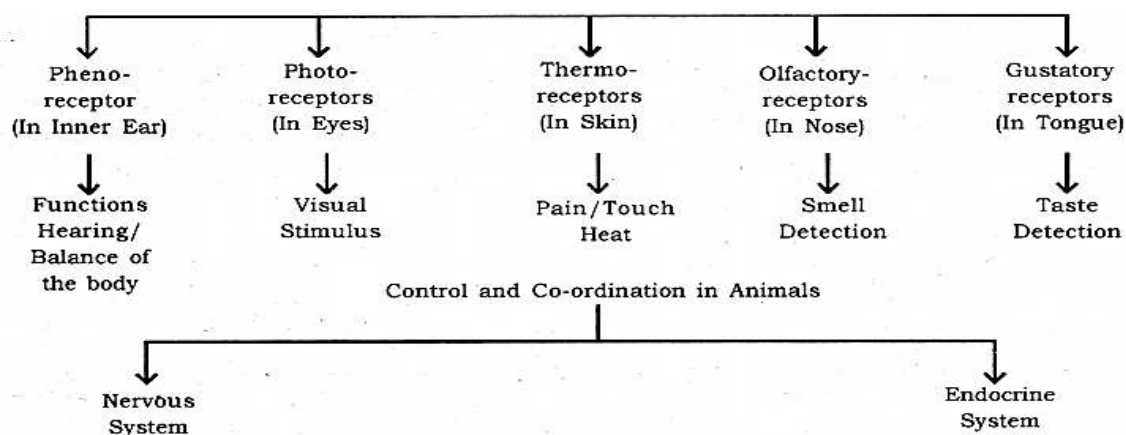
Control and Coordination

In animals

Nervous system and hormonal system are responsible for control and coordination.

Receptors:

- Specialized tips of nerve fibres that collect information to be conducted by nerves.
- In the sense organs of the animals.



- **Types:**

1. **Nervous System**

- A **highly complex regulatory system** in animals.
- **Coordinates actions & transmits sensory information** and **signals** to/from the different parts of body.
- **Neuron** - **structural and functional unit** of entire system.
- **Functions:**
 - **Receives information** from the **environment**.
 - Receive the information from the **various body parts**.
 - **Act accordingly** through muscles and glands.
- **Movement**- **ability** of an organism **to move** a **particular body part**.
- **Locomotion** - **ability** of an organism **to move** its **whole body** from one place to another.

Neuron

- **Structural and functional unit of the nervous system**
- **Coordinates and controls the complex actions** in animals.
- **Specialized cells** responsible for **transmission of nerve impulses**.
- **3 parts-**

1. **Axon-**

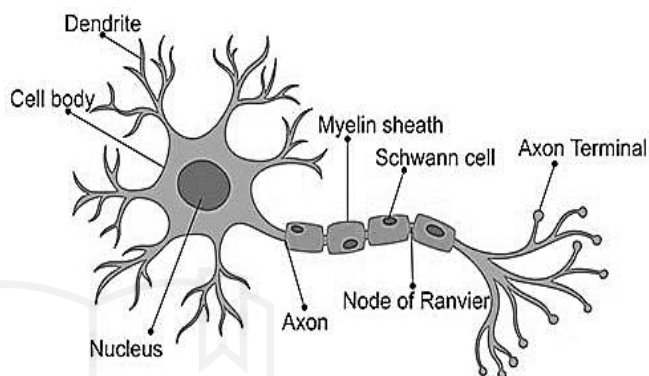
- **Tail of the neuron**.
- **Ends in fine hair-like structures** k/a **axon terminals** which rely on nerve impulses
- **Axons** - **myelinated** or **unmyelinated**.
- **Impulse transmission** is faster in **myelinated neurons**.

2. **Cyton/soma/cell body-**

- **Star-shaped** having various **hair-like structures** k/a **dendrites** which **receive the nerve impulses**

3. **Myelin Sheath-**

- An **insulating sheath** on **axon**.
- **Insulates axon** against **nerve impulse** from its **surroundings**.
- **Dendrites** **receive the impulse** from other neurons.
- **Cyton** or **Soma** cells **process the impulse- transmitted** to the **Axon**. Gets transmitted either to other neurons or to muscles for taking necessary action.



- **Types :**

1. **Sensory** neurons- Receive the signals from a sense organ
2. **Motor** neurons- Send the signals to a gland or muscle
3. **Relay** or association neuron- Relay signals between a motor neuron and sensory neuron.

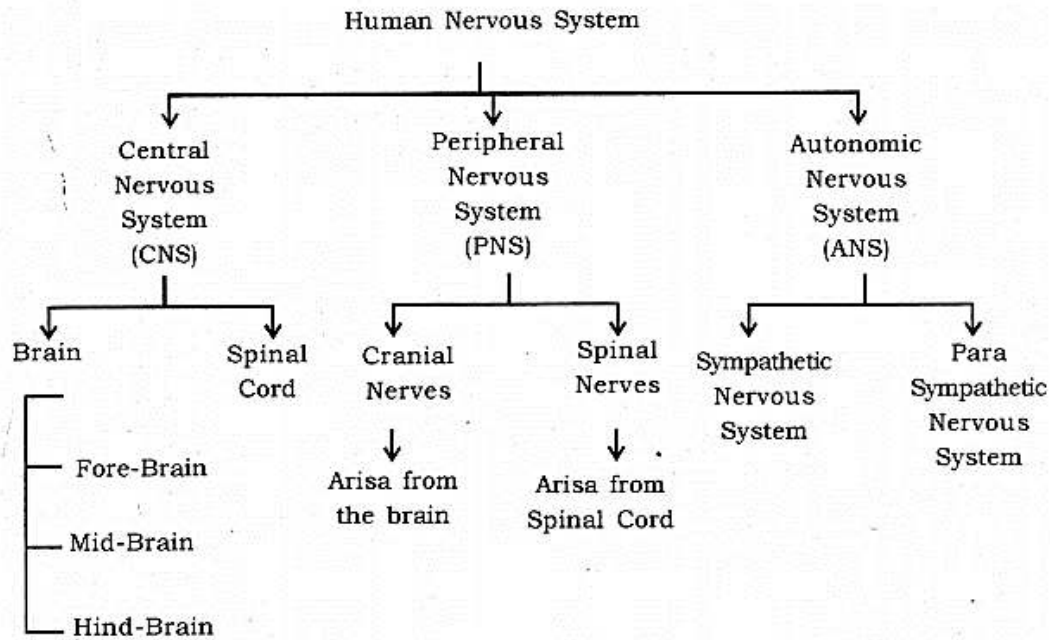
- **Synapse**

- A **microscopic gap** between **two adjacent neurons**.
- A **point contact** between **terminal branches** of **axon** of one neuron and with the dendrite of another neuron.
- **Convert electric signals** into **chemicals** that can cross over gap between axon and dendrite.
- **Chemical message** is **passed** to **next neuron** and **converted back** to the **electrical signal** for **interpretation**.

- **Neuromuscular Junction:**

- **Point** where a **muscle fibre** comes in **contact** with a **motor neuron** carrying nerve impulse from the control nervous system.

Human nervous system



1. Central Nervous System:

- Brain + spinal cord.
- Brain controls all the functions in the human body.
- Spinal cord works as relay channel for signals between brain and peripheral nervous system.

Human Brain

- A highly complex organ mainly composed of nervous tissue.
- Tissues highly folded to accommodate a large surface area in less space.
- Covered by a 3-layered system of membranes k/a meninges.
- Cerebrospinal fluid filled between meninges cushions the brain against mechanical shocks.
- 3 parts:

1. Fore-brain:

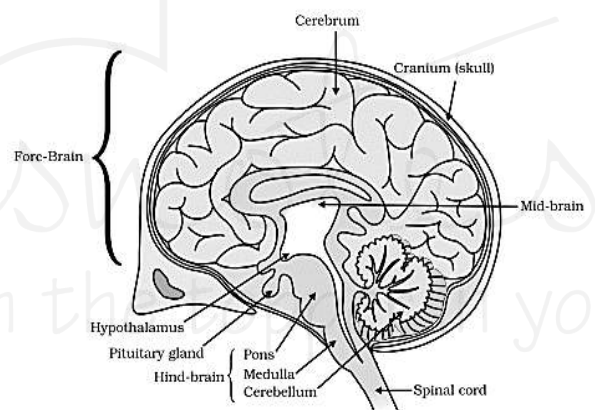
- Composed of the cerebrum.
- Cerebrum- Largest part in human brains.
- Divided into 2 hemispheres k/a cerebral hemispheres.
- Functions:
 - Controls voluntary motor actions.
 - Site of sensory perceptions, like tactile and auditory perceptions.
 - Site of learning and memory.

2. Mid-brain:

- Composed of the hypothalamus.
- Hypothalamus- lies at the base of the cerebrum.
- Controls sleep and wake cycle (circadian rhythm) of the body.
- Controls the urges for eating and drinking.

3. Hind-brain:

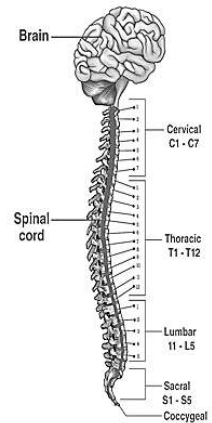
- Composed of cerebellum, pons, medulla, oblongata.
- Cerebellum- lies below cerebrum and at back of whole structure.
 - Coordinates the motor functions.
 - Eg. riding a bicycle, ensures perfect coordination between pedalling and steering control.
 - Controls posture and balance.
 - Controls the precision of voluntary action.



- **Medulla: Forms brain stem**, along with the pons.
 - **Lies at the base of brain** and **continues into spinal cord**.
 - **Controls various involuntary functions**, like hear beat respiration, etc.
 - **Controls involuntary actions**.
 - **Eg:** Blood pressure, salivation, vomiting.
- **Pons:**
 - **Relays impulses** between **lower cerebellum** and **spinal cord**
 - **Regulates respiration**.

Spinal cord:

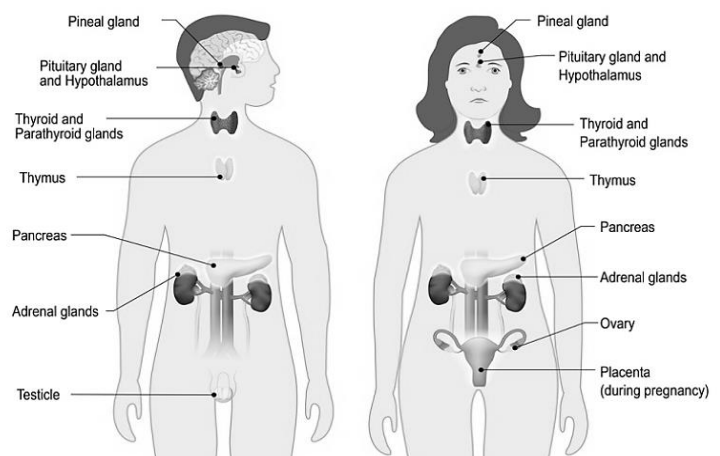
1. **Controls reflex actions** and conducts messages between different parts of body and brain.
2. **Reflex Action:**
3. **Sudden and involuntary response to stimuli**.
4. **Helps organisms to quickly adapt to an adverse circumstance** that could cause bodily harm or even death.
5. **Eg.** Pulling our hands away immediately after touching a hot or cold object.
6. **Reflex Arc:**
7. **Path** through which nerves signals, **involved in a reflex action**, travel.
Receptor → Sensory neuron → Relay neuron → Motor neuron → Effector (muscle)
2. **Peripheral Nervous System:**
 - **Cranial nerves + spinal nerves**.
 - **12 pairs of cranial nerves** coming out of brain and go to the organs in the head region.
 - **31 pairs of spinal nerves** coming out of spinal cord and go to the organs which are below the head region.
3. **Autonomous Nervous System:**
 - **Composed of a chain of nerve ganglion** which **runs along spinal cord**.
 - **Controls all the involuntary actions** in the **human body**.
 - **2 parts :**
 - A. **Sympathetic Nervous System:**
 - **Increases activity** of an **organ** as required.
 - **Eg.** during running, there is an increased demand for oxygen by the body - fulfilled by an increased breathing rate and increased heart rate.
 - B. **Parasympathetic Nervous System:**
 - **Decreases the activity** of an organ and thus has a calming effect.
 - **Eg.** during sleep, breathing rate slows down and so does the heart rate.
 - Helps in the **conservation of energy**.



Endocrine System

- **Made up of interconnected glands** that create **hormones**.
- **Almost every cell, organ, and function in our body is influenced by the endocrine system**.
- **Aids** - regulation of mood, growth and development, tissue function, metabolism, and sexual and reproductive functions.
- Also k/a **ductless system** as the endocrine glands **secrete their hormones** directly into **bloodstream**.

ENDOCRINE SYSTEM



Hormones released by endocrine glands

Endocrine Gland	Location	Hormones Produced	Functions
Pituitary gland (aka master gland)	Base of brain	• Growth hormone (GH). • Thyroid stimulating hormone (TSH). • Follicle stimulating hormone (FSH)	• GH stimulates growth. • TSH stimulates the functioning of thyroid gland. • FSH stimulates follicles during ovulation.
Thyroid Gland	Neck	• Thyroxine	• Controls general metabolism and growth in the body.
Adrenal gland	Above kidneys	• Adrenalin	• Prepares the body for emergency situations and hence is also called 'Fight and flight' hormone.
Pancreas	Near stomach	• Insulin	• Controls blood sugar level
Testis (male)	In Scrotum	• Testosterone	• Sperm production, development of secondary sexual characters during puberty.
Ovary (female)	Near uterus	• Oestrogen • Progesterone	• Egg production, development of secondary sexual characters during puberty.

Reproduction in Human Beings:

- **Method:** sexual reproduction.
- **Male -**
 - Produces male gametes called **sperms**.
 - Sperms have **tail** and are **motile**.
 - Produced in **large numbers** in **testes**.
 - **No food stored**.
- **Female -**
 - Produces female gametes called **ova**.
 - Ovum is **bigger, non-motile** and **only one ovary** produces **one ovum** in **one month**.
 - **Contain stored food**.
- **Both the gametes** are **microscopic, unicellular** and have **half** the number of **chromosomes** than **body cells**.
- Human beings become **reproductively active** from the onset of **puberty**.
- **Puberty-**
 - **Period during adolescence** when **rate of general body growth** begins to **slow down** and **reproductive tissues** begin to **mature**.
 - **Age** of puberty in human **males**- 11 to 13 yrs of age, while in **females** - 10 to 12 yrs. of age.
 - **Associated with** physical, mental, emotional and psychological **changes** in boys and girls occurring slowly k/a **secondary sexual characters**.
- **Eg.**
 - **Thick dark hair** start growing in **genital areas & armpits**.
 - **Skin** becomes **oily** and **pimples** may appear on the **face**.
 - **Boys** - **beard** and **mustache** start appearing, **voice** begins to **crack**, **reproductive organs** develop and start producing releasing **sperms**.
 - **Girls** - **breast size** begins to **increase**, **skin** of the **nipples** **darkens**, **menstruation** starts.
- **Copulation:** act of **mating** between the male and female partner.

Male Reproductive System:

Parts:

1. A pair of testes.

- Present **outside the body** in a pouch k/a scrotum.
- **Oval shaped**.
- **Functions:**
 - Producing **testosterone** – a male sex hormone.
 - Producing **sperms** (spermatogenesis) – a carrier of man's genes.

2. Scrotum

- A **sac of thick skin** that **protects** and **surrounds** the **testes**.
- **Controls temperature** of **testes** since they have to be at a slightly lower temperature than body temperature for suitable sperm creation.
- **Muscles** in the wall **allow** the **testes to hang** far from the body or **shrink** to pull them closer for protection and warmth.

3. Epididymis:

- A **coiled tube** that **stores** the **sperms** formed in testes.

4. Vas deferens

- A **long tube connecting urethra & epididymis**.

5. Glands:

A. Seminal vesicles

- A **pair of glands** found in **male pelvis**
- **Produce** many of the **constituent ingredients of semen**.
- Provide around **70% of total volume of semen**.

B. Prostate gland

- **Largest accessory gland** in male reproductive system.
- **Secretes proteolytic enzymes** into **semen**, which breaks down clotting factors in the ejaculate.
- **Allows the semen to remain** in a **fluid state**, moving throughout the **female reproductive tract** for potential fertilisation.

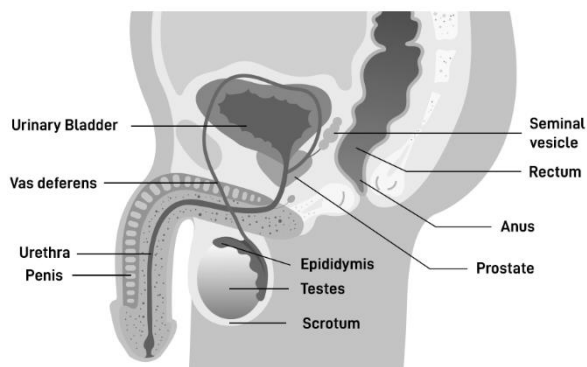
C. Bulbourethral glands / Cowper's glands

- Pair of **pea shaped exocrine glands** located posterolateral to the membranous urethra.
- **Contribute to final volume of semen** by producing a **lubricating mucus secretion**.

Semen = Sperms + Liquid part

6. Penis

- **Male external genitalia**.
- Has **3 cylindrical spaces** of **erectile tissue**.
- **Becomes rigid** when these spaces are **filled** with **blood**.
- **Tissues help** in the **erection** of the penis and **facilitate insemination**.
- **Foreskin** covers the **enlarged end** of the **penis** k/a **glans penis**.



Female Reproductive System

Parts:

1. Ovaries

- **Main female sex organ.**
- **Produce female gamete 'ovum'** and various hormones.
- **Situated** one on **both** the **side** of the **lower abdomen**.
- **Connected** to **uterus** and **pelvic wall** through ligaments.
- A **thin covering** of **epithelium**- encloses ovarian stroma.
- **Ovarian follicle** - **basic unit** of female **reproductive system**.

2. Fallopian Tubes / oviducts

- A **pair** of **muscular tubes** and **funnel-shaped structures**
- **Extend** from **right** and **left** of the superior corners of uterus to edge of ovaries.
- **Each tube** is **covered by cilia** that functions by **carrying** the **ovum** to the **uterus**.

3. Uterus

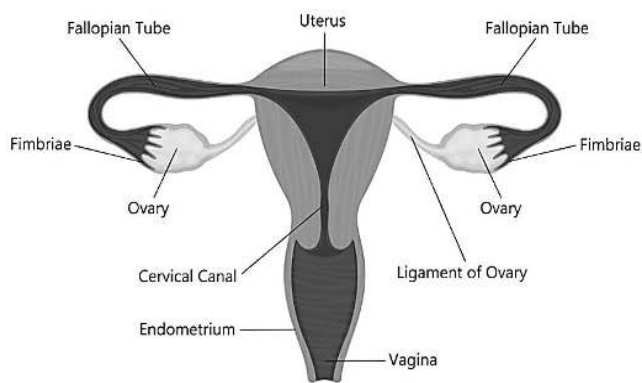
- aka **womb**.
- A **muscular, inverted pear-shaped organ**.
- **Wall** has **three layers**-
 - Inner glandular layer
 - Middle thick layer
 - Outer thin layer.
- **Site of growth and development of fertilised egg.**

4. Cervix

- A **narrow opening** that **connects uterus** to **vagina**.

5. Vagina

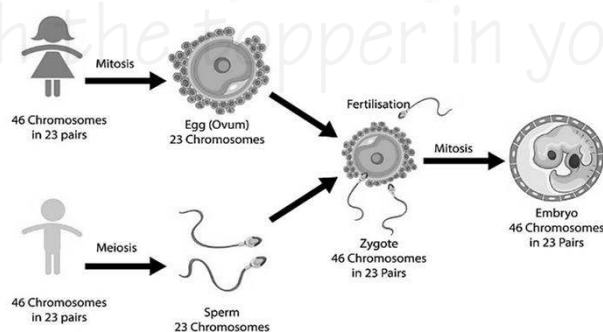
- A **muscular tube** which starts at the lower end of uterus to outside.
- **Cervical canal + vagina = birth canal.**



Process of reproduction:

- **Sperms enter** through **vaginal passage** by **sexual intercourse**.
- **Travel upwards** and **reach oviduct** where they **fertilise** the egg.
- **Fertilised egg (zygote)** **starts dividing** and **form** a ball of cells or **embryo**.
- **Embryo implanted** in **lining of uterus** - **grow** and **develop organs** to **become foetus**.

Human reproduction process



Difference Between Mitosis and Meiosis

Mitosis	Meiosis
One division	Two divisions
Number of chromosomes remains the same	Number of chromosomes is halved
Homologous chromosomes line up separately on the metaphase plate	Homologous chromosomes line up in pairs at the metaphase plate
Homologous chromosome do not pair up	Homologous chromosome pair up to form bivalent
Chiasmata do not form and crossing over never occurs	Chiasmata form and crossing over occurs
Daughter cells are genetically identical	Daughter cells are genetically different from the parent cells
Two daughter cells are formed	Four daughter cells are formed

Menstruation:

- **Loss of blood, mucous, unfertilized ovum and ruptured cells and tissues** of endometrium **through the vagina** of the female.
- A **28-day cycle** occurring in every reproductively active female (from puberty).
- **Flow of blood** - 2 to 8 days.
- If the **ovum does not get fertilized, endometrium starts sloughing off** and there is **loss of blood and mucous** etc. through the vagina.
- If **ovum gets fertilized, endometrium becomes thick and spongy** for nourishing the embryo and hence **menstruation does not occur**.
- A lady with a **developing embryo** in her womb is termed as **pregnant**.
- **Beginning of menstruation** at puberty - **menarche**.
- **Stoppage of menstruation** when the woman is 45-55 yrs of age - **menopause**.

Types of fertilisation:

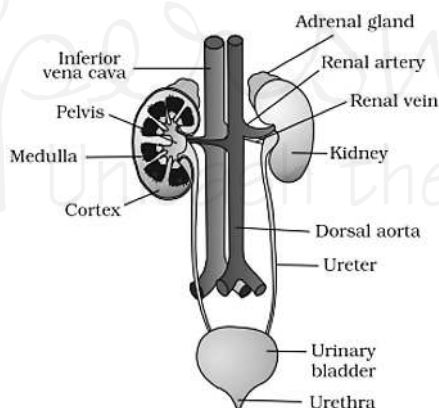
Internal fertilization	External fertilization
It involves the fusion of the male and the female gamete inside the female body.	It involves the fusion of the male and the female gamete outside the female body.
Chances of the survival of the offspring are more. Therefore, a small number of eggs are produced.	Chances of survival of the offspring are less. Therefore, a large number of eggs are produced.
Humans, cows, hens are organisms showing internal fertilization.	Fish, frog, starfish are organisms showing external fertilization

Excretory System

Removal of harmful metabolic wastes from the body of organisms.

Excretion in organisms

- Unicellular organisms, like amoeba remove wastes by simple diffusion from body surface into surrounding water.
- Lower multicellular organisms like flat worms use flame cells while
- Earthworms use nephridia for excretion.
- Higher multicellular organisms like fish, frogs, lizards, birds and humans use kidneys for excretion.



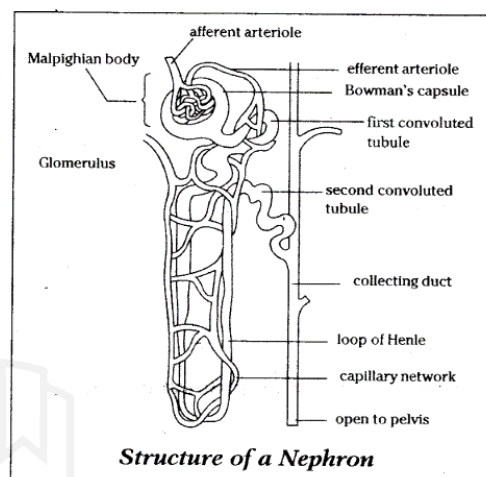
Excretion in Humans

Pair of Kidneys	• Dark red, bean-shaped, 10 cm long, 6 cm wide • Right side slightly lower in position due to liver. • Acts as excretory organ • Also control balance of water and mineral ions in the body. • Divided into 2 parts: ○ External region (comprises of a thick layer followed by fat layer) ○ Internal region (comprises of renal cortex and renal medulla). ▪ Medulla composed of conical masses of tissue leading to pelvis. ▪ Cortex has a random arrangements of tiny tubules called nephrons.
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Pair of Ureters	• Tube-like structures arising from notch, i.e. hilum of each kidney • Connect behind with the urinary bladder. • Carry the urine produced to the urinary bladder.
Urinary bladder	• Muscular sac-like structure. • Stores urine temporarily. • Opening guarded by muscular sphincters. • Sphincters open at time of urination.
Urethra	• Short muscular tube which expels urine out of the body.

Nephrons- Unit of excretion

- **Blood enters kidney** through the **renal artery**, which **branches into** many **capillaries associated with glomerulus**.
- **Water and solute transferred to nephron** at **Bowman's capsule**.
- **Proximal tubule** - amino acids, glucose, and salts **selectively reabsorbed** and **unwanted molecules added** in the **urine**.
- **Filtrate then moves down into loop of Henle**, where more water is absorbed.
- Then, it **moves upwards into distal tubule** and **finally to the collecting duct**.
- **Collecting duct** collects urine from **many nephrons**.
- **Urine formed** in each kidney **enters** a long tube called **ureter**.
- From **ureter** → **urinary bladder** → **urethra**.



Excretion in Plants

- **Water & oxygen excreted** through **stomata**.
- **Other wastes** stored in **leaves, bark** etc. which fall off from the plant.
- **Excrete some waste into the soil** around them through roots.
- **Gums, resin** → In old xylem
- Some **metabolic wastes** in the **form of crystals** of **calcium oxalates** in the leaves of colocasia and stem of Zamikand.

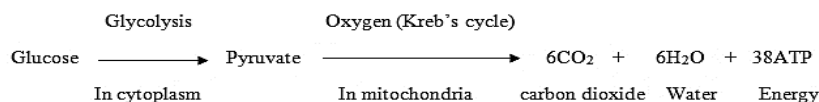
Difference b/w excretion in Plants & animals

Animal (human being)	Excretion	Plant
skin, lung, kidney	excretory organs	no particular organ
water, carbon dioxide, urea, mineral salt, and other nitrogenous materials	excretory materials	water, oxygen, carbon dioxide, latex, gum, acid, resin, oil and alkaloid
perspiration, discharging of urine and cellular respiration	method of excretion	photosynthesis, transpiration and cellular respiration
carbon dioxide is absorbed by green plants to carry out photosynthesis	use of excretory materials	oxygen is absorbed by living things cellular respiration. for

Respiratory System

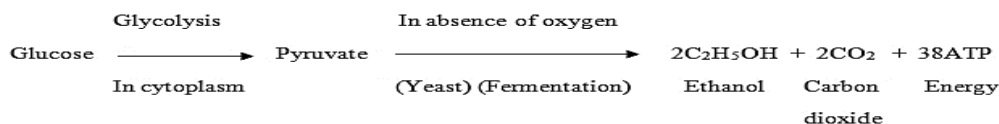
- Involves **2 process**:
 - **Breathing**: Intake of oxygen and release of CO₂.
 - **Breakdown** of **simple food** in order to release energy **inside the cell**.
- An **oxidation reaction** in which **carbohydrate is oxidized to produce energy**.
- **Mitochondria** - site of respiration
- **Steps**:
 - Breaking down of glucose into pyruvate**:
 - In the cytoplasm.
 - Glucose (6 carbon molecule) broken down into pyruvic acid (3 carbon molecule).
 - Breaking down of Pyruvic Acid**:
 - In **mitochondria**
 - **Molecules formed** depend on **type of respiration**:

1. Aerobic respiration:

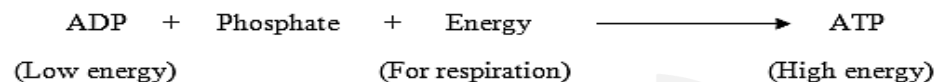


- Occurs in the **presence of oxygen**.
- **Pyruvic acid** → carbon dioxide.
- **Products:** Energy+ water molecule

2. Anaerobic respiration:



- Occurs in the **absence of oxygen**.
- **Products:**
 - **Pyruvic acid** → ethyl alcohol or lactic acid.
 - **Ethyl alcohol** - yeast or bacteria.
 - **Lactic acid** - microbes / muscle cells.
- **Storage of energy** released during respiration:
 - **Energy produced** is stored as **ATP molecules** in cells of body.
 - **Energy released** during respiration **used to make ATP** molecules from ADP and inorganic phosphate.

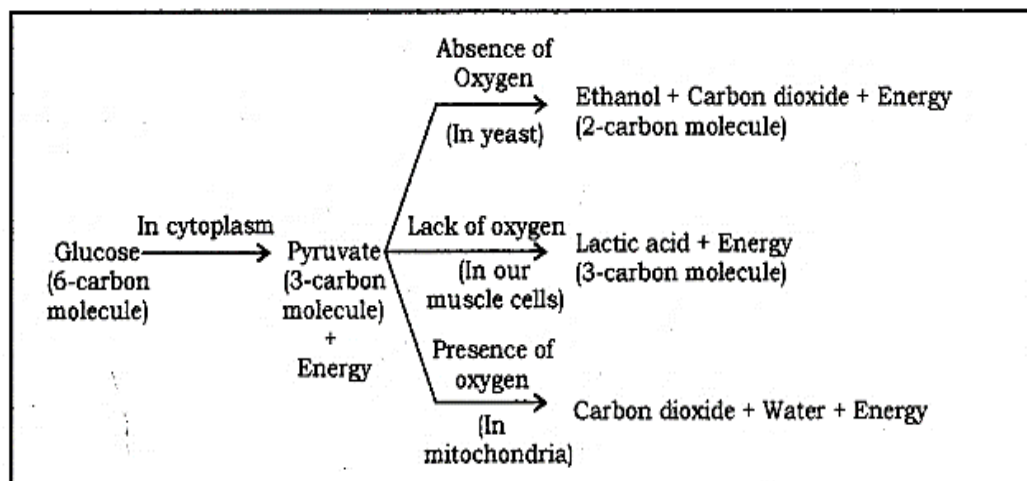


- So, **energy stored as ATP**.
- When **cell need energy**, **ATP broken down** using water to release energy.
- **ATP - energy currency** of cells.



Breathing	Respiration
Mechanism by which organisms obtain oxygen from air and release carbon dioxide .	Includes breathing & oxidation in cells of organisms to release energy.
A physical process.	Physical + biochemical oxidation of food.
Involves the lungs of the organism.	Involves lungs and mitochondria of cells.

Various pathways of breakdown of glucose:



5

CHAPTER

Golden Rules of English Grammar

NOUN

Rule:1

- Sometimes, “The” is used before a proper noun to use it like a common noun.

Example

- ✓ Kalidas is the Shakespeare of India.

- Sometimes, a proper noun is also used like a common noun. At that time, the proper noun represents a class or a person of that class.

Example

- ✓ There are five Ram in my Class.

- Proper, material, and abstract nouns are always singular, but when they are used in a plural sense, they become common nouns.

Example

- ✓ Simran is the wife of Shivam. (Proper Noun)

Rule 2: Generally, a collective noun takes a singular verb. A plural verb is used only when each member of the group is referred to.

Example

- The crowd of the migrant workers at the station for the Shramik Special is unforgettable.
- A pride of lions consists of related females, cubs, and a small number of adult males.

Rule 3: Some nouns are always used in plural form. The ‘s’ at the end cannot be removed to make them singular. They look plural and are used as plural.

- **Words :** Alms, amends, annals, archives, ashes, arrears, athletics, auspices, caves, species, scissors, trousers, pants, clippers, bellows, gallows, fangs, eyeglasses, goggles, belongings, breeches, bowels, braces, binoculars, customs, congratulations, dregs, earnings, entrails, embers, fetters, fireworks, lodgings, lees, odds, outskirts, particulars, proceeds, proceedings, regards, riches, remains, savings, shambles, shears, spectacles, surroundings, tidings, troops, tactics, thanks, tongs, vegetables, valuables, wages, Bacteria etc.

Example

- ✓ My father gave me a pair of binoculars on my birthday.
- ✓ Bacteria are single-celled organisms that can reproduce on their own.

Rule 4: Some nouns appear plural but are singular in meaning. They are always used as singular.

- **Words:** News, Innings, Politics, Summons, Physics, Economics, Ethics, Mechanics, Mathematics, Mumps, Rickets, Billiards, Draughts, etc.

Example

- ✓ The first innings of the match was very sensational.

Rule 5: Some nouns appear singular but are always used as plural.

- **Words:** cattle clergy, cavalry, infantry, poultry, peasantry, children, gentry, police etc.

Example

- ✓ Cattle have died when liquid manure stored in pits under slotted floors was agitated.

Rule 6: Some nouns are used only in singular form. These are uncountable nouns, and articles a/an are not used with them.

- **Words:** Scenery, Poetry, Furniture, Advice, Information, Hair, Language, Business, Mischief, Bread, Stationery, Crockery, Luggage, Baggage, Postage, Knowledge, Wastage, Money, Jewellery, Breakage, temper.

Example

- ✓ We need to buy new furniture for the office.
- ✓ The scenery was so beautiful that John was mesmerized and captivated by all that he saw.
- ✓ Dozens of lower courts have rejected cases pressed by Trump and his allies.

Rule 7: Some nouns have the same form in both singular and plural.

- **Words:** deer, fish, crew, family, team, jury, carp, pike, trout, aircraft, counsel, committee etc.

Example

- ✓ The committee were split on whether the new regulations for the National Health Protection Scheme should be implemented.

Rule 8: Some nouns are plural in meaning, but when they are used with a definite numeral adjective, they are not pluralized.

- **Words:** Pair, score, gross, stone, hundred, dozen, thousand, million, Billion etc.

Example

- ✓ Amount of less than a million rupees is required right now. Take the money to the bank and withdraw it.
- ✓ His sons-in-law have enhanced his business within a short period.

Rule 9: If a noun is followed by a preposition and then the same noun is repeated, the noun remains singular.

Example:

- a. Town after town was devastated.
- b. Row upon row of pick marble looks beautiful.
- c. He enquired from door to door.
- d. Ship after ship is arriving.

Note: In such sentences, writing towns after towns, rows upon rows, doors to doors, or ships after ships is incorrect.

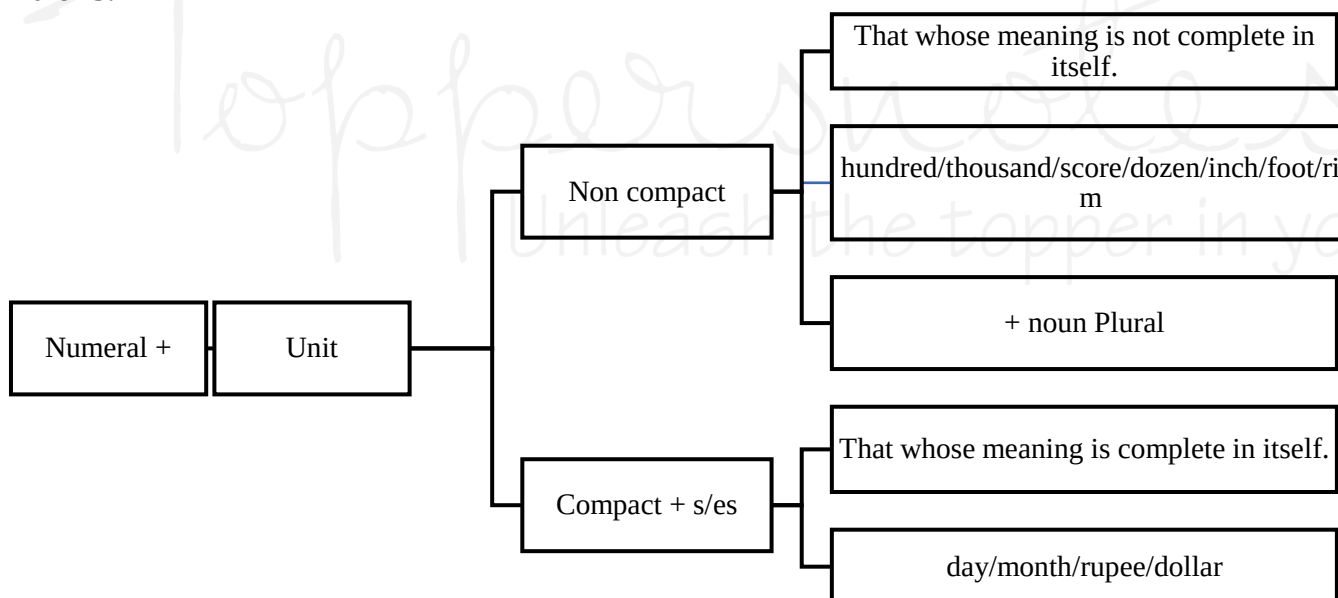
Rule 10: In a sentence, when a half or a quarter comes after a numeral adjective, the noun is placed after the numeral adjective, followed by a half or a quarter.

Example:

- a. He gave me one rupee and a half.
- b. She gave me two rupees and a quarter.

Notes: If the numeral adjective and fraction are joined with *and* and used in the sense of multiplication, then the noun is used in plural form after *a half* or *a quarter*.

Rule 15:



Example:

- a. Ramesh spent ten rupees.
- b. She sold two dozens.
- c. We bought two dozen mangoes from the market.

Rule 16: Unit (Plural) of noun (Plural) + plural helping verb

Example:

- a. Hundreds of shops are closed during riot.

Example:

- a. Two and a quarter times.
- b. One and a half times.

Here, multiplication is implied; therefore, the noun "times" is used in plural after a quarter / a half.

Rule 11: A hyphenated noun is not used in plural form.

Example:

- a. He gave me two hundred-rupee notes.
- b. He stays in five-star hotels. (change stars to star)

Rule 12: With a set of / a pair of / a group of / each of / either of / neither of, the noun is plural, but the helping verb is singular.

Example:

- a. A set of proceeds was deposited in bank account.
- b. A pair of shocks has bought by Ramesh.
- c. Each of Students has solved this Questions.

Rule 13: both of / all of + Noun plural + helping Plural

Example:

- a. All of students are thrown out in my class.

Rule 14: Numeral + unit (singular) + Noun (singular)/ adjective

Numeral + unit (Plural) + adjective

Example:

- a. She saw a six foot snake.
- b. He is six feet tall

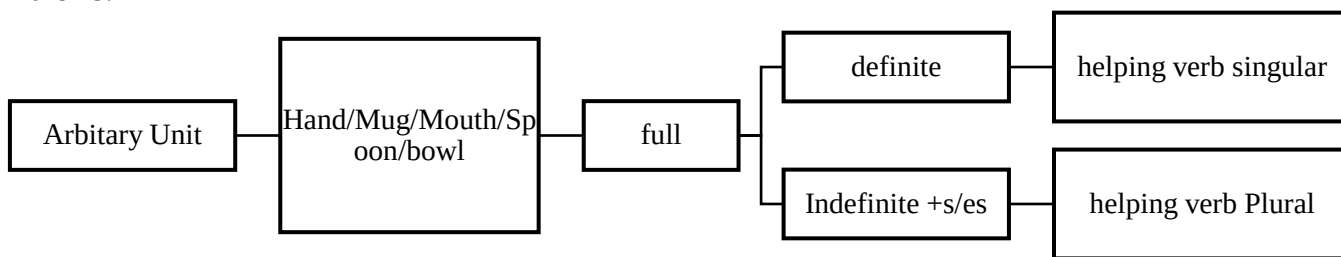
- b. Balloons filled with helium travel hundreds or even thousands of miles.

Rule 17: more than one unit in sentence. We use unit in ascending order.

Example:

- a. Thousands of lakhs of student of student have given test.

Rule 18:



Example:

- Two Spoonful
- His sons-in-law have enhanced his business within a short period

Rule 19:

Example:

- Ten miles needs to covered completely on foot.
- Five thousands rupees were spent on foot and entertainment.

PRONOUN

Rule 1: In a sentence, the pronoun used before the verb is in the nominative (subjective) case, and the pronoun used after the verb is in the objective case.

Structure:

- Subjective / Nominative + Verb + Objective → I teach him → Active Voice
- Subjective/ Nominative + Verb + Objective → He is taught by me. → Passive Voice

Example:

- The credit for organizing the successful event was given to both Neha and me.
- She came home to meet my family and me.

Rule 2: Singular Pronoun: If more than one pronoun is used in a sentence and the sentence does not express anything negative, then the order 231 (2nd person, 3rd person, 1st person) is used.

Example

- ✓ Sia and I spent a few magical minutes observing giraffes and elephants assembling at a watering hole.
- ✓ Mary and I will be going to the movies after we're done with the marathon.

Rule 3: Plural Pronoun: When more than one pronoun is used in a sentence and they are plural, the order 123 (1st person, 2nd person, 3rd person) is used.

Example

- You, she and I will be traveling by my car.

Rule 4: If the sentence expresses a mistake, fault, crime, or a negative idea, then the order of pronouns should be 123.

Example

- I and he will beg sorry for the misconduct.

Rule 5: If different persons' pronouns are used in a sentence and a single plural pronoun is used for them, then:

- III + I Person → I Person Plural
- II + III Person → II Person Plural
- II + I Person → I Person Plural

Example:

- You** and **I** have done our job.
- You he** and **I** have completed our duty.
- You and I have submitted our work on time.

Rule 6: With a collective noun, the pronoun is singular (and neuter gender) when the noun is used as a single unit. If the collective noun is used in a divided sense, a plural pronoun is used.

Example

- Apart from Germany, they also visited Italy and Austria during **their** business trip.

Rule 7: When two or more pronouns are joined by and, the pronoun is plural.

Example:

- Ram** and **Mohan** went to their school.
- Suresh** and **his family** members have completed their work.

Rule 8: When two singular nouns are joined by and and each is preceded by each or every, the pronoun is singular.

Example:

- Each** officer and **each** clerk has joined his duty.
- Every** soldier and **every** officer was in his place.

Rule 9: With each, either, and neither, always use a singular pronoun and a singular verb.

Example

- Each of the employees needs to submit his or her reports by Friday.

Rule 10: When two or more singular nouns are joined by *or*, *either...or*, *neither...nor*, a singular pronoun is used.

Example:

- Neither the tunny nor the coral fishery is carried on by the Sardinians themselves, who are not sailors by nature.
- Either my brother or my parents are going to bring the sleeping bags.
- Neither Suresh nor Ramesh is allowed to enter the class if they have not completed the homework given by me last week.

Rule 11: When one plural and one singular noun are joined by *or* or *nor*, a plural pronoun is used.

Example:

- a. **Either** the Principal **or** the teachers failed in their duty.
- b. **Neither** the teacher **nor** the students have done their work.

Rule 12: In comparative sentences, after *than* or *as*, whether the pronoun is in nominative or objective form depends on the meaning of the sentence.

Example:

- a. I love you more than he (loves you).
- b. I love you more than (I love) him.
- c. I shall give you as many pens as (I shall give) him.
- d. I am as intelligent as he (is).

Rule 13: The pronoun used after a “to be” form verb should be in the same case as the noun or pronoun used before the verb.

Example:

- a. It is I.
- b. This is She.

Note: When a clause with *who/which* is used, the pronoun after “to be” is always in the nominative case.

Example:

- a. It is he who is responsible.
- b. It is she who refused the offer.
- c. It is I who saw her yesterday.
- d. It is he who will pay you.

Rule 14: After *let*, *like*, *between*, *but*, *except*, and other prepositions, the objective case is used.

Example:

- a. **Let** me do this work.
- b. Let me clear the doubts, if any.
- c. **Everybody** but him was present for the meeting.

Use of It:

Rule 1: “It” is used for animals, non-living things, countries, and babies. Its plural is “they”.

Example:

- a. Here is your pen. Please take it.
- b. He has a cat. It is very beautiful.
- c. When he saw the child, it was playing.

Rule 2: “It” is used as an introductory subject to express time, weather, temperature, distance, or natural events. In this case, it is called “empty it” because it has no specific meaning.

Example:

- a. It is 7 O’clock.
- b. It is fine.
- c. It is summer.

Rule 3: “It” is also used in place of an infinitive, gerund, or clause.

Example:

- a. It rains.
- b. It blows.

Rule 4: “It” is used as the subject of a sentence to emphasize a noun or pronoun.

Example:

- a. It is you, who can solve this problem.
- b. It is the place where he was murdered.

Rule 5: “It” is used to introduce a phrase or clause.

Example:

- a. **That the Record will break today** is probable.

Rule 6: “It” is used in exclamatory sentences as follows:

Example:

- a. What a beautiful bird it is!
- b. What a large building it is!

Rule 7: The possessive pronoun required here is “its” (without an apostrophe).

It’s = it is

- a. She has been a member of this club since its formation.
- b. It’s impossible to conduct truly causal research on media consumption and suicide.
- c. Now it’s referring to the same big lug who met his fate thanks to David’s slingshot.
- d. The energetic kitten is playful after having its breakfast.
- e. A computer can’t function without its motherboard.

Rule 15: Some transitive verbs require a reflexive pronoun. A transitive verb needs an object, and when no object is present, a reflexive pronoun is used to complete it.

verbs: avail, absent, enjoy, resign, apply, revenge, exert etc.

Example:

- They enjoyed themselves the pleasure of weather.
- Try to avail yourself of every opportunity that comes your way.
- You should avail yourself of this opportunity to demonstrate your skills.

Rule 16: Some verbs, when used intransitively, do not take a reflexive pronoun.

Verbs: Keep, break, set, bathe, make, stop, steal, qualify, move, open, draw, rest, roll, burst, hide, feed, gather, sleep etc.

Example:

- She hid in the room.
- After a long and fun-filled day, the children slept peacefully.

Rule 17: "This" is used for one person or thing that is near, while "these" is used for more than one person or thing that is near.

Example:

- This is a cat.
- These are cats.

Rule 18: "That" is used for one person or thing that is far, while "those" is used for more than one person or thing that is far.

Example:

- That is a book.
- Those are books.

Note: To avoid repetition of a singular noun, "that of" is used, and to avoid repetition of a plural noun, "those of" is used.

Example:

- The climate of Pune is better than that (अर्थ: climate) of Mumbai.
- The streets of Delhi are wider than those (Meaning: streets) of Mumbai.

Rule 19: To avoid repetition of a singular countable noun, "one" is used, and for plural countable nouns, "ones" is used (not "one's").

Example:

- This is the new version, but **that** is an old **one**.
- These are new books, but **those** are old **ones**.

Indefinite Pronoun		
Word	Person	Thing
Some	Someone, somebody	Something
Any	Anyone, anybody	Anything
Every	Everyone, everybody	Everything
No	No one, no body	Nothing
Possessive case	His	Its

Distributive Pronoun

Distributive Pronoun	Meaning
Everyone	Used for more than two
Each	Used for two or more
Either	Used for two or more
Neither	Used for two or more
Any, none, no one	Used for two or more

Rule 20: Each/Either/Neither + of + plural Noun + S.H.V -----

Example:

- Each of** the boys has a note book.
- Each of** the boys has his own pen.

Note: "The" is used before the plural noun after each of/either of/neither of.

Rule 21: When *each* is used as a subject, it is placed after the subject and before the auxiliary verb. The main verb agrees with the subject.

Example:

- We **each** have advised him to give up smoking.

Rule 22: "Both" is used for two persons or things. It is not used in negative sentences.

Example:

- Both** of the two students are guilty.

Rule 23: The third-person singular masculine pronouns (he, his, him) are used with distributive pronouns.

Example:

- Everyone** should obey his parents.
- Neither** of these two students has received his prize.

Rule 23: If a noun of the feminine gender is used after a distributive pronoun in a sentence, it is necessary to use the pronoun 'her'.

Example:

- Neither** of these two girls has deposited her fees.
- Either** of the two girls has received her gift.
- Each** of the girls has donated her pocket money.

Rule 24: If a feminine noun is used after distributive pronouns, then the pronoun "her" must be used.

Example:

- Neither** of them has done his duty.
- Each** of them has forgot his purse.

Rule 25 : When two subjects are joined by *as well as*, *with*, *along with*, *together with*, and *not*, in *addition to*, *but*, *besides*, *except*, *rather than*, *accompanied by*, *like*, *unlike*, *no less than*, *nothing but*, the possessive pronoun agrees with the first subject.