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FPSC



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- Classification of Mollusks, Edinodermata
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- Multiple Alleles
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Table Of Content

Part 1: ZOOLOGY

- Mammals
- Reptiles
- Fishes
- Phylum Echinodermata
- Phylum Mollusca
- Biological Membrane
- Evolution
- Variation and Genetics
- Ecology and Ecosystems
- Endocrine System
- Reproduction and Development

Part 3: PEDAGOGY

- Teaching Techniques and Methodologies
 - Classroom Management and Discipline
 - Testing, Measurement, Assessment and Evaluation
 - Taxonomies of Education
-

Part 2: ENGLISH

- The Noun
- The Pronoun
- The Verb
- Subject Verb Agreement
- The Adverb
- The Adjective
- The Preposition
- Sentence, Phrase and Clause
- Active and Passive Voice
- Direct and Indirect Narration
- Idioms and Phrasal Verbs
- Synonyms And Antonyms



PART 1: ZOOLOGY



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MAMMALS

1. Mammals

INTRODUCTION AND DIAGNOSTIC CHARACTERISTICS

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Mammals (Class **Mammalia**) are a class of **endothermic, amniotic vertebrates** uniquely characterized by the presence of **hair** and **mammary glands**. They represent one of the most biologically differentiated groups, occupying nearly every terrestrial, aquatic, and aerial habitat. Despite comprising only about 5,700 species, their morphological, physiological, and behavioral diversity is immense, ranging from the 2-gram bumblebee bat to the 170-ton blue whale.

Core diagnostic characteristics (synapomorphies) of mammals include:

1. **Hair/Fur:** Composed of **keratin**; present at some life stage in all species. Functions include insulation, camouflage, sensory perception (vibrissae), and protection.
2. **Mammary Glands:** Modified integumentary (sweat) glands that secrete **milk** for nourishing offspring. This defines the class and is linked to extended parental care.
3. **Single Dentary Bone:** The lower jaw is composed of a single bone, the **dentary**, which articulates directly with the **squamosal bone** of the skull.
4. **Three Middle Ear Ossicles:** The **malleus** (derived from the articular bone), **incus** (derived from the quadrate bone), and **stapes** form a chain that amplifies sound vibrations, enhancing hearing acuity.
5. **Diphyodont Dentition:** Most have two sets of teeth: deciduous ("milk") teeth and permanent teeth.
6. **Muscular Diaphragm:** A sheet of muscle separating the thoracic and abdominal cavities, enabling efficient **negative-pressure lung ventilation**.
7. **Four-Chambered Heart:** Provides complete separation of pulmonary and systemic circuits, supporting high metabolic rates and endothermy.
8. **Highly Developed Neocortex:** The outer layer of the **cerebral cortex** is enlarged and often convoluted, responsible for higher cognitive functions, sensory integration, and complex behavior.



9. **Endothermy and Homeothermy:** The ability to generate internal heat metabolically and maintain a relatively constant high body temperature.

ORIGIN AND EVOLUTION OF MAMMALS

Mammals evolved from **synapsid amniotes**, a lineage distinct from the diapsid reptiles (including dinosaurs, lizards, and birds). Their evolution is one of the best-documented transitions in vertebrate history.

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Synapsid Lineage

The synapsid lineage is characterized by a skull with a **single pair of temporal openings**. This group diversified during the late Paleozoic era.

- **Pelycosaurs (Early Permian):** Early, diverse synapsids often mislabeled as "mammal-like reptiles." They were not monophyletic nor closely related to lizards. Examples like *Dimetrodon* had sprawling limbs and likely were ectothermic.
- **Therapsids (Mid-Permian to Triassic):** Descended from carnivorous pelycosaurs and were the only synapsids to survive into the Mesozoic.
 - Key innovations included a more **erect gait** (limbs positioned more underneath the body).
 - Expansion of the **cerebellum** for improved muscular coordination.
 - Changes in jaw musculature increased feeding efficiency.
- **Cynodonts (Triassic):** An advanced therapsid subgroup that gave rise to mammals. They evolved features supporting a higher metabolic rate:
 - **Heterodont teeth** for better food processing.
 - **Secondary (hard) palate**, allowing breathing while eating or suckling.
 - **Turbinate bones** (conchae) in the nasal cavity to warm and moisten inhaled air, aiding heat and water retention.
 - Loss of lumbar ribs, correlating with the evolution of a **diaphragm** and providing greater spinal flexibility.



Emergence of True Mammals

The first true mammals appeared in the **Late Triassic**. Key defining transitions include:

- **Jaw and Ear Evolution:** The ancestral jaw joint bones (**articular** and **quadrate**) became incorporated into the middle ear as the **malleus** and **incus**. A new jaw joint formed between the **dentary** and **squamosal** bones—the defining characteristic of fossil mammals.
- **Diphyodonty:** Replacement of teeth only once (deciduous then permanent), unlike the continuous polyphyodonty of earlier amniotes.
- **Endothermy and Insulation:** Early mammals were endothermic. The presence of **hair** for insulation implies the concurrent evolution of **sebaceous** (oil) and **sudoriferous** (sweat) glands.
- **Lactation and Parental Care:** Evolution of **mammary glands** and lactation allowed extended parental care, buffering altricial young from the immediate demands of foraging.

Diversification and Biogeography

- **Mesozoic Era:** During the age of dinosaurs, mammals were generally small, shrew-like, and likely nocturnal. They diversified into various forms (e.g., carnivores, aquatic species) in the Jurassic and Cretaceous.
- **Cenozoic Radiation:** Following the Cretaceous-Paleogene (K-Pg) mass extinction (~66 mya) that eliminated non-avian dinosaurs, mammals underwent an explosive **adaptive radiation** into vacant ecological niches, marking the "Age of Mammals."
- **Pleistocene Megafauna:** The Pleistocene epoch featured diverse communities of large mammals (megafauna: mammoths, mastodons, giant sloths, etc.). Most went extinct ~12,000 years ago, likely due to combined effects of climate change and **overhunting by modern humans**. A parallel extinction occurred in Australian marsupial megafauna.

STRUCTURAL AND FUNCTIONAL ADAPTATIONS

Integument and Its Derivatives

Mammalian skin is thick and gland-rich, with highly modified derivatives.

Hair (Pelage):

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- Structure: Grows from a follicle; consists of dead, keratinized cells. Layers: medulla (pith), cortex (pigment), cuticle (scales).
- Types: **Underhair** (dense, soft, for insulation) and **guard hair** (coarse, long, for protection and coloration).
- Functions: Thermal insulation, camouflage (e.g., seasonal molts in arctic hare), sensory (**vibrissae** or whiskers), defense (porcupine quills, hedgehog spines), and communication.
- Molting: Periodic shedding and replacement of the coat, often seasonal.

Glands (All epidermal derivatives):

- **Sebaceous Glands:** Usually associated with hair follicles. Secrete **sebum**, an oily substance that conditions skin and hair.
- **Sudoriferous (Sweat) Glands:**
 - **Eccrine glands:** Secrete watery sweat for evaporative cooling (prominent in primates, horses).
 - **Apocrine glands:** Produce milky secretions associated with hair follicles; function in scent communication and, in some species, cooling.
- **Scent/Musk Glands:** Highly variable in location (anal, orbital, pedal, etc.). Secrete **pheromones** for territorial marking, defense (skunks), and sexual attraction.
- **Mammary Glands:** Defining feature. Develop from epidermal ducts. **Lactation** (milk release) is hormonally controlled (by prolactin and oxytocin).

Horns and Antlers:

Structure	Composition	Growth & Shedding	Core Attachment	Sex Typically Possessing	Examples
True Horns (Bovidae)	Keratin sheath over bony core	Permanent; sheath grows continuously	Fused to skull	Both	Cattle, sheep, goats

Antlers (Cervidae)	Solid bone	Deciduous: shed and regrown annually	On bony pedicel	Males (except caribou)	Deer, elk, moose
Rhino Horn	Keratin filaments (matted hair)	Permanent; can regrow if broken	No bony core; sits on skin	Both	All rhinoceros
Pronghorn Horn	Keratin sheath over bony core	Sheath shed annually ; core permanent	Branched bony core	Both	Pronghorn antelope
Giraffe Horns (Ossicones)	Bony core, skin-covered	Permanent; skin-covered	Fused to skull	Both	Giraffes, okapis

Feeding and Digestive Specializations

Mammalian **heterodont** dentition is highly adaptive to diet.

Dental Formula: A shorthand (I:C:PM:M) denoting the number of each tooth type in one-half of the upper and lower jaws. The ancestral placental pattern was I3/3, C1/1, PM4/4, M3/3 = 44.

Dietary Adaptations:

Dietary Guild	Dental Adaptations	Digestive Tract Adaptations	Examples & Notes
Insectivorous	Pointed cusps for piercing; some edentulous	Short tract; minimal fermentation	Shrews, moles, most bats, anteaters. High metabolic rate.
Herbivorous	Reduced/absent canines; high-crowned, ridged molars for grinding. Hypsodont	Long tract with fermentation chambers. Two main strategies:	



	(ever-growing) teeth in grazers.		
		1. Hindgut Fermenters: Large cecum and/or colon. (Horses, rabbits, elephants). Coprophagy in rabbits recaptures nutrients.	Horses, rabbits, elephants.
		2. Foregut Fermenters (Ruminants): Four-chambered stomach (rumen, reticulum, omasum, abomasum). Regurgitate and rechew cud for efficient cellulose digestion.	Cattle, deer, sheep, giraffes.
Carnivorous	Large, pointed canines ; caninial pair (last upper premolar/first lower molar) for shearing flesh.	Short tract; small or absent cecum. Protein-rich diet easily digested.	Cats, dogs, weasels. <i>Note: Not all Carnivora are strictly carnivorous (e.g., giant panda).</i>
Omnivorous	Versatile; incisors for cutting, rounded molars for crushing.	Moderately long tract; variable cecum.	Bears, pigs, raccoons, primates, including humans.

- **Metabolic Rate and Body Size:** Metabolic rate scales with body surface area (~mass^{0.7}). **Smaller mammals** have much higher mass-specific metabolic rates and food requirements (e.g., a shrew may eat >100% body weight daily).

Locomotion



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- **Cursorial:** Adapted for running (elongated limbs, digitigrade/unguligrade posture). E.g., horses, deer.
- **Fossorial:** Adapted for digging (powerful forelimbs, reduced eyes/pinnae). E.g., moles.
- **Scansorial/Arboreal:** Adapted for climbing (grasping limbs, claws, prehensile tails). E.g., squirrels, primates.
- **Aerial: Bats (Chiroptera)** are the only mammals with true powered flight via a wing membrane (**patagium**) stretched over elongated digits.
- **Gliding:** Use patagial membranes for controlled descent. E.g., flying squirrels, colugos.
- **Aquatic:** Streamlined body, limbs modified into flippers, blubber for insulation. E.g., whales (Cetacea), seals, manatees (Sirenia).

Sensory Systems

- **Olfaction (Smell):** Highly developed, critical for foraging and social communication via scent glands. Olfactory receptors in nasal epithelium project to a large **olfactory bulb**. Some species have a **vomer nasal organ** for detecting pheromones.
- **Audition (Hearing):** Excellent, especially in early nocturnal mammals. The **pinna** (external ear) directs sound. The three ossicles amplify vibrations to the fluid-filled **cochlea**, which is coiled for enhanced frequency discrimination.
- **Echolocation:** Biological sonar used for navigation and hunting in complete darkness.
 - **Bats (Microchiroptera):** Emit high-frequency ultrasonic pulses (up to 100,000 Hz) from mouth/nose and interpret returning echoes. Pulse rate increases as target is approached.
 - **Toothed Whales (Odontoceti):** Produce clicks in nasal passages, focused by the fatty **melon**. Echoes are received primarily through the lower jaw and transmitted to the inner ear.
- **Vision:** Typically good. Color vision is variable; many mammals are dichromatic. **Primates** (especially catarrhines) often have **trichromatic color vision**.

Neural Adaptations



The mammalian brain is characterized by its large size relative to body mass, with a massive, often folded **neocortex**. This region is responsible for:

- Sensory perception and integration.
 - Voluntary motor control.
 - Higher cognitive functions: learning, memory, judgment, reasoning, and complex social behavior.
- The **cerebellum** is also well-developed for motor coordination.

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REPRODUCTION AND DEVELOPMENT

All mammals share **internal fertilization**. Reproductive patterns define the major subclasses.

Reproductive Cycles

- **Estrous Cycle:** In most mammals. Females are sexually receptive (**in estrus** or "heat") only during periodic cycles. If not pregnant, the uterine lining is reabsorbed. Can be **monestrous** (one cycle/season) or **polyestrous** (multiple).
- **Menstrual Cycle:** In haplorrhine primates (including humans). The cycle ends with **menstruation**—the shedding of the endometrial lining if implantation does not occur.

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Patterns of Development

Feature	Monotremes (Prototheria)	Marsupials (Metatheria)	Placentals (Eutheria)
Reproduction	Oviparous (egg-laying)	Viviparous (live birth)	Viviparous (live birth)
Gestation	N/A (egg incubation)	Very short (e.g., 12-13 days in opossum)	Prolonged (varies with size)
Placenta	Absent; yolk nourishes embryo.	Choriovitelline (yolk sac) placenta ; simple and short-lived.	Highly developed chorioallantoic placenta ; intimate maternal-fetal exchange.



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Young at Birth	Hatched from leathery egg.	Extremely altricial (embryonic); crawls to pouch.	Varies from altricial (helpless) to precocial (well-developed).
Postnatal Care	Young lap milk from mammary patch (no nipples).	Prolonged development attached to nipple in a marsupium (pouch).	Extended lactation and parental care; young nourished via nipples/teats.
Key Adaptation	Retention of ancestral amniote trait.	Reproductive investment in prolonged lactation ; pouch protects young.	Reproductive investment in prolonged in utero development via efficient placenta.
Examples	Platypus, echidnas.	Kangaroos, opossums, koalas.	Humans, dogs, whales, rodents.

Special Reproductive Strategies:

- **Delayed Implantation:** The **blastocyst** remains dormant for weeks/months before implanting in the uterus, ensuring birth occurs at an optimal time (e.g., bears, seals, some deer).
- **Embryonic Diapause:** In some marsupials (e.g., kangaroos), development of a new embryo is arrested (**diapause**) while an older sibling is suckling, allowing continuous reproduction.

MAMMALS AND THEIR ENVIRONMENT

Migration

Energetically costly for terrestrial mammals but practiced by some.



- **Terrestrial: Barren-ground caribou** undertake long seasonal migrations between tundra (summer calving) and boreal forest (winter) ranges.
- **Marine: Gray whales** migrate ~18,000 km annually between Alaskan feeding grounds and Mexican breeding lagoons. **Northern fur seals** have trans-oceanic migrations.

Torpor and Hibernation

M Adaptations to conserve energy during cold or food-scarce periods.

K • **Hibernation:** Deep, seasonal torpor in small mammals (ground squirrels, some bats). Body temperature drops to near ambient, and metabolic rate drastically decreases.

P • **Shallow Torpor/Winter Sleep:** Modest reductions in body temperature and metabolism in larger mammals (e.g., bears).

R • **Daily Torpor:** Used by small mammals (e.g., bats, hummingbirds) to save energy during rest periods.

P Social Behavior and Territories

A • **Territoriality:** Many mammals defend exclusive areas (**territories**) using scent marking, vocalizations, or aggression to secure resources (food, mates). This differs from a **home range**, which is the total area used but not necessarily defended.

A • **Social Structures:** Range from solitary (tigers) to complex societies.

T ○ **Monogamous pairs:** Beavers, some foxes.

I ○ **Matriarchal herds:** Elephants.

O ○ **Pride-based:** Lions.

N ○ **Large colonies:** Prairie dog "towns," bat colonies.

S HUMAN EVOLUTION

Humans are **primates**. Shared primate traits include **grasping hands/feet with nails**, **forward-facing eyes for stereoscopic vision**, and a **large brain**.

Primate Classification

- **Strepsirrhini:** Wet-nosed primates (lemurs, lorises).
- **Haplorrhini:** Dry-nosed primates.
 - **Tarsiers**
 - **Anthropoidea** (Monkeys & Apes):
 - **Platyrrhini** (New World Monkeys): Broad, outward-facing nostrils; some have prehensile tails.
 - **Catarrhini** (Old World Monkeys & Apes): Narrow, downward-facing nostrils.
 - **Cercopithecoidea** (Old World Monkeys): E.g., baboons, macaques.
 - **Hominoidea** (Apes): No tail; larger brains.
 - **Hylobatidae** (Gibbons)
 - **Hominidae** (Great Apes & Humans): Orangutans, gorillas, chimpanzees/bonobos, humans.

Hominin Evolution

The human lineage (**hominins**) diverged from the chimpanzee lineage ~6-7 million years ago (mya) in Africa. Key trends: **bipedalism** → **tool use** → **encephalization** (brain expansion) → **cultural complexity**.

Species	Time (mya)	Key Characteristics & Significance
<i>Sahelanthropus tchadensis</i>	7-6	Oldest known hominin; possible upright posture; mix of ape and human traits.
<i>Ardipithecus ramidus</i> ("Ardi")	5.8-4	Clear evidence of bipedalism but retained arboreal adaptations. Woodland dweller.

<i>Australopithecus afarensis</i> ("Lucy")	3.9-3	Fully obligate bipedal ; small brain (~380-450 cm ³); gracile build. Likely ancestor to <i>Homo</i> .
<i>Paranthropus</i> spp.	2.5-1.2	"Robust" australopithecines; massive jaws/molars for tough diet; an extinct side branch.
<i>Homo habilis</i>	2.4-1.5	"Handy man"; first maker of Oldowan stone tools; brain size increase begins.
<i>Homo erectus</i>	1.8-0.3	First to migrate out of Africa. Used Acheulean tools (handaxes), possibly used fire. Larger brain.
<i>Homo heidelbergensis</i>	0.7-0.2	Ancestral to both Neanderthals and modern humans. Sophisticated toolmakers.
<i>Homo neanderthalensis</i>	0.23-0.03	Adapted to cold European climate; Mousterian tools; buried their dead; evidence of culture. Interbred with <i>H. sapiens</i> .
<i>Homo sapiens</i>	0.3 - present	Anatomically modern humans. Complex language, symbolism, art (e.g., cave paintings), advanced technology. Originated in Africa.

Theories of Modern Human Origins: The prevailing "**Out of Africa**" model (with assimilation) states that *H. sapiens* evolved in Africa ~300,000 years ago, migrated out, and



largely replaced other *Homo* species, with limited **interbreeding** (introgression) with Neanderthals and Denisovans.

TAXONOMIC CLASSIFICATION OF LIVING MAMMALS

Modern mammalian taxonomy, based on molecular phylogenetics and morphology, recognizes **29 orders** grouped into three major lineages: the egg-laying **monotremes**, the pouched **marsupials**, and the placental **eutherians**.

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SUBCLASS PROTOTHERIA (MONOTREMES)

The most ancient and basal mammalian lineage, retaining several reptilian traits.

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Order Monotremata

- **Reproduction: Oviparous** (egg-laying). Females lay 1-2 leathery, yolk-rich eggs. Incubation is external (platypus in burrow) or in a temporary abdominal pouch (echidna).
- **Mammary Glands:** Lack nipples; milk is secreted onto a specialized patch of abdominal skin (mammary patch) for the young to lap.
- **Cloaca:** A single opening (cloaca) for digestive, urinary, and reproductive tracts.
- **Other Features:** Adults are toothless, with horny plates or a leathery bill. They have a lower, more variable body temperature (~31°C) than other mammals. The pectoral girdle retains reptilian bones (interclavicle, coracoids). Males of the platypus have a venomous spur on the hind ankle.
- **Distribution:** Australia, Tasmania, and New Guinea.
- **Examples:** Duck-billed platypus (*Ornithorhynchus anatinus*), Short-beaked echidna (*Tachyglossus aculeatus*), Long-beaked echidnas (*Zaglossus* spp.).

INFRACLASS METATHERIA (MARSUPIALS)

Characterized by giving birth to highly altricial young after an extremely short gestation, followed by a prolonged period of lactation and development within a pouch.

Key Marsupial Traits:



- **Reproduction:** Viviparous with a **brief gestation** (12-40 days) facilitated by a simple **choriovitelline (yolk sac) placenta**. The tiny, embryo-like newborn crawls to the **marsupium** (pouch) and attaches to a teat.
- **Skeletal: Epipubic bones** project from the pelvis, supporting pouch muscles. Present in both sexes.
- **Dentition:** Unique dental formula; often **polyprotodont** (many small incisors) or **diprotodont** (two prominent lower incisors).
- **Brain:** Lack a **corpus callosum** (the nerve fiber bundle connecting cerebral hemispheres).

Order	Common Name(s)	Key Characteristics	Distribution	Examples
Didelphimorphia	American Opossums	Most have a prehensile tail. Many have a well-developed abdominal pouch. Primarily omnivorous and nocturnal.	The Americas	Virginia opossum (<i>Didelphis virginiana</i>)
Paucituberculata	Shrew Opossums	Small, shrew-like insectivores. Lack a true pouch.	Western South America	Chilean shrew opossum (<i>Rhyncholestes raphanurus</i>)
Microbiotheria	Monito del Monte	Small, mouse-like. Phylogenetically significant as a potential link between American and	Southern South America	Monito del monte (<i>Dromiciops gliroides</i>)



		Australian marsupials.		
Dasyuromorphia	Marsupial Carnivores	Includes carnivorous and insectivorous forms. Dentition resembles placental carnivores.	Australia, New Guinea, Tasmania	Tasmanian devil (<i>Sarcophilus harrisii</i>), numbat (<i>Myrmecobius fasciatus</i>), quolls
Peramelemorphia	Bandicoots & Bilbies	Omnivorous. Have a more advanced chorioallantoic placenta (unusual for marsupials). Syndactylous hind feet.	Australia, New Guinea	Bilby (<i>Macrotis</i>), bandicoot (<i>Perameles</i>)
Notoryctemorphia	Marsupial Moles	Fossorial (burrowing). Convergent with placental moles: reduced eyes, powerful forelimbs, velvety fur.	Arid Australia	Marsupial mole (<i>Notoryctes</i> spp.)

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Diprotodontia	The largest marsupial order	Syndactylous hind feet (2nd & 3rd toes fused). Mostly herbivorous or omnivorous. Diverse forms.	Australia, New Guinea, surrounding islands	Kangaroos & wallabies (Macropodidae), koala (<i>Phascolarctos cinereus</i>), wombats (Vombatidae), possums (Phalangeridae)
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INFRACLASS EUTHERIA (PLACENTAL MAMMALS)

The most diverse group, characterized by a **long gestation** and a complex, highly vascular **chorioallantoic placenta** that nourishes the fetus to a relatively advanced stage.

Modern phylogenetics groups placental mammals into four major superordinal clades:

1. SUPERORDER AFROTHERIA

Believed to have evolved in Africa during its long isolation. A diverse group often united by genetic and anatomical traits (e.g., extra lumbar vertebrae).

Order	Key Characteristics	Examples
Proboscidea	Largest living land animals. Trunk (proboscis) – a muscular, prehensile elongation of nose/upper lip. Tusks – elongated, continuously growing incisors. Massive, pillar-like (graviportal) limbs.	African bush elephant (<i>Loxodonta africana</i>), Asian elephant (<i>Elephas maximus</i>)
Sirenia	Fully aquatic, herbivorous "sea cows." Fusiform body, no hind limbs, forelimbs as flippers, horizontal tail fluke. Dense bones (pachyostosis) for buoyancy control.	Florida manatee (<i>Trichechus manatus</i>), dugong (<i>Dugong dugon</i>)

<p>Hyracoidea</p>	<p>Small, herbivorous, rodent-like appearance. Upper incisors are triangular and ever-growing (tusk-like). Plantigrade feet with rubbery pads.</p>	<p>Rock hyrax (<i>Procavia capensis</i>), tree hyrax (<i>Dendrohyrax arboreus</i>)</p>
<p>Tubulidentata</p>	<p>Specialized for myrmecophagy (ant/termite eating). Teeth are peg-like, lack enamel, and have distinctive tubules. Long snout, sticky tongue, powerful digging claws.</p>	<p>Aardvark (<i>Orycteropus afer</i>)</p>
<p>Afrosoricida</p>	<p>Small insectivores/omnivores. Includes the diverse tenrecs of Madagascar and fossorial golden moles of Africa. Zalambodont molars (V-shaped crests) in some.</p>	<p>Lesser hedgehog tenrec (<i>Echinops telfairi</i>), Cape golden mole (<i>Chrysochloris asiatica</i>)</p>
<p>Macroscelidea</p>	<p>Long, flexible snout for probing. Long hind limbs for cursorial, hopping locomotion. Large eyes and ears.</p>	<p>Cape elephant shrew (<i>Elephantulus edwardii</i>)</p>

2. SUPERORDER XENARTHRA

An ancient lineage originating in South America. Characterized by **xenarthrous vertebrae** – extra articular surfaces for strength. Teeth are simplified or absent.

Order	Key Characteristics	Examples
Cingulata	Body covered in bony dermal plates (osteoderms) overlain by keratinous scales, forming a protective armor. Insectivorous/omnivorous.	Nine-banded armadillo (<i>Dasypus novemcinctus</i>)
Pilosa	Suborder Folivora (Sloths): Arboreal leaf-eaters. Slow metabolism, long claws for suspension, algae grow in fur. Suborder Vermilingua (Anteaters): Toothless, elongated snout, long sticky tongue for ant/termite feeding.	Brown-throated sloth (<i>Bradypus variegatus</i>), giant anteater (<i>Myrmecophaga tridactyla</i>)

3. SUPERORDER BOREOEUTHERIA

Contains the majority of placental diversity, divided into two major groups.

A. Superorder Laurasiatheria

Diverse group proposed to have originated on the northern supercontinent Laurasia.

Order	Key Characteristics	Examples
Eulipotyphla	Formerly part of "Insectivora." Small, sharp-snouted insectivores/carnivores. Many have venomous saliva (shrews). High metabolic rate.	European hedgehog (<i>Erinaceus europaeus</i>), star-nosed mole (<i>Condylura cristata</i>), common shrew (<i>Sorex araneus</i>)



Chiroptera	<p>Only mammals capable of true powered flight. Forelimbs modified into wings with elongated digits supporting a patagium. Most (Microchiroptera) use echolocation. Some (Megachiroptera, fruit bats) rely on vision/smell.</p>	<p>Little brown bat (<i>Myotis lucifugus</i>), large flying fox (<i>Pteropus vampyrus</i>), common vampire bat (<i>Desmodus rotundus</i>)</p>
Pholidota	<p>Body covered in large, overlapping keratinous scales. Toothless, with a long sticky tongue for myrmecophagy. Can roll into a ball for defense.</p>	<p>Chinese pangolin (<i>Manis pentadactyla</i>)</p>
Carnivora	<p>Possess carnassial pair (upper premolar 4 / lower molar 1) adapted for shearing flesh. Well-developed canines. Two suborders: Caniformia (dog-like: dogs, bears, seals) and Feliformia (cat-like: cats, hyenas).</p>	<p>Gray wolf (<i>Canis lupus</i>), lion (<i>Panthera leo</i>), brown bear (<i>Ursus arctos</i>), walrus (<i>Odobenus rosmarus</i>)</p>
Perissodactyla	<p>Odd-toed ungulates. Mesaxonic limb structure: weight borne primarily on the third (middle) digit. Herbivorous with hindgut fermentation (large cecum/colon).</p>	<p>Horse (<i>Equus ferus caballus</i>), Indian rhinoceros (<i>Rhinoceros unicornis</i>), Brazilian tapir (<i>Tapirus terrestris</i>)</p>



Artiodactyla	<p>Even-toed ungulates. Paraxonic limb structure: weight borne equally on third and fourth digits (cloven hoof). Many are ruminants with a complex, multi-chambered stomach. Cetacea (whales) are now embedded within this order.</p>	<p>Wild boar (<i>Sus scrofa</i>), red deer (<i>Cervus elaphus</i>), giraffe (<i>Giraffa camelopardalis</i>), hippopotamus (<i>Hippopotamus amphibius</i>)</p>
Cetacea	<p>Fully aquatic, streamlined. Forelimbs are flippers, hind limbs absent, tail has horizontal flukes. Breathe through a blowhole. Suborder Odontoceti (toothed whales) echolocate. Suborder Mysticeti (baleen whales) filter-feed using keratinous baleen plates.</p>	<p>Blue whale (<i>Balaenoptera musculus</i>), sperm whale (<i>Physeter macrocephalus</i>), common bottlenose dolphin (<i>Tursiops truncatus</i>)</p>

B. Superorder Euarchontoglires

Order	Key Characteristics	Examples
Rodentia	<p>Largest mammalian order. Single pair of upper and lower incisors that grow continuously, with enamel only on the front surface (creating a self-sharpening chisel). A diastema separates incisors from cheek teeth. Extremely diverse.</p>	<p>Brown rat (<i>Rattus norvegicus</i>), eastern gray squirrel (<i>Sciurus carolinensis</i>), North American beaver (<i>Castor canadensis</i>), capybara (<i>Hydrochoerus hydrochaeris</i>)</p>

Lagomorpha	Herbivorous. Two pairs of upper incisors – a large front pair and a small peg-like pair directly behind. Ever-growing incisors. Hind limbs often adapted for leaping.	European rabbit (<i>Oryctolagus cuniculus</i>), snowshoe hare (<i>Lepus americanus</i>), American pika (<i>Ochotona princeps</i>)
Scandentia	Small, arboreal mammals resembling squirrels. Possess a primitive brain but share some features (e.g., postorbital bar) with primates.	Common treeshrew (<i>Tupaia glis</i>)
Dermoptera	Patagium (gliding membrane) extends from neck to digits, tail, and hind limbs, allowing extensive gliding. Herbivorous.	Sunda flying lemur (<i>Galeopterus variegatus</i>)
Primates	Grasping hands and feet with opposable thumbs/big toes (where not reduced) and flat nails . Forward-facing eyes for stereoscopic vision. Large brains relative to body size. Two suborders: <ul style="list-style-type: none"> • Strepsirrhini: Wet-nosed (lemurs, lorises). • Haplorrhini: Dry-nosed (tarsiers, monkeys, apes, humans). 	Ring-tailed lemur (<i>Lemur catta</i>), rhesus macaque (<i>Macaca mulatta</i>), Western gorilla (<i>Gorilla gorilla</i>), human (<i>Homo sapiens</i>)

Census Techniques for Mammals

A **census** in mammalogy refers to the procedure of obtaining an **absolute count** or a complete enumeration of all individuals of a species in a given area at a specific time. An **estimate**, in contrast, provides a probable number, often derived from sampling. The primary goal is to



determine **population parameters** such as size, density, distribution, sex ratio, and age structure, which are fundamental for **conservation management, ecological research, and impact assessment**.

Importance and Objectives of Mammal Census

- **Baseline Data Creation:** Establishes reference points for monitoring **population trends** over time.
- **Conservation Status Assessment:** Critical for IUCN Red List categorizations and identifying endangered species.
- **Management and Harvesting:** Informs **sustainable harvest quotas** for game species and **culling programs** for pest species.
- **Impact Evaluation:** Assesses effects of habitat fragmentation, pollution, climate change, and human-wildlife conflict.
- **Ecological Understanding:** Elucidates species' roles in ecosystems, including predator-prey dynamics and herbivore-vegetation interactions.

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Classification of Census Techniques

Techniques are broadly classified based on whether they attempt to count every individual or use sampling to infer numbers.

1. Direct Methods (Absolute Counts)

These aim to count each individual animal directly, ideally suited for small, conspicuous, or aggregated populations in open or confined areas.

- **Total Count (Direct Enumeration):**
 - **Procedure:** Systematic counting of all animals in a defined area, often from vehicles, aircraft, or on foot.
 - **Best For:** Large, diurnal mammals in open habitats (e.g., savannah, tundra, wetlands).
 - **Examples:** Counting **African elephants** (*Loxodonta africana*) from a low-flying aircraft; counting **colony-breeding seals** on a beach.



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- **Limitations:** Costly, time-consuming, prone to error in dense habitats, may double-count moving animals.

- **Waterhole Count:**

- **Procedure:** Conducted during dry seasons when animals concentrate near limited water sources. Observers are stationed at waterholes for 24-hour periods.
- **Best For:** Arid and semi-arid regions (e.g., African savannahs, Indian grasslands).
- **Limitations:** Seasonal applicability; misses animals not using monitored waterholes; behavior may change due to observer presence.

- **Block Count:**

- **Procedure:** A large area is divided into smaller, manageable blocks. Each block is thoroughly searched by a team, often using beaters to flush animals towards stationary observers.
- **Best For:** Dense but finite habitats like woodland patches or marshes.
- **Limitations:** Labor-intensive; may disturb animals; less effective for cryptic or nocturnal species.

- **Roadside/Line Transect Count:**

- **Procedure:** Observers travel along pre-defined transects (roads, trails, compass lines) and record all animals seen and their perpendicular distance from the line.
- **Data Analysis:** Uses **Distance Sampling** theory to estimate density. The probability of detection decreases with distance from the transect line; this function is modeled to estimate total population.
- **Best For:** A wide range of habitats for species that are visible from the transect.
- **Limitations:** Assumes all animals on the line are detected ($g(0)=1$); requires a large sample size; habitat openness affects accuracy.

2. Indirect Methods (Relative or Derived Estimates)

Used when direct observation is impossible. These methods measure signs of animal presence and convert them into population estimates using calibrations.



- **Pellet/Dung Count:**

- **Procedure:** Counting fecal pellet groups or dung piles in sampled plots or along transects.
- **Calibration:** Requires knowing the **defecation rate** (pellets per animal per day) and **decay rate** of pellets in that environment.
- **Formula:** $Density = (Total\ pellets\ counted / (Plot\ area \times Decay\ time)) / Defecation\ rate.$
- **Best For:** Forest-dwelling ungulates (e.g., deer, antelope), lagomorphs (rabbits, hares).
- **Limitations:** Decay and defecation rates vary with diet, season, and climate; requires initial calibration studies.

- **Track Count:**

- **Procedure:** Counting animal tracks along prepared sand transects or natural substrates after a clearing event (e.g., snow, smooth soil).
- **Analysis:** Can give a relative index of abundance or be converted to density if animal movement parameters (daily travel distance) are known.
- **Best For:** Medium to large mammals in substrates that record tracks well.
- **Limitations:** Species identification can be challenging; substrate and weather-dependent.

- **Call Count:**

- **Procedure:** Counting vocalizations (howls, roars, chirps) at listening posts during peak calling periods.
- **Best For:** Species with loud, species-specific calls used for communication (e.g., wolves, gibbons, howler monkeys, some bats).
- **Limitations:** Mainly provides an index; linking calls to individual numbers can be difficult; affected by weather and season.



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- **Burrow/Nest Count:**

- **Procedure:** Counting active burrows, nests, or lodges.
- **Calibration:** Requires knowledge of **occupancy rate** (animals/burrow) through direct trapping or camera checks at a subsample of burrows.
- **Best For:** Colonial or territorial fossorial and arboreal mammals (e.g., prairie dogs, squirrels, some primates).

3. Capture-Based Methods

These involve capturing, marking, and recapturing individuals.

- **Mark-Recapture (Lincoln-Petersen Index):**

- **Procedure:**
 1. **First Capture:** Capture a sample of animals (M), mark them uniquely, and release.
 2. **Second Capture:** After time for mixing, capture a second sample (n).
 3. **Count Recaptures:** Note the number of marked animals in the second sample (m).
- **Formula:** Population Size (N) = (M × n) / m.
- **Assumptions:** Closed population (no births, deaths, migration), marks are not lost/overlooked, animals mix randomly, marking doesn't affect catchability.
- **Variants:** **Schnabel** and **Jolly-Seber** methods for open populations.

- **Capture per Unit Effort (CPUE):**

- **Procedure:** The number of animals caught (or signs found) per standard unit of trapping effort (e.g., 100 trap-nights).
- **Output:** Provides a **relative abundance index** to compare populations across sites or times.
- **Limitations:** Does not give absolute density; assumes constant catchability.



4. Advanced and Technological Methods

- **Camera Trapping:**
 - **Procedure:** Motion-activated cameras deployed in a grid. Individuals are identified by unique markings (stripes, spots, scars).
 - **Analysis:** Used in **Spatially Explicit Capture-Recapture (SECR)** models, which estimate density by modeling animal movement and detection probability in space.
 - **Best For:** Cryptic, nocturnal, and individually recognizable species (e.g., tigers, leopards, jaguars).
- **Genetic Census (Non-Invasive Genetic Sampling):**
 - **Procedure:** Collection of hair (from hair snares), feces, or saliva from which DNA is extracted.
 - **Analysis:** Individual identification via microsatellite or SNP genotyping. Data analyzed using **mark-recapture** models in space and time.
 - **Advantage:** Provides data on population size, sex ratio, genetic diversity, and individual movement.
- **Aerial Surveys & Drones:**
 - **Procedure:** Using manned aircraft or UAVs (drones) with visual observers, thermal imaging, or high-resolution cameras.
 - **Thermal Imaging:** Effective for detecting body heat signatures of mammals, especially at night or in dense cover.
- **Acoustic Monitoring:**
 - **Procedure:** Deploying autonomous recording units to capture echolocation calls of bats or vocalizations of other mammals.
 - **Analysis:** Automated species identification using AI and call libraries; can provide activity indices.



Comparative Table of Major Census Techniques

Technique	Type of Estimate	Key Principle	Best-Suited For	Major Limitations
Total Count	Absolute	Direct enumeration	Conspicuous, aggregated populations in open areas	Costly, misses cryptic animals, habitat-limited
Line Transect	Absolute (Density)	Distance sampling	Visible species in varied habitats	Requires modeling, assumes perfect detection on line
Pellet/Dung Count	Absolute (if calibrated)	Defecation & decay rates	Forest ungulates, lagomorphs	Requires species/season-specific rate calibration
Mark-Recapture	Absolute	Capture-mark-recapture ratio	Trappable small to medium mammals	Labor-intensive, assumes closed population
Camera Trapping (SECR)	Absolute (Density)	Spatially explicit recapture	Individually identifiable species	High setup cost, data analysis is complex
Genetic Census	Absolute	DNA-based individual ID	Elusive species with non-invasive samples	Very high cost per sample, requires lab expertise

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1. Mammals

Planning a Mammal Census: Key Considerations

1. **Objective Definition:** Is an absolute number needed, or is a relative trend sufficient?
2. **Species Biology:** Consider behavior (diurnal/nocturnal), sociality, habitat use, and detectability.



MK PREPARATIONS



3. **Habitat and Terrain:** Dictates accessibility and choice of method (e.g., aerial for forests, transects for grasslands).
4. **Logistics and Resources:** Budget, available manpower, time, and technological access.
5. **Spatial Scale and Sampling Design:** Use **random, systematic, or stratified sampling** to ensure statistical rigor and representativeness.
6. **Pilot Study:** Essential to test methods, estimate detection probabilities, and refine effort.

1. Mammals

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Mammals: One-Liners

Evolutionary Perspective

- Mammals belong to the **synapsid lineage** of amniotes, which diverged from diapsid reptiles during the Carboniferous period (~320 mya).
- **Pelycosaurs** were early, diverse synapsids of the Permian period; they had a sprawling gait and were likely ectothermic.
- Some pelycosaurs, like *Dimetrodon*, possessed large dorsal "sails" possibly used for thermoregulation, display, or defense.
- **Therapsids** were more advanced, mammal-like reptiles from the mid-Permian, exhibiting trends like differentiated teeth and an arched palate.
- Therapsids showed improved locomotion with hindlimbs positioned more directly beneath the body.
- In therapsids, predatory forms had enlarged anterior teeth, while herbivores developed grinding posterior teeth and a **diastema**.
- Rib cage changes in therapsids suggest separation of thoracic and abdominal cavities, hinting at a diaphragm-like mechanism.
- **Cynodonts**, a therapsid subgroup, survived the Permian-Triassic mass extinction and became smaller, more nocturnal, and mammal-like.
- Cynodonts evolved a **secondary palate, heterodont teeth, turbinate bones**, and lost lumbar ribs, correlating with diaphragm evolution.
- The first true mammals appeared in the **Late Triassic** from cynodont ancestors.
- Key mammalian transitions include the **dentary-squamosal jaw joint** and the ancestral jaw bones (articular, quadrate) becoming the **malleus** and **incus**.
- Mammalian characteristics like hair, mammary glands, and endothermy evolved gradually over about 200 million years.
- Early mammals were small, nocturnal, and insectivorous during the Mesozoic era, coexisting with dinosaurs.

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1. Mammals



- The **Cretaceous-Paleogene (K-Pg) mass extinction** (~65 mya) eliminated non-avian dinosaurs, allowing mammals to undergo an **adaptive radiation**.
- The Cenozoic era is known as the "**Age of Mammals**" due to their diversification into vacant ecological niches.
- **Pleistocene megafauna** extinctions (~12,000 years ago) are linked to climate change and overhunting by modern humans.

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Diversity of Mammals: Major Lineages

- Class **Mammalia** is characterized by hair, mammary glands, a four-chambered heart, a diaphragm, and a large cerebral cortex.
- Living mammals are divided into two main subclasses: **Prototheria** and **Theria**.
- **Prototheria** contains the **monotremes** (infraclass Ornithodelphia), which are **oviparous** (egg-laying).
- Monotremes, like the platypus and echidnas, have a **cloaca** and mammary glands without nipples.
- **Theria** includes the viviparous mammals, split into **Metatheria** (marsupials) and **Eutheria** (placental mammals).
- **Metatheria** (marsupials) have a very short gestation, a simple **choriovitelline placenta**, and young complete development in a **marsupium** (pouch).
- **Eutheria** (placental mammals) have a long gestation and a complex **chorioallantoic placenta**.
- Modern phylogenetic studies group placental mammals into four major clades: **Afrotheria**, **Xenarthra**, **Laurasiatheria**, and **Euarchontoglires**.
- **Afrotheria** originated in Africa and includes elephants, manatees, hyraxes, tenrecs, and golden moles.
- **Xenarthra** originated in South America and includes anteaters, sloths, and armadillos, characterized by **xenarthrous vertebrae**.



- **Laurasiatheria** originated in the northern continent Laurasia and includes bats, carnivores, pangolins, ungulates, and whales.
- **Euarchontoglires** also originated in Laurasia and includes rodents, lagomorphs, treeshrews, colugos, and primates.

Integumentary System and Derivatives

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- **Hair** (pelage) is a unique mammalian structure composed of **keratin**, providing insulation, camouflage, and sensory functions.
- Hair consists of **guard hairs** for protection and **underhair** for insulation.
- **Vibrissae** are specialized sensory hairs (whiskers) with a rich nerve supply.
- **Arrector pili muscles** contract to erect hairs, improving insulation or for threat displays.
- Hair color is determined by **melanin** pigment and air within the shaft.
- **Molting** is the periodic shedding and replacement of hair.
- **Glands** are all epidermal derivatives.
- **Sebaceous glands** are associated with hair follicles and produce oily **sebum** for waterproofing and lubrication.
- **Sudoriferous (sweat) glands** include **eccrine glands** (watery sweat for cooling) and **apocrine glands** (milky secretion, often with pheromones).
- **Scent/Musk glands** produce **pheromones** for communication, territorial marking, and defense.
- **Mammary glands** are modified apocrine glands that secrete milk for nourishing young; their evolution is linked to **exaptation**.
- **Claws, nails, and hooves** are keratinous derivatives of the integument.
- **Horns and antlers** are specialized structures: true horns (bovids) have a keratin sheath over a bony core; antlers (cervids) are solid, deciduous bone.
- **Rhino horns** are made of keratinized filaments with no bony core.



- **Baleen** is keratin plates in mysticete whales used for filter-feeding.
- **Quills** are modified, sharp defensive hairs found in porcupines.

Skull and Dentition

- Mammals have a **synapsid skull** with a single **temporal fenestra**.
- The lower jaw is composed of a single **dentary bone**, which articulates with the **squamosal bone**.
- The **secondary palate** (hard and soft) separates nasal and oral cavities, allowing simultaneous breathing and chewing.
- Some mammals (e.g., equines, rodents, lagomorphs) are **obligate nasal breathers**.
- Mammals have **heterodont dentition**: incisors (nipping), canines (piercing/grasping), premolars and molars (chewing/grinding).
- Mammalian teeth are **thecodont** (set in sockets) and **diphyodont** (two sets: deciduous and permanent).
- A **dental formula** (e.g., 2:1:2:3 for human permanent dentition) denotes the number of each tooth type in one half of the jaw.
- **Hypsodont teeth** have high crowns and continuous growth, suited for abrasive diets (grazers).
- **Brachyodont teeth** have low crowns and stop growing.
- **Carnassial pair** (P4/m1) in carnivores is adapted for shearing flesh.
- Herbivores often have a **diastema**, reduced canines, and high-crowned molars.
- Rodents and lagomorphs have **ever-growing incisors** with enamel only on the front surface.
- **Tusks** of elephants are modified, continuously growing incisors.

Skeleton and Locomotion

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- The mammalian vertebral column is divided into cervical (typically 7), thoracic (with ribs), lumbar, sacral, and caudal regions.
- Almost all mammals have **seven cervical vertebrae**, with exceptions like manatees (6) and two-toed sloths (5-7).
- The appendicular skeleton has limbs oriented **vertically beneath the body**, increasing stride efficiency.
- Modes of locomotion include **cursorial** (running), **fossorial** (digging), **scansorial** (climbing), **volant** (gliding/flying), and **aquatic**.
- **Bipedalism** is seen exclusively in humans among living mammals; adaptations include an S-shaped spine, short broad pelvis, and angled femur.
- The pelvic girdle bones are fused in adults, but the **pubic symphysis** loosens before birth to aid parturition.

Nutrition and Digestive System

- Digestive tract specializations correlate with diet.
- **Carnivores** have a short, simple digestive tract focused on protein and fat digestion.
- **Herbivores** have a long digestive tract with fermentation chambers to break down cellulose via symbiotic microbes.
- **Ruminants** (e.g., cattle) have a four-chambered stomach (rumen, reticulum, omasum, abomasum) and practice **cud-chewing**.
- **Non-ruminant herbivores** (e.g., horses, rabbits) use **hindgut fermentation** in a large cecum and colon.
- **Omnivores** (e.g., primates, bears) have an intermediate tract length and both sharp anterior teeth and grinding molars.
- **Coprophagy** in rabbits recaptures nutrients from cecal fermentation.

Circulation and Gas Exchange



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- Mammals have a **four-chambered heart** with complete separation of pulmonary and systemic circuits; its evolution is **convergent** with birds and crocodylians.
- **Fetal circulation** includes shunts: the **foramen ovale** (between atria) and the **ductus arteriosus** (between pulmonary artery and aorta); these close at birth.
- Lungs are alveolar and spongy, ventilated by a **negative-pressure system** driven by the **diaphragm** and intercostal muscles.

Temperature Regulation (Endothermy)

- Mammals are **endothermic homeotherms**, maintaining a constant high body temperature.
- Heat production occurs via **shivering thermogenesis** and **non-shivering thermogenesis** (especially in **brown adipose tissue**).
- Heat conservation involves insulation (pelage, subcutaneous fat) and **countercurrent heat exchange** in limbs.
- Heat dissipation methods include panting, sweating (eccrine glands), vasodilation, and behavioral changes.
- **Torpor** and **hibernation** are controlled states of reduced metabolic rate to conserve energy during unfavorable conditions.

Nervous and Sensory Systems

- The mammalian brain is marked by a greatly enlarged **cerebral cortex (neocortex)** for complex integration and learning.
- The **cerebellum** is well-developed for coordination.
- **Olfaction (smell)** is highly developed and critical for communication and foraging; many species have a **vomerinasal organ** for pheromone detection.
- **Audition (hearing)** is excellent; the **pinna** directs sound, and three middle ear ossicles amplify vibrations to the coiled **cochlea**.
- **Echolocation** is used by bats (Microchiroptera) and toothed whales (Odontoceti) for navigation and hunting.



- **Vision** is typically good; color vision is variable, with many mammals being dichromatic; primates often have **trichromatic color vision**.

Excretion and Osmoregulation

- Mammals have **metanephric kidneys** with a **loop of Henle**, which creates a concentration gradient allowing production of **hyperosmotic urine**.
- Mammals excrete **urea** as their primary nitrogenous waste (ureotelic).
- Water conservation is achieved through renal efficiency and behaviors like nocturnal activity in deserts.

Behavior and Communication

- Mammals use **chemical communication** via **pheromones** from scent glands.
- **Visual communication** includes body postures, facial expressions, and tail positions.
- **Auditory communication** involves vocalizations for alarm, mating, and social cohesion.
- **Tactile communication** includes grooming and bonding behaviors.
- **Territoriality** is common, with defense using scent marking, vocalizations, or aggression to secure resources and mates.

Reproduction and Development

- Most mammals have defined breeding seasons synchronized with resource availability.
- The **estrous cycle** is found in most mammals, where the female is receptive ("in heat") only during **estrus**.
- The **menstrual cycle** occurs in haplorrhine primates (including humans), ending with **menstruation**.
- **Ovulation types** can be spontaneous (cyclic) or **induced** (triggered by copulation, as in cats and rabbits).
- **Monotremes** are **oviparous**, laying leathery eggs.

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- **Marsupials** are **viviparous** with very short gestation and a simple **choriovitelline placenta**; altricial young complete development in a marsupium.
- **Eutherians** are **viviparous** with long gestation and a complex **chorioallantoic placenta**; young can be altricial or precocial.
- **Delayed implantation** (embryonic diapause) occurs in some species (e.g., bears, seals) to ensure birth at an optimal time.

Human Evolution: Primates

- Primates evolved from small, arboreal, insectivorous mammals in the late Cretaceous.
- Key primate adaptations include **grasping hands/feet with opposable digits and nails, forward-facing eyes** for stereoscopic vision, and a **large brain**.
- Primates are divided into **Strepsirrhini** (wet-nosed: lemurs, lorises) and **Haplorrhini** (dry-nosed: tarsiers, monkeys, apes, humans).
- **Hominins** are the human lineage that diverged from the chimpanzee lineage ~6-7 million years ago.
- Key trends in hominin evolution are **obligate bipedalism**, increased **encephalization** (brain size), and cultural complexity.

Significant Hominin Species

- *Sahelanthropus tchadensis* (7-6 mya): Oldest known hominin; mix of ape and human traits; possible upright posture.
- *Ardipithecus ramidus* (5.8-4 mya): Showed evidence of both climbing and bipedalism; reduced canine teeth.
- *Australopithecus afarensis* ("Lucy", 3.9-3 mya): Clear evidence of **obligate bipedalism**; small brain; likely ancestor to *Homo*.
- *Homo habilis* (2.4-1.5 mya): "Handy man"; first toolmaker (**Oldowan tools**); brain size increase begins.
- *Homo erectus* (1.8-0.3 mya): First to migrate out of Africa; used **Acheulean tools**; likely used fire.



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- *Homo heidelbergensis* (0.6-0.2 mya): Ancestral to both Neanderthals and modern humans.
- *Homo neanderthalensis* (0.23-0.03 mya): Adapted to cold climates; complex **Mousterian tools** and symbolic behavior (burials); interbred with *H. sapiens*.
- *Homo sapiens* (0.3 mya - present): Anatomically modern humans; complex language, art, and technology.
- Human evolution is "bushy," with multiple species coexisting; genetic evidence confirms **introgression** with Neanderthals and Denisovans.
- The prevailing model for modern human origins is the "**Out of Africa**" model with assimilation.

Taxonomy of Living Mammalian Orders

Subclass Prototheria: Monotremes

- **Order Monotremata:** Egg-laying; cloaca present; no nipples (milk secreted onto a patch); adults toothless; examples: Platypus, Echidnas; distribution: Australia, New Guinea.

Infraclass Metatheria: Marsupials

- **Order Didelphimorphia:** American opossums; prehensile tail; abdominal pouch; omnivorous; example: Virginia Opossum.
- **Order Paucituberculata:** Shrew opossums; small, insectivorous; no true pouch; distribution: South America.
- **Order Microbiotheria:** Monito del Monte; mouse-like; potential phylogenetic link between American and Australian marsupials.
- **Order Dasyuromorphia:** Marsupial carnivores; includes Tasmanian devil, quolls, numbat.
- **Order Peramelemorphia:** Bandicoots and bilbies; omnivorous; have a more advanced placenta; syndactylous hind feet.
- **Order Notoryctemorphia:** Marsupial moles; fossorial; convergent with placental moles.



- **Order Diprotodontia:** Largest marsupial order; syndactylous hind feet; herbivorous/omnivorous; includes kangaroos, wallabies, koalas, wombats, possums.

Infraclass Eutheria: Placental Mammals

Superorder Afrotheria

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- **Order Proboscidea:** Elephants; trunk (proboscis); tusks (modified incisors); graviportal limbs.
- **Order Sirenia:** Manatees, dugong; fully aquatic herbivores; flippers, no hind limbs; horizontal tail fluke; pachyostosis.
- **Order Hyracoidea:** Hyraxes; small, herbivorous; upper incisors are tusk-like and ever-growing.
- **Order Tubulidentata:** Aardvark; teeth peg-like, lack enamel; myrmecophagous.
- **Order Afrosoricida:** Tenrecs and golden moles; small insectivores/omnivores; zalambdodont molars in some.
- **Order Macroscelidea:** Elephant shrews; long, flexible snout; long hind limbs for cursorial locomotion.

Superorder Xenarthra

- **Order Cingulata:** Armadillos; body covered in bony dermal plates (osteoderms).
- **Order Pilosa:** Includes suborders Folivora (sloths) and Vermilingua (anteaters); xenarthrous vertebrae; sloths are arboreal leaf-eaters; anteaters are toothless with long sticky tongues.

Superorder Laurasiatheria

- **Order Eulipotyphla:** Hedgehogs, moles, shrews; small insectivores; many shrews have venomous saliva.
- **Order Chiroptera:** Bats; only mammals with true powered flight; most use echolocation (Microchiroptera).



- **Order Pholidota:** Pangolins; body covered in overlapping keratinous scales; toothless, myrmecophagous.
- **Order Carnivora:** Possess **carnassial pair** (P4/m1); includes Caniformia (dogs, bears, seals) and Feliformia (cats, hyenas).
- **Order Perissodactyla:** Odd-toed ungulates; mesaxonic foot (weight on digit 3); hindgut fermenters (e.g., horses, rhinos).
- **Order Artiodactyla:** Even-toed ungulates; paraxonic foot (weight on digits 3 & 4); many are ruminants (e.g., deer, cattle).
- **Order Cetacea:** Whales, dolphins; fully aquatic; now classified within Artiodactyla as the sister group to hippos; suborders: Odontoceti (toothed, echolocating) and Mysticeti (baleen, filter-feeding).

Superorder Euarchontoglires

- **Order Rodentia:** Largest mammalian order; single pair of ever-growing incisors per jaw; diastema present (e.g., rats, squirrels, beavers).
- **Order Lagomorpha:** Two pairs of upper incisors (second pair small and peg-like); herbivorous (e.g., rabbits, hares, pikas).
- **Order Scandentia:** Treeshrews; arboreal; primitive brain but share some features with primates.
- **Order Dermoptera:** Colugos or flying lemurs; extensive patagium for gliding; herbivorous.
- **Order Primates:** Grasping hands/feet with nails; forward-facing eyes; large brains; includes lemurs, monkeys, apes, and humans.

Mammalogy and Census Techniques

- Mammalogy is the study of mammals, encompassing taxonomy, anatomy, physiology, behavior, ecology, and conservation.
- Census techniques aim to estimate population size and parameters.



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- **Direct methods** include total counts (e.g., aerial surveys), waterhole counts, and block counts.
- **Line transect counts** use distance sampling theory to estimate density.
- **Indirect methods** include pellet/dung counts (requiring defecation and decay rates), track counts, call counts, and burrow/nest counts.
- **Capture-based methods** include mark-recapture (Lincoln-Petersen Index) and capture per unit effort (CPUE).
- **Advanced techniques** include camera trapping (with Spatially Explicit Capture-Recapture models), genetic census (non-invasive DNA sampling), aerial surveys with drones/thermal imaging, and acoustic monitoring.
- Accurate census planning requires consideration of objectives, species biology, habitat, logistics, sampling design, and a pilot study.
- Factors affecting accuracy include observer bias, detection probability, animal movement, and sampling error.



Practice MCQs

1. Mammals

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1. Which of the following is the most biologically differentiated group in the animal kingdom?

- A) Arthropods
- B) Birds
- C) Mammals
- D) Fishes

Answer: Mammals

2. The columella bone of amphibians is homologous to which mammalian ear ossicle?

- A) Incus
- B) Malleus
- C) Stapes
- D) None of these

Answer: Stapes

3. Nearly all orders of living mammals appeared by the end of which geological epoch?

- A) Eocene
- B) Oligocene
- C) Pliocene
- D) Holocene

Answer: Eocene

4. In which mammalian group is the cecum typically absent?

- A) Herbivorous ruminants
- B) Non-herbivorous ruminants
- C) Insectivores
- D) Carnivores

Answer: Insectivores

5. What is the approximate gestation period for cats and dogs?

- A) 60 days
- B) 90 days
- C) 120 days
- D) 280 days

Answer: 60 days

6. Which hominin is known as the first maker of stone tools?

- A) Homo neanderthalensis
- B) Homo sapiens
- C) Homo habilis
- D) Paranthropus robustus

Answer: Homo habilis

7. How many times did the secondary palate evolve independently in vertebrates?

- A) Single time
- B) Two times
- C) Three times
- D) Four times

Answer: Two times

8. Which of the following mammals is NOT an obligate nasal breather?

- A) Equines
- B) Lagomorphs
- C) Rodents
- D) Anteaters

Answer: Anteaters

9. Animals having the largest teeth in the animal kingdom belong to which order?

- A) Sirenia



- B) Pilosa
- C) Proboscidea
- D) Lagomorpha

Answer: Proboscidea

10. What is the number of cervical vertebrae in manatees?

- A) 5
- B) 8
- C) 6
- D) 9

Answer: 6

11. Which of the following animals is NOT a member of the order Artiodactyla?

- A) Pigs
- B) Hippopotamus
- C) Rhinoceros
- D) Camels

Answer: Rhinoceros

12. Which of the following is a toothed whale?

- A) Humpback whale
- B) Blue whale
- C) Sperm whale
- D) Right whale

Answer: Sperm whale

13. Pikas belong to which mammalian order?

- A) Lagomorpha
- B) Rodentia
- C) Artiodactyla
- D) Cingulata

Answer: Lagomorpha

14. What is the second largest mammalian order?

- A) Rodentia
- B) Lagomorpha
- C) Carnivora
- D) Chiroptera

Answer: Chiroptera

15. Large aquatic herbivores with thick wrinkled skin and forelimbs modified into flippers belong to which order?

- A) Pilosa
- B) Proboscidea
- C) Sirenia
- D) Cingulata

Answer: Sirenia

16. Which male mammal sheds its antlers each year?

- A) Cattle
- B) Sheep
- C) Antelope
- D) Deer

Answer: Deer

17. Which of the following is a living ape?

- A) Tarsiers
- B) Lorises
- C) Gibbon
- D) Lemurs

Answer: Gibbon

18. All are members of the family Hominidae except:

- A) Orangs
- B) Gibbons
- C) Gorillas
- D) Chimps

Answer: Gibbons

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19. The first humans evolved from ancestors approximately 2 MYA belonging to which group?

- A) Ardipithecine
- B) Australopithecine
- C) Neanderthals
- D) Sahelanthropus

Answer: Australopithecine

20. Who were the first humans?

- A) *Homo ergaster*
- B) *Homo erectus*
- C) *Homo habilis*
- D) *Homo sapiens*

Answer: *Homo habilis*

21. Which of the following is NOT an exclusive feature of mammals?

- A) Endothermy
- B) Hair
- C) Mammary glands
- D) Ear ossicles

Answer: Ear ossicles

22. Mammals descended from a group of mammal-like reptiles called:

- A) Dicyndonus
- B) Thecodonus
- C) Therapsids
- D) Archosaurs

Answer: Therapsids

23. Which of the following statements is NOT correct?

- A) Mammalian teeth have heterodont dentition.
- B) Monotremes lack nipples in their mammary glands.
- C) Deciduous teeth are milk teeth replaced

by a permanent set.

D) Cellulose is easily digested by all mammalian species.

Answer: Cellulose is easily digested by all mammalian species.

24. Members of the order Chiroptera include:

- A) Rats and mice
- B) Bats
- C) Rabbits
- D) Armadillos

Answer: Bats

25. Members of the order Perissodactyla include:

- A) Elephants
- B) Deer and cattle
- C) Horses and zebras
- D) Dogs and cats

Answer: Horses and zebras

26. The echidna and duck-billed platypus are members of the infraclass:

- A) Prototheria
- B) Metatheria
- C) Ornithodelephia
- D) Eutheria

Answer: Prototheria

27. Which glands are associated with hair follicles and function to lubricate and waterproof the skin?

- A) Sudoriferous glands
- B) Sebaceous glands
- C) Mammary glands
- D) Musk glands

Answer: Sebaceous glands

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28. In adult mammalian circulation, blood in which vessel is most highly oxygenated?

- A) Pulmonary artery
- B) Pulmonary vein
- C) Anterior vena cava
- D) Posterior vena cava

Answer: Pulmonary vein

29. A diaphragm is present in:

- A) Birds and mammals
- B) Reptiles, birds, and mammals
- C) Mammals only
- D) All chordates

Answer: Mammals only

30. Ancestral primates are split into which two major lineages?

- A) Prosimians and simians
- B) Neanderthals and *Homo erectus*
- C) Archosaurs and simians
- D) Hominids and simians

Answer: Prosimians and simians

31. The largest mammalian order is:

- A) Carnivora
- B) Primates
- C) Rodentia
- D) Insectivore

Answer: Rodentia

32. Ungulate mammals include:

- A) Artiodactyles
- B) Lagomorphs
- C) Perissodactyles
- D) Both A and C

Answer: Both A and C

33. Mammals which do not have nipples on their mammary glands are called:

- A) Eutherians
- B) Marsupials
- C) Prototherians
- D) Primates

Answer: Prototherians

34. An external ear or pinna is absent in:

- A) Placentals
- B) Marsupials
- C) Prototherians
- D) Bats

Answer: Prototherians

35. Diastema can be defined as:

- A) Structure of the mammalian eye
- B) Type of teeth in mammals
- C) Space in between the teeth due to the absence of canine
- D) Part of pelvic girdle

Answer: Space in between the teeth due to the absence of canine

36. Chordae tendineae are structures found in the:

- A) Ventricles of the brain
- B) Ventricles of the heart
- C) Auricles of the heart
- D) Connection between bones

Answer: Ventricles of the heart

37. In many mammals, fertilization occurs right after coitus but development is arrested for a few weeks, a phenomenon called:

- A) Embryonic delay
- B) Embryonic arrest
- C) Embryonic diapause



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D) Embryonic pause

Answer: Embryonic diapause

38. Embryonic diapause is best observed in:

- A) Sea lions, bats, bears only
- B) Sea lions, bats, bears, and marsupials only
- C) Sea lions, bats, bears, martens and marsupials
- D) Bats, bears and sea lions only

Answer: Sea lions, bats, bears, martens and marsupials

39. Stomachs of cattle, sheep and deer are modified into how many chambers?

- A) Two chambers
- B) Four chambers
- C) Three chambers
- D) Five chambers

Answer: Four chambers

40. What is the gestation period in an elephant?

- A) 10 months
- B) 18 months
- C) 15 months
- D) 19 months

Answer: 19 months

41. Synapsids diverged from other amniote lineages during which period?

- A) Devonian
- B) Carboniferous
- C) Silurian
- D) Triassic

Answer: Carboniferous

42. All of the following are members of Order Carnivora except:

- A) Dogs
- B) Cats
- C) Walrus
- D) Pikas

Answer: Pikas

43. Hedgehog, mole and shrews are members of which order?

- A) Chiroptera
- B) Endentata
- C) Insectivora
- D) Artiodactyla

Answer: Insectivora

44. Marsupial mammals are also known as:

- A) Protherian
- B) Metatherian
- C) Eutherian
- D) Monotremes

Answer: Metatherian

45. Arrector pili muscles are under the control of which nervous system?

- A) Somatic nervous system
- B) Autonomic nervous system
- C) Cerebral cortex
- D) Both A and C

Answer: Autonomic nervous system

46. Mammary glands are probably derived evolutionarily from which type of glands?

- A) Eccrine glands
- B) Autocrine glands
- C) Endocrine glands

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D) Apocrine glands

Answer: Apocrine glands

47. Reptilian teeth are and mammalian teeth are

- A) Homodont : Heterodont
- B) Homodont : Homodont
- C) Isodont : Platyodont
- D) Platyodont: Heterodont

Answer: Homodont : Heterodont

48. Which mammalian order possesses a carnassial apparatus?

- A) Primates
- B) Carnivora
- C) Cetacea
- D) Proboscidea

Answer: Carnivora

49. What is the number of cervical vertebrae in giraffe and whales respectively?

- A) 8 : 9
- B) 7 : 5
- C) 7 : 7
- D) 7 : 10

Answer: 7 : 7

50. The foramen ovale in the fetal heart is the opening between:

- A) Two atria
- B) Two ventricles
- C) The right atrium and right ventricle
- D) The left atrium and left ventricle

Answer: Two atria

51. Who is known as "The First Toolmaker"?

- A) Homo erectus

B) Homo habilis

C) Neanderthal man

D) Cro-Magnon man

Answer: Homo habilis

52. What is the cranial capacity range of modern humans?

- A) 900 – 1100 c.c
- B) 650 – 700 c.c
- C) 1400 – 1500 c.c
- D) 1050 – 1500 c.c

Answer: 1050 – 1500 c.c

53. Which living great apes lack a tail?

- A) Orangutan
- B) Gorilla
- C) Chimpanzee
- D) All of these

Answer: All of these

54. Which pair of characters is found without exception in all mammals?

- A) Hair and Viviparity
- B) Viviparity and Mammary Glands
- C) Viviparity and Internal fertilization
- D) Mammary Glands and Internal fertilization

Answer: Mammary Glands and Internal fertilization

55. A dental formula of 2.1.2.3\2.1.2.3 indicates that this mammal has a total of how many molars?

- A) 10
- B) 6
- C) 9
- D) 12

Answer: 12

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56. A member of the Order Cetacea includes:

- A) Elephants
- B) Manatees
- C) Beavers and porcupines
- D) Whales

Answer: Whales

57. Roughly how many described mammal species exist?

- A) 4000
- B) 5,400
- C) 10,000
- D) 25,000

Answer: 5,400

58. What is the human vertebral formula?

- A) C7 T12 L5 S4-5 Co4-5
- B) C7 T8 L4 S8 Co8
- C) C7 T12 L5 S5 Co4
- D) C7 T12 L5 S4 Co4

Answer: C7 T12 L5 S4-5 Co4-5

59. Which of the following is a polyestrus animal?

- A) Domestic Dogs
- B) Sea Lions
- C) Bears
- D) Rat

Answer: Rat

60. Which glands secrete pheromones?

- A) Sebaceous Glands
- B) Sudoriferous Glands
- C) Scent Glands
- D) Apocrine Glands

Answer: Scent Glands

61. Teeth are absent in which mammalian group?

- A) Herbivores
- B) Edentata
- C) Rodentia
- D) Cetacea

Answer: Edentata

62. Double vagina is found in which animal group?

- A) Monotremes
- B) Eutheria
- C) Marsupials
- D) None of them

Answer: Marsupials

63. Hairs are present in all except:

- A) Chiroptera
- B) Rodentia
- C) Cetacea
- D) Lagomorpha

Answer: Cetacea

64. Locomotion in a Kangaroo is known as:

- A) Volant
- B) Cursorial
- C) Saltatorial
- D) Creeping

Answer: Saltatorial

65. The only poisonous mammal is:

- A) Echidna
- B) Ornithorhynchus
- C) Guinea Pig
- D) Snake

Answer: Ornithorhynchus

66. The first mammals were probably:

- A) Large and nocturnal
- B) Large and diurnal
- C) Small and nocturnal
- D) Small and diurnal

Answer: Small and nocturnal

71. What is the closest animal to a bat?

- A) Robin
- B) Pigeon
- C) Crow
- D) Seal

Answer: Seal

M 67. Keratinized hairs in mammals are derivatives of which skin layer?

- A) Epidermis
- B) Dermis
- C) Hypodermis
- D) Endodermis

Answer: Epidermis

72. Mammals became dominant in which geological period?

- A) Jurassic
- B) Cenozoic
- C) Devonian
- D) Cambrian

Answer: Cenozoic

K 68. Coprophagy is a phenomenon found in:

- A) Rabbits
- B) Mice
- C) Kangaroos
- D) Whales

Answer: Rabbits

73. Only the left aortic arch is present in:

- A) Mammals
- B) Birds
- C) Reptiles
- D) Amphibians

Answer: Mammals

P 69. All are characteristics of class **Mammalia** except:

- A) Sweat and scent Glands
- B) Ear ossicles
- C) Diaphragm
- D) Homodont dentition

Answer: Homodont dentition

74. Marsupium is a characteristic feature of:

- A) Opossum
- B) Echidna
- C) Dolphin
- D) Duckbill Platypus

Answer: Opossum

R 70. What is the gestation period in a mouse?

- A) 10 days
- B) 20 days
- C) 28 days
- D) 35 days

Answer: 20 days

75. The most advanced mammal is:

- A) Rat
- B) Kangaroo
- C) Opossum
- D) Spiny ant eater

Answer: Opossum

76. How many pairs of ribs are directly attached to the vertebral column in



humans?

- A) 08
- B) 10
- C) 12
- D) 22

Answer: 12

81. What is the approximate percentage of genetic variation that exists between traditional human 'races'?

- A) 85%
- B) 15%
- C) 50%
- D) 5%

Answer: 15%

82. The idea that humans can be divided into a few distinct races is challenged by the fact that:

- A) All human groups have common ancestors
- B) Traits vary independently of each other
- C) Cultural differences are more significant than biological ones
- D) Gene flow has always been extensive

Answer: Traits vary independently of each other

83. The 'Out of Africa' hypothesis is supported by evidence that:

- A) Neanderthals were replaced by *H. sapiens*
- B) Modern humans arrived in Siberia around 12000 years ago
- C) Africans possess the most genetic diversity
- D) Early modern humans created elaborate cave art

Answer: Africans possess the most genetic diversity

84. The majority of human genetic variation is found:

- A) Between continents
- B) Between races

M 77. Bears and raccoons undergo a period of inactivity called:

- A) Winter Sleep
- B) Hibernation
- C) Aestivation
- D) Torpor

Answer: Hibernation

K 78. Which of the following mammals is monoestrous?

- A) Wild Dog
- B) Bear
- C) Foxes
- D) Sea Lion

Answer: Bear

P 79. Mammalian kidneys are of which type?

- A) Pronephric
- B) Mesonephric
- C) Metanephric
- D) Neuronephric

Answer: Metanephric

R 80. Which sense is more developed in reptiles and birds than in humans?

- A) Hearing
- B) Smell
- C) Color vision
- D) Cognition

Answer: Smell

- C) Within continents
- D) In isolated populations

Answer: Within continents

85. Biological races in humans are considered invalid due to the lack of strong correlation among:

- A) Physical traits and geographic origin
- B) Genetic markers and cultural practices
- C) Observable traits and underlying genetic differences
- D) Environmental adaptations and historical migration patterns

Answer: Observable traits and underlying genetic differences

86. Which statement best describes the relationship between skin colour and UV radiation?

- A) Darker skin is common in higher latitudes
- B) Lighter skin is common in tropical areas
- C) Darker skin protects against UV radiation
- D) Skin color is unrelated to UV radiation

Answer: Darker skin protects against UV radiation

87. The genetic exchange between Neanderthals and *H. sapiens* primarily occurred in:

- A) Africa
- B) Middle East
- C) Europe
- D) Asia

Answer: Middle East

88. African populations exhibit more genetic variation primarily because:

- A) They adapted to diverse climates

- B) They are the ancestral group
- C) They have fewer common diseases
- D) They have larger population sizes

Answer: They are the ancestral group

89. The concept of human races as distinct biological categories is largely rejected by modern biologists due to:

- A) Genetic drift
- B) Continuous variation
- C) Geographic isolation
- D) Convergent evolution

Answer: Continuous variation

90. Which human characteristic is most strongly linked to the capacity for symbolic thought?

- A) Bipedalism
- B) Artistic expression
- C) Brain size
- D) Tool use

Answer: Artistic expression

91. The oldest evidence for *H. sapiens* from Jebel Irhoud, Morocco is approximately:

- A) 120,000 YA
- B) 300,000 YA
- C) 70,000 YA
- D) 41,000 YA

Answer: 300,000 YA

92. Which region shows the greatest genetic diversity in humans?

- A) Europe
- B) Africa
- C) Asia
- D) North America

Answer: Africa

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93. The development of complex abstract thought is best evidenced by:

- A) Simple cave paintings
- B) Figurative cave art
- C) Efficient stone tools
- D) Burials with grave goods

Answer: Figurative cave art

94. The 'Cro-Magnons' are an early example of:

- A) Neanderthals
- B) Denisovans
- C) *Homo erectus*
- D) *Homo sapiens*

Answer: *Homo sapiens*

95. The earliest *Homo sapiens* fossils outside of Africa are approximately how old?

- A) 300,000 YA
- B) 70,000 YA
- C) 120,000 YA
- D) 41,000 YA

Answer: 120,000 YA

96. Denisovan DNA is found primarily in populations from:

- A) Europe
- B) Melanesia
- C) Africa
- D) North America

Answer: Melanesia

97. Modern human migration to America began around:

- A) 70,000 YA
- B) 41,000 YA
- C) 10,000 YA

D) 5 million YA

Answer: 10,000 YA

98. The youngest Neanderthal fossils date to approximately:

- A) 300,000 YA
- B) 41,000 YA
- C) 70,000 YA
- D) 28,000 YA

Answer: 28,000 YA

99. Which *Homo* group is associated with ritual burials?

- A) Early *Homo sapiens*
- B) *Homo erectus*
- C) Neanderthals
- D) Denisovans

Answer: Neanderthals

100. The age of the Liang Bua cave finds (Flores) for *H. floresiensis* is:

- A) 2.5 to 1.8 MYA
- B) 1.8 MYA to 300,000 YA
- C) 100,000 to 60,000 YA
- D) 130,000 to 28,000 YA

Answer: 100,000 to 60,000 YA

101. Which hominin species shows a prominent brow ridge and receding forehead?

- A) *Homo sapiens*
- B) *Homo habilis*
- C) *Homo erectus*
- D) *Homo neanderthalensis*

Answer: *Homo erectus*

102. The estimated brain size of *Homo floresiensis* is comparable to a:

- A) Chimpanzee

- B) Gorilla
- C) Modern human
- D) Australopithecus

Answer: Chimpanzee

103. A cranial capacity of 1000 cm³ is characteristic of which hominin?

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- A) *Homo habilis*
- B) *Homo floresiensis*
- C) *Homo erectus*
- D) *Australopithecus afarensis*

Answer: *Homo erectus*

104. The oldest *Homo* fossil is approximately how old?

- A) 2.5 MYA
- B) 1.8 MYA
- C) 0.5 MYA
- D) 130,000 YA

Answer: 2.5 MYA

105. What aspect of primate evolution saw slower change than brain size?

- A) Locomotion
- B) Genetics
- C) Dental arcade
- D) Tool use

Answer: Dental arcade

106. The species *Sahelanthropus tchadensis* is significant because it:

- A) Was found in South Africa
- B) Had a large brain
- C) Is the oldest potential hominin
- D) Used complex tools

Answer: Is the oldest potential hominin

107. Which feature is least associated with obligate bipedalism?

- A) Broadening of the pelvis
- B) Shortening of the lower limbs
- C) Lengthening of the upper limbs
- D) Formation of a lumbar curve

Answer: Lengthening of the upper limbs

108. Which group is considered the earliest hominin to exhibit a spinal curvature resembling modern humans?

- A) *Homo habilis*
- B) *Homo erectus*
- C) Early *Australopithecus*
- D) Later *Australopithecines*

Answer: Later *Australopithecines*

109. Footprints at Laetoli are primarily evidence of:

- A) Tool use
- B) Dietary shifts
- C) Bipedal locomotion
- D) Brain expansion

Answer: Bipedal locomotion

110. What is a key ecological role of Southern sea otters in kelp forests?

- A) Prey for sharks
- B) Shelters for fish
- C) Consumption of sea urchins
- D) Nutrient cycling

Answer: Consumption of sea urchins

111. The decline in Southern sea otter populations was primarily due to:

- A) Habitat loss
- B) Disease
- C) Commercial hunting
- D) Reduced food availability

Answer: Commercial hunting

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112. The vomeronasal organ in mammals is primarily used for detecting what?

- A) Sound waves
- B) Light intensity
- C) Airborne pheromones
- D) Ground vibrations

Answer: Airborne pheromones

113. Which sensory mechanism is most crucial for territorial marking in many mammals?

- A) Visual displays
- B) Olfactory cues
- C) Auditory calls
- D) Tactile communication

Answer: Olfactory cues

114. During hibernation, what physiological change most directly precedes a significant drop in body temperature?

- A) Increased activity
- B) Changes in diet
- C) Reduced heart rate
- D) Enhanced immune response

Answer: Reduced heart rate

115. What cardiovascular adaptation allows endotherms to maintain core body temperature in cold water?

- A) Reduced blood flow
- B) Countercurrent heat exchange
- C) Increased peripheral circulation
- D) Enhanced arterial elasticity

Answer: Countercurrent heat exchange

116. The presence of what fetal cardiovascular structure allows significant right to left shunting?

- A) Ductus venosus
- B) Ductus arteriosus
- C) Foramen ovale
- D) Umbilical vein

Answer: Foramen ovale

117. The lengthening of the intestine in herbivores primarily aids in the digestion of what?

- A) Protein
- B) Lipids
- C) Cellulose
- D) Carbohydrates

Answer: Cellulose

118. What specialized tooth feature distinguishes rodents from most other mammals?

- A) Single rooted molars
- B) Large canines
- C) Continuously growing incisors
- D) Shearing carnassials

Answer: Continuously growing incisors

119. What adaptation in herbivores promotes efficient plant material processing?

- A) Reduced enamel on teeth
- B) Simple, sharp molars
- C) Enlarged diastema
- D) Absence of canines

Answer: Enlarged diastema

120. What muscle action causes hair to stand erect?

- A) Smooth muscle contraction
- B) Skeletal muscle relaxation
- C) Arrector pili muscle contraction



D) Cardiac muscle innervation
Answer: Arrector pili muscle contraction

121. What physiological adaptation is directly linked to hair's insulation function?

- A) Perception of light
- B) Osmoregulation
- C) Temperature regulation
- D) Chemical sensation

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Answer: Temperature regulation

122. The presence of a single pair of upper incisors modified into tusks is characteristic of which order?

- A) Perissodactyla
- B) Sirenia
- C) Proboscidea
- D) Cetacea

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Answer: Proboscidea

123. The absence of teeth in adult baleen whales is characteristic of which order?

- A) Artiodactyla
- B) Perissodactyla
- C) Cetacea
- D) Primates

Answer: Cetacea

124. What internal structure is critical for distinguishing *Dimetrodon* from earlier reptiles?

- A) Secondary palate
- B) Diastema
- C) Rib cage
- D) Lumbar region

Answer: Secondary palate

125. Which group's evolutionary success is tied to specialized teeth for tearing and shearing?

- A) Mammals
- B) Synapsids
- C) Reptiles
- D) Therapsids

Answer: Therapsids

126. The defining characteristic distinguishing a whale from a manatee is its:

- A) Aquatic habitat
- B) Forelimb structure
- C) Skin adaptation
- D) Diet

Answer: Skin adaptation

127. Which order exclusively consists of endothermic species?

- A) Insectivora
- B) Artiodactyla
- C) Sirenia
- D) All mammals are endothermic

Answer: All mammals are endothermic

128. What is the primary reason the eutherian embryo is considered 'protected'?

- A) Maternal body temperature
- B) Absence of a pouch
- C) Intimate placental connection
- D) Internal development

Answer: Intimate placental connection

129. The similarity between the North American flying squirrel and the Australian sugar glider is primarily due to:



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- A) Shared recent ancestry
- B) Convergent evolution
- C) Geographic isolation
- D) Identical dietary niches

Answer: Convergent evolution

130. If an animal possesses a placenta but lays eggs, it would belong to which group?

- A) Eutheria
- B) Metatheria
- C) Prototheria
- D) None of the above

Answer: None of the above

131. The ancestral marsupial homeland was likely:

- A) Australia
- B) North America
- C) South America
- D) Asia

Answer: South America

132. Convergent evolution is best exemplified by:

- A) Lemur and Cuscus
- B) Wolf and Thylacine
- C) Mouse and Dasycercus
- D) Anteater and Myrmecobius

Answer: Wolf and Thylacine

133. Which group's young are born in an undeveloped stage?

- A) Monotremes
- B) Marsupials
- C) Eutherians
- D) All mammals

Answer: Marsupials

134. Which mammalian ear bone is NOT derived from jawbones?

- A) Incus
- B) Stapes
- C) Malleus
- D) Tympanic

Answer: Stapes

135. Mammalian hair's primary role in early mammals was likely:

- A) Camouflage
- B) Sensory
- C) Insulation
- D) Protection

Answer: Sensory

136. The relationship between metabolic rate and body weight in mammals is generally described as:

- A) Directly proportional
- B) Inversely proportional
- C) Not directly correlated
- D) Proportional to body weight raised to power of 0.75

Answer: Proportional to body weight raised to power of 0.75

137. What is most unusual about the vampire bat's feeding strategy?

- A) Consuming large quantities of insects
- B) Specializing in nectar and pollen
- C) Regurgitating blood for others
- D) Primarily hunting small mammals

Answer: Regurgitating blood for others

138. What adaptation allows sloths to remain inconspicuous to predators despite slow movement?

- A) Camouflage from algae in their fur

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- B) Rapid bursts of speed when threatened
- C) Emitting ultrasonic sounds
- D) Nocturnal activity exclusively

Answer: Camouflage from algae in their fur

139. Which group of mammals is characterized by a remarkably low metabolic rate relative to body size?

- A) Carnivores
- B) Rodents
- C) Herbivores
- D) Sloths

Answer: Sloths

140. What is the approximate maximum frequency of sounds emitted by some bats for echolocation?

- A) 20 kHz
- B) 50 kHz
- C) 100 kHz
- D) 200 kHz

Answer: 200 kHz

141. Which statement best describes the dentition of most mammals?

- A) All teeth are identical in shape and function.
- B) Teeth are continuously replaced throughout life.
- C) Teeth differentiate for various functions.
- D) Teeth are primarily for piercing and holding.

Answer: Teeth differentiate for various functions.

142. Which feeding specialization involves the consumption of both animal and plant matter?

- A) Herbivory
- B) Carnivory
- C) Omnivory
- D) Insectivory

Answer: Omnivory

143. What is the defining characteristic of a ruminant digestive system?

- A) A single chambered stomach.
- B) A four chambered stomach with a large rumen.
- C) A short intestinal tract.
- D) The absence of a cecum.

Answer: A four chambered stomach with a large rumen.

144. Which anatomical feature is least prominent in a short intestine, no cecum digestive system?

- A) Esophagus
- B) Stomach
- C) Large intestine
- D) Rumen

Answer: Rumen

145. Which term best describes the dentition of an animal that has uniform, peg-like teeth?

- A) Heterodont
- B) Bunodont
- C) Homodont
- D) Lophodont

Answer: Homodont

146. What is the primary reason for the longer lifespan of a permanent set of teeth in most mammals?

- A) Constant growth throughout life.
- B) Replacement throughout life.



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C) A complete set designed for an entire lifetime.

D) Specialized for continuous grinding.

Answer: A complete set designed for an entire lifetime.

147. Which statement best describes the functional significance of the brain's expansion in humans?

A) It solely relates to increased memory capacity.

B) It allows for improved physical coordination.

C) It supports more advanced cognitive functions.

D) It primarily enhances sensory perception.

Answer: It supports more advanced cognitive functions.

148. Which type of gland is least associated with the production of distinct odors in mammals?

A) Sebaceous

B) Eccrine

C) Apocrine

D) Scent

Answer: Eccrine

149. The enlargement of the olfactory bulb in many mammals primarily serves to:

A) Improve vision

B) Enhance tactile sensation

C) Increase olfactory sensitivity

D) Regulate internal organs

Answer: Increase olfactory sensitivity

150. A key difference between human milk and cow's milk regarding fat content

is:

A) Human milk has significantly less fat.

B) Cow's milk has more protein.

C) Human milk has a higher carbohydrate content.

D) Cow's milk has less water.

Answer: Human milk has significantly less fat.

151. In which region of the brain is the sense of smell primarily processed?

A) Cerebellum

B) Cerebral cortex

C) Olfactory bulb

D) Brainstem

Answer: Olfactory bulb

152. What percentage of the human genome is dedicated to olfactory receptor genes?

A) 1%

B) 3%

C) 5%

D) 10%

Answer: 3%

153. Beyond lactation, what other function is associated with mammary glands in some species?

A) Regulation of body temperature.

B) Secretion of digestive enzymes.

C) Pheromone production.

D) Lubrication of skin.

Answer: Pheromone production

154. Which gland primarily secretes an odorific substance for sexual attraction in many mammals?

A) Eccrine

- B) Apocrine
- C) Sebaceous
- D) Mammary

Answer: Apocrine

155. What distinguishes the 'gular' fat in female seals from typical sebaceous glands?

- A) Its role in milk production.
- B) Its continuous secretion.
- C) Its presence on the throat.
- D) Its association with hair follicles.

Answer: Its continuous secretion.

156. What is the primary reason for the increase in brain size of humans compared to other mammals?

- A) Enhanced motor skills.
- B) Dietary changes.
- C) Social interactions.
- D) Olfactory lobe reduction.

Answer: Dietary changes.

157. The growth of new antlers is initiated by increased levels of which hormone?

- A) Estrogen
- B) Testosterone
- C) Prolactin
- D) Growth hormone

Answer: Testosterone

158. The 'velvet' on growing antlers is primarily for:

- A) Protection from predators.
- B) Supplying blood to the growing bone.
- C) Aiding in thermoregulation.
- D) Attracting mates.

Answer: Supplying blood to the growing bone.

159. What explains the smaller teeth of *Homo ergaster* compared to earlier hominins?

- A) Omnivorous diet
- B) Larger brain size
- C) Reliance on tools
- D) Reduced sexual dimorphism

Answer: Reliance on tools

160. What indicated *Homo ergaster's* bipedalism from its skeleton?

- A) Large braincase
- B) Thick skull bones
- C) Short forelimbs
- D) Long leg joints

Answer: Long leg joints

161. Which hominin group shares evidence of interbreeding with Denisovans?

- A) *Homo habilis*
- B) Neanderthals
- C) *Homo ergaster*
- D) *Australopithecus afarensis*

Answer: Neanderthals

162. What evidence most directly supports early *A. afarensis* bipedalism?

- A) Skull size
- B) Jaw structure
- C) Laetoli footprints
- D) Arm length

Answer: Laetoli footprints

163. What explains the long arms of *Australopithecus afarensis*?

- A) Swimming adaptation
- B) Tool use
- C) Tree climbing

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D) Bipedal hunting

Answer: Tree climbing

164. Lucy's small brain size, relative to her body, was comparable to which modern object?

- A) Gorilla
- B) Softball
- C) Chimpanzee
- D) Human child

Answer: Softball

165. Early *Homo* species are characterized by what trend in brain size?

- A) Decrease
- B) Stagnation
- C) Increase
- D) Fluctuation

Answer: Increase

166. What percentage of genes do humans share with chimpanzees?

- A) 99%
- B) 98%
- C) 97%
- D) 96%

Answer: 99%

167. The skull opening where the spinal cord exits is called the:

- A) Foramen magnum

B) Occipital condyle

C) Cranial vault

D) Temporal fenestra

Answer: Foramen magnum

168. Which group diverged earliest from the common primate ancestor?

- A) New World monkeys
- B) Lemurs
- C) Tarsiers
- D) Gibbons

Answer: Lemurs

169. Which order of mammals is characterized by large, heavy-bodied herbivores with trunks?

- A) Sirenia
- B) Perissodactyla
- C) Proboscidea
- D) Artiodactyla

Answer: Proboscidea

170. If a mammal has a short gestation period followed by a long period of development in a pouch, it is most likely

- a:**
- A) Placental mammal
 - B) Monotreme
 - C) Marsupial
 - D) Primate

Answer: Marsupial

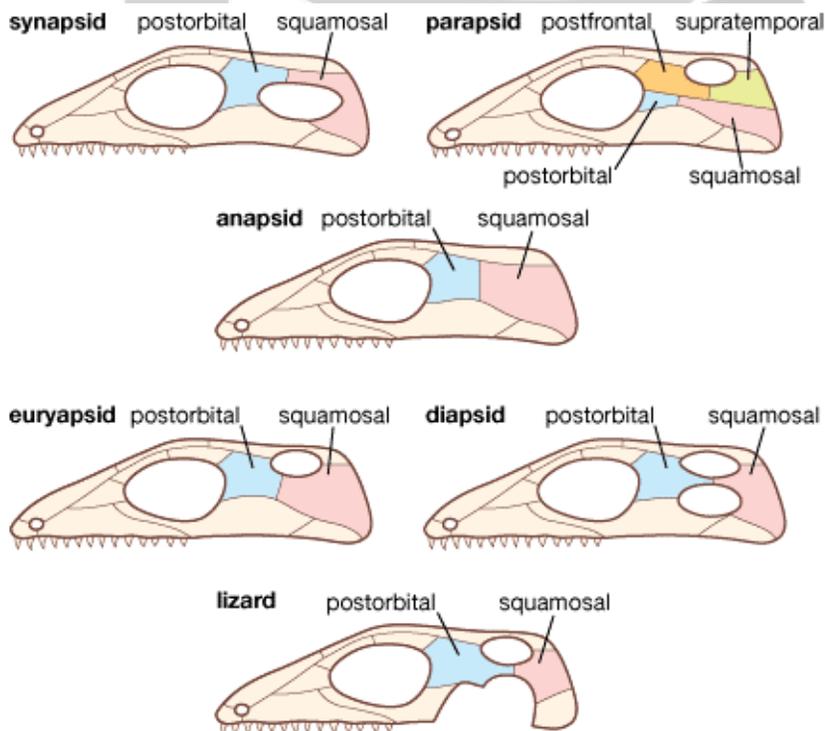
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REPTILES

Evolutionary Perspective

- **Amniotes** are a **monophyletic lineage** of tetrapod vertebrates defined by the **amniotic egg**.
- This egg contains **extraembryonic membranes** (amnion, chorion, allantois, yolk sac) that provide protection, gas exchange, waste storage, and nourishment, freeing reproduction from standing water.
- This adaptation was pivotal for the vertebrate colonization of terrestrial habitats.
- The lineage includes **Reptilia** (non-avian and avian/birds) and **Mammalia**.
- Early amniote evolution began in the late Carboniferous/early Permian periods.
- The ancestral amniote likely possessed an **anapsid skull** (no temporal openings).
- Two major lineages diverged from this ancestor:
 1. **Synapsida** (leading to mammals).
 2. **Diapsida** (leading to all reptiles, including birds).





Reptiles: One-liners

EVOLUTIONARY PERSPECTIVE & AMNIOTE ORIGINS

- The **amniotes** are a **monophyletic lineage** of tetrapod vertebrates defined by the **amniotic egg**.
- The amniotic egg contains **extraembryonic membranes** (amnion, chorion, allantois, yolk sac) that free embryonic development from dependence on standing water.
- This adaptation was pivotal for the complete vertebrate conquest of terrestrial habitats.
- Amniotes include **mammals** and **reptiles** (the latter encompassing turtles, squamates, tuataras, crocodylians, and birds).
- Amniotes evolved from small, **lizard-like ancestors** in the late Paleozoic era, most closely related to **anthracosaurs**.
- Early amniotes diversified rapidly during the Permian period into various ecological niches.
- The ancestral amniote skull condition was **anapsid** (lacking temporal openings).

CLADISTICS & MODERN CLASSIFICATION OF REPTILES

- Traditional Linnaean classification makes "**Reptilia**" a **paraphyletic group** because it excludes birds, which are descendants within the reptile lineage.
- **Cladistic analysis** requires that a taxon include all descendants of a common ancestor to be **monophyletic**.
- Birds share their most recent common ancestor with dinosaurs (archosaurs) within the diapsid reptile lineage.
- Therefore, a monophyletic **Reptilia** must include birds.
- The term "**nonavian reptiles**" is used informally for the paraphyletic group containing turtles, squamates, tuataras, and crocodylians.
- The clade **Sauropsida** is often used for the monophyletic group encompassing all reptiles, including birds.

SKULL MORPHOLOGY (TEMPORAL FENESTRATION)

- Skull structure, specifically the presence and number of **temporal fenestrae**, is a key diagnostic feature for classifying amniote lineages.

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Practice MCQs

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1. How many living orders of non-avian reptiles are recognized today?

- A) Three
- B) Four
- C) Five
- D) Six

Answer: Four

2. Which order of reptiles is characterized by a bony shell consisting of a carapace and plastron?

- A) Squamata
- B) Crocodylia
- C) Sphenodontia
- D) Testudines

Answer: Testudines

3. Lizards and snakes are classified under which reptilian order?

- A) Testudines
- B) Rhynchocephalia
- C) Crocodylia
- D) Squamata

Answer: Squamata

4. The closest living relatives of birds are the:

- A) Turtles
- B) Tuataras
- C) Crocodilians
- D) Lizards

Answer: Crocodilians

5. What is the primary nitrogenous waste excreted by most reptiles?

- A) Ammonia
- B) Urea
- C) Uric Acid

D) Allantoin

Answer: Uric Acid

6. A skull with no temporal openings behind the orbits is characteristic of:

- A) Synapsids
- B) Diapsids
- C) Anapsids
- D) Euryapsids

Answer: Anapsids

7. The dorsal part of a turtle's shell is called the:

- A) Plastron
- B) Scute
- C) Carapace
- D) Nuchal shield

Answer: Carapace

8. Which reptile is known as a "living fossil" and is found only in New Zealand?

- A) Komodo dragon
- B) Gila monster
- C) Tuatara
- D) Glass lizard

Answer: Tuatara

9. The specialized sensory organ used by snakes and lizards for chemoreception is the:

- A) Tympanum
- B) Lateral line
- C) Jacobson's organ
- D) Ampullae of Lorenzini

Answer: Jacobson's organ

10. Temperature-Dependent Sex Determination (TSD) is common in:



FISHES

INTRODUCTION AND DEFINITION

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In common usage, the term "fish" is often incorrectly applied to aquatic invertebrates such as jellyfish or crayfish. Biologically, a **fish** is defined as an **aquatic vertebrate with gills, appendages in the form of fins, and usually skin with dermal scales**. This is a **convenient term, not a taxonomic unit**, as fishes are **paraphyletic**. The ancestor of land vertebrates (tetrapods) is found within a group of fishes (sarcopterygians). Thus, a more precise definition is **all vertebrates that are not tetrapods**.

Fishes are the oldest and most diverse vertebrate group, with **over 34,000 described species** occupying virtually every aquatic niche—from high-altitude streams to the deep sea abyss. Their streamlined bodies, gills, fins, and advanced sensory systems represent exquisite adaptations to life in a dense, aqueous medium. The study of fishes is called **Ichthyology**.

Note on Plural: "Fish" refers to one or more individuals of the same species; "Fishes" refers to more than one species.

EVOLUTIONARY PERSPECTIVE AND PHYLOGENY

The **subphylum Craniata** (animals with a skull) is at least **500 million years old**. The earliest vertebrate fossils, such as the **mylokunmingiids** (530-520 mya), were small, lancelet-shaped craniates with protective braincases and fish-like muscle blocks, suggesting they were active, visual predators.

Water covers 73% of Earth's surface. It is a buoyant, thermally stable medium, but life in water presents distinct physiological challenges related to respiration, osmoregulation, and locomotion. Fishes represent the **ancestral group to all other vertebrates (Vertebrata)**, and their adaptive radiation, beginning over 500 mya, demonstrates remarkable diversification.

Key Milestones in Early Vertebrate Evolution:

- **Conodonts (~510 mya):** Eel-like animals with tooth-like **denticles** made of **hydroxyapatite**, a bone mineral. These may represent the first evolutionary appearance of bone.



Fishes: One-liners

Introduction and Definition

- Biologically, a **fish** is an **aquatic vertebrate with gills, appendages as fins, and usually skin with dermal scales.**
- The term "fish" is a **convenient, non-taxonomic term** as fishes are a **paraphyletic group.**
- A more precise definition is **all vertebrates that are not tetrapods.**
- Fishes are the oldest and most diverse vertebrate group, with **over 34,000 described species.**
- The study of fishes is called **Ichthyology.**
- "**Fish**" refers to multiple individuals of the same species; "**Fishes**" refers to multiple species.

Evolutionary Perspective

- The **subphylum Craniata** is at least **500 million years old.**
- The oldest known craniate fossils are **mylokunmingiids (530-520 mya)**, small, lancelet-shaped predators with braincases and fish-like muscle.
- **Conodonts (~510 mya)** were eel-like animals with tooth-like **denticles** made of **hydroxyapatite**, possibly representing the first bone.
- **Ostracoderms** were extinct, jawless, bottom-dwelling fishes with heavy **bony armor (dermal plates)**; most were filter-feeders and lacked paired fins.
- **Placoderms** were extinct, heavily armored, **jawed fishes with paired appendages.**
- Key evolutionary innovations include the **braincase, bone, jaws (from anterior pharyngeal arches), and paired appendages.**
- Water covers **73% of Earth's surface** and is a buoyant, thermally stable medium that presents physiological challenges.

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Practice MCQs

1. Which subclass of bony fishes includes lungfishes and coelacanth?

- A) Actinopterygii
- B) Cephalaspidomorphi
- C) Chondrichthyes
- D) Sarcopterygii

Answer: Sarcopterygii

2. In elasmobranchs, urea is primarily produced in which organ?

- A) Gills
- B) Skin
- C) Liver
- D) Kidneys

Answer: Liver

3. An example of a catadromous fish is:

- A) Salmon
- B) Fresh water eel (Anguilla)
- C) Lamprey
- D) Catfish

Answer: Fresh water eel (Anguilla)

4. Which of the following fishes exhibits viviparity?

- A) Electric eel
- B) Trout
- C) Mice
- D) Hammerhead Shark

Answer: Hammerhead Shark

5. The three living genera of lungfishes are:

A) Neoceratodus, Protopterus, Lepidosiren

B) Neoceratodus, Protopterus, Latimeria

C) Neoceratodus, Amia, Lepidosiren

D) Neoceratodus, Protopterus, Polypterus

Answer: Neoceratodus, Protopterus, Lepidosiren

6. Conodont fossils date back approximately how many million years?

A) 450 million years

B) 510 million years

C) 620 million years

D) 830 million years

Answer: 510 million years

7. Ostracoderms were typically about how long?

A) 5 cm

B) 15 cm

C) 25 cm

D) 15 m

Answer: 15 cm

8. Male Brazilian Catfish brood their embryos in their:

A) Stomach

B) Ventral Pouches

C) Nests

D) Enlarged lower lip

Answer: Enlarged lower lip

9. Which of the following is a true fish?



Phylum Echinodermata

4. Phylum Echinodermata

Introduction

Echinodermata is a **wholly marine** phylum of **triploblastic, coelomate deuterostomes**. The name derives from Greek: *echinos* (spiny) + *derma* (skin), referring to their characteristic **calcareous endoskeleton** often bearing spines. They are a classic "**noble group especially designed to puzzle the zoologist**" due to their unique combination of features not found in any other animal group. Adults exhibit **pentaradial symmetry**, a derived condition from a bilateral ancestor, as confirmed by their **bilateral larval stages** and fossil record. They occupy diverse **benthic habitats**, from intertidal zones to abyssal depths, and play crucial ecological roles.

General Diagnostic Characteristics

The phylum is defined by a suite of unique characteristics:

1. **Pentaradial Symmetry:** The adult body is organized in **five parts (or multiples thereof)** around a central oral-aboral axis.
2. **Water-Vascular System (Ambulacral System):** A unique, **coelom-derived hydraulic system** used for locomotion, feeding, attachment, and respiration. It terminates externally in **tube feet (podia)**.
3. **Endoskeleton:** Composed of **calcareous ossicles** (plates or spicules) of calcium carbonate (calcite) with a distinctive mesh-like **stereom** structure. The ossicles may be articulated or fused to form a rigid **test**.
4. **Mutable Collagenous Tissue (Catch Collagen):** Specialized connective tissue under neural control that can **rapidly change stiffness**, allowing energy-efficient posture maintenance, autotomy (self-amputation), and protection.
5. **Dermal Branchiae (Papulae):** Thin-walled, finger-like extensions of the body wall (skin gills) used for respiration in some classes.
6. **Pedicellariae:** Minute, pincer-like structures on the body surface, often stalked, used for **defense and cleaning**.

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Phylum Echinodermata: One-Liners

INTRODUCTION TO ECHINODERMS

- The phylum **Echinodermata** is a group of **exclusively marine, triploblastic, coelomate deuterostomes**.
- The name derives from Greek: *echinos* (spiny) + *derma* (skin), referring to their often spiny **calcareous endoskeleton**.
- Adults exhibit **pentaradial symmetry** (body parts in fives or multiples), a condition **derived from bilateral ancestors**.
- Larvae are **bilaterally symmetrical**, providing key evidence for their evolutionary origin from bilateral animals.
- They possess a unique **water-vascular system (ambulacral system)** used for locomotion, feeding, and respiration.
- Echinoderms are described as a "**noble group especially designed to puzzle the zoologist**" due to their unique combination of features.
- They occupy diverse **benthic habitats**, from intertidal zones to abyssal depths.

GENERAL / DIAGNOSTIC CHARACTERISTICS OF PHYLUM ECHINODERMATA

- **Habitat:** Exclusively marine, found at all ocean depths.
- **Symmetry:** **Pentaradial symmetry** in adults; **bilateral symmetry** in larvae.
- **Germ Layers & Coelom:** **Triploblastic** with a true, **enterocoelous coelom**.
- **Level of Organization:** Organ-system level.
- **Endoskeleton:** Composed of **calcareous ossicles** (plates or spicules) made of calcium carbonate (calcite), often with spines.
- **Water-Vascular System:** A unique, **coelom-derived hydraulic system** ending in **tube feet (podia)**.

Practice MCQs

1. Which of the following is a wholly marine phylum?

- A) Mollusca
- B) Arthropoda
- C) Echinodermata
- D) Annelida

Answer: Echinodermata

2. Adult echinoderms exhibit which type of symmetry?

- A) Bilateral
- B) Spherical
- C) Pentaradial
- D) Asymmetrical

Answer: Pentaradial

3. The name Echinodermata is derived from Greek words meaning what?

- A) Star form
- B) Spiny skin
- C) Five arms
- D) Water tube

Answer: Spiny skin

4. What is the most distinctive feature of the phylum Echinodermata?

- A) Notochord
- B) Water-vascular system
- C) Mantle
- D) Radula

Answer: Water-vascular system

5. Echinoderm larvae are characteristically what?

- A) Pentaradial
- B) Asymmetrical

C) Bilaterally symmetrical

D) Radially symmetrical

Answer: Bilaterally symmetrical

6. The calcareous endoskeleton of echinoderms is composed of what?

- A) Chitin
- B) Silica
- C) Calcite ossicles
- D) Cartilage

Answer: Calcite ossicles

7. Which system in echinoderms is used for locomotion and feeding?

- A) Hemal system
- B) Ambulacral system
- C) Nervous system
- D) Excretory system

Answer: Ambulacral system

8. Pedicellariae in echinoderms are primarily used for what?

- A) Respiration
- B) Digestion
- C) Defense and cleaning
- D) Reproduction

Answer: Defense and cleaning

9. The specialized connective tissue in echinoderms that can change stiffness is called what?

- A) Cartilage
- B) Mutable collagenous tissue
- C) Chitin
- D) Epidermis

Answer: Mutable collagenous tissue



Chapter 5

Phylum Mollusca

5. Phylum Mollusca

Evolutionary Perspective and Success

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Phylum Mollusca is a highly successful, species-rich phylum with nearly 100,000 described living species—more than twice the number of vertebrate species. Its success is attributed to **extensive adaptive radiation**, resulting in adaptation to nearly every habitat on Earth: marine, freshwater, and terrestrial.

Molluscs are **triploblastic, coelomate, protostomate** organisms exhibiting **spiral cleavage** and **schizocoelous coelom formation**. They are placed within the **Lophotrochozoa**, a major protostome clade, though their precise relationships with groups like Annelida, Brachiopoda, and Entoprocta remain a subject of ongoing phylogenetic research.

Evolutionary Trends:

- The vast majority of species belong to **Gastropoda** (snails, slugs) and **Bivalvia** (clams, mussels).
- Class **Cephalopoda** (octopuses, squid) has dramatically declined from an estimated 9,000 fossil species to about 700 living species. Hypotheses for this decline include **competition with evolving vertebrate predators** (bony fishes) and random evolutionary events.
- The phylum is ancient, with fossils over 550 million years old. Some evidence suggests the Ediacaran fossil *Kimberella* may be an early mollusc.

Theories on Coelom Origin (Context):

1. **Schizocoel Hypothesis:** The coelom arose from a splitting of mesodermal bands (as in protostomes), implying triploblastic acoelomates (e.g., flatworms) as forerunners.
2. **Enterocoel Hypothesis:** The coelom arose as outpocketings from the primitive gut (as in deuterostomes), implying formation from a diploblastic ancestor. Current understanding suggests the true origin may involve multiple independent evolutionary events.

General Molluscan Body Plan and Characteristics



Phylum Mollusca: One-liners

Evolutionary Perspective and Success

- The **Phylum Mollusca** is one of the largest and most successful animal phyla, second only to Arthropoda in number of described species.
- It is highly **species-rich**, with nearly 100,000 described living species—more than twice the number of vertebrate species.
- Its success is attributed to **extensive adaptive radiation**, resulting in adaptation to nearly every habitat on Earth: marine, freshwater, and terrestrial.
- Molluscs are **triploblastic, coelomate, protostomate** organisms.
- They exhibit **spiral cleavage** and **schizocoelous coelom formation**.
- Molluscs are placed within the **Lophotrochozoa**, a major protostome clade.
- The phylum is ancient, with fossils over **550 million years old**; the Ediacaran fossil *Kimberella* may be an early mollusc.
- The vast majority of living mollusc species belong to **Gastropoda** (snails, slugs) and **Bivalvia** (clams, mussels).
- Class **Cephalopoda** (octopuses, squid) has dramatically declined from an estimated 9,000 fossil species to about **700 living species**.
- Hypotheses for cephalopod decline include **competition with evolving vertebrate predators** (bony fishes) and random evolutionary events.

General Molluscan Body Plan and Characteristics

- All molluscs share a fundamental body plan despite incredible diversity in size and form.
- The body is divided into two main regions: the **head-foot** (anterior, with mouth, sensory organs, and muscular foot) and the **visceral mass** (dorsal, containing most internal organs).
- A specialized epidermal tissue called the **mantle** enfolds the visceral mass and secretes the shell.

Practice MCQs

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1. What is the approximate number of described living species in Phylum Mollusca?

- A) 50,000
- B) 75,000
- C) 100,000
- D) 125,000

Answer: 100,000

2. Molluscs are classified within which major protostome clade?

- A) Ecdysozoa
- B) Deuterostomia
- C) Lophotrochozoa
- D) Radiata

Answer: Lophotrochozoa

3. Which class contains the largest number of molluscan species?

- A) Bivalvia
- B) Cephalopoda
- C) Gastropoda
- D) Polyplacophora

Answer: Gastropoda

4. What hypothesis proposes that the coelom arose from splitting of mesodermal bands?

- A) Enterocoel hypothesis
- B) Schizocoel hypothesis
- C) Pseudocoel hypothesis
- D) Hydrostatic hypothesis

Answer: Schizocoel hypothesis

5. Which structure is secreted by the mantle and typically tri-layered?

- A) Radula
- B) Shell
- C) Odontophore
- D) Operculum

Answer: Shell

6. In molluscs, the space between the mantle and body wall that functions in respiration and excretion is called the:

- A) Coelom
- B) Mantle cavity
- C) Visceral mass
- D) Hemocoel

Answer: Mantle cavity

7. The unique rasping feeding organ found in most molluscs is the:

- A) Ctenidium
- B) Radula
- C) Siphon
- D) Captacula

Answer: Radula

8. Which layer of the molluscan shell is the outer organic layer?

- A) Prismatic layer
- B) Nacreous layer
- C) Periostracum
- D) Conchiolin layer

Answer: Periostracum

9. Most molluscs possess which type of circulatory system?

- A) Closed
- B) Open
- C) Lacunar



Biological Membranes

6. Biological Membranes

Introduction

Biological membranes are dynamic, selectively permeable barriers that form the boundary of all cells (**plasma membrane**) and internal organelles. They are fundamental to cellular life, enabling:

- **Compartmentalization** and maintenance of distinct internal environments.
- **Regulation of molecular traffic** in and out of the cell/organelle.
- **Communication** via signal transduction.
- **Surface for biochemical reactions** (e.g., electron transport chain, photosynthesis).

Evolutionary Significance: The emergence of lipid membranes was a critical step in the origin of life, allowing protocells to maintain chemical gradients and perform metabolic functions.

Membrane Structure: The Fluid Mosaic Model

Historical Development of Membrane Models

- **Danielli-Davson Sandwich Model (1935):** Proposed a lipid bilayer coated on both sides by a layer of globular proteins. Incorrect—proteins were shown to be embedded.
- **Singer-Nicolson Fluid Mosaic Model (1972):** The accepted model describing the membrane as a **fluid lipid bilayer** with a **mosaic of proteins** embedded or attached.

Key Principles of the Fluid Mosaic Model

1. **Lipid Bilayer as a Fluid Matrix:**
 - Phospholipids move laterally within their own leaflet (~10⁷ times per second).
 - **Flip-flop** (transverse movement between leaflets) is slow (half-life of weeks) and requires enzymes (**flippases, floppases**).
2. **Protein Mosaic:**
 - Proteins are embedded (**integral**) or peripherally attached.

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Biological Membranes: One-liner

- **Biological membranes** are dynamic, selectively permeable barriers that form the boundaries of all cells and internal organelles.
- They are fundamental to cellular life, enabling **compartmentalization**, regulation of molecular traffic, communication, and providing a surface for biochemical reactions.
- The evolution of lipid membranes was a critical step in the origin of life, allowing protocells to maintain chemical gradients and perform metabolism.

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Membrane Structure: The Fluid Mosaic Model

- The **Fluid Mosaic Model**, proposed by Singer and Nicolson in 1972, is the accepted model of membrane structure.
- It describes the membrane as a **fluid lipid bilayer** with a **mosaic of proteins** embedded or attached.
- The model succeeded earlier incorrect models like the **Danielli-Davson sandwich model**.
- Key principles include the **lipid bilayer as a fluid matrix**, **protein mosaic** with lateral mobility, **membrane asymmetry**, and **selective permeability**.
- **Freeze-fracture electron microscopy** reveals intramembrane particles (integral proteins) within the bilayer plane.
- **Fluorescence Recovery After Photobleaching (FRAP)** demonstrates the lateral mobility of lipids and proteins.
- Membrane phospholipids can move laterally within their leaflet very rapidly ($\sim 10^7$ times per second).
- **Flip-flop** (transverse movement between leaflets) is rare, slow (half-life of weeks), and requires enzymes like **flippases** and **floppases**.
- Proteins exhibit **lateral mobility** but can be restricted by the cytoskeleton or lipid domains.

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Membrane Lipids

Practice MCQs

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1. What is the primary function of the plasma membrane in a cell?

- A) ATP synthesis
- B) Protein synthesis
- C) Compartmentalization and regulation of molecular traffic
- D) DNA replication

Answer: Compartmentalization and regulation of molecular traffic

2. Who proposed the Fluid Mosaic Model of membrane structure?

- A) Watson and Crick
- B) Danielli and Davson
- C) Singer and Nicolson
- D) Frye and Edidin

Answer: Singer and Nicolson

3. Which type of lipid acts as a 'fluidity buffer' in animal cell membranes?

- A) Phosphatidylcholine
- B) Cholesterol
- C) Sphingomyelin
- D) Phosphatidylserine

Answer: Cholesterol

4. What is the term for the movement of a phospholipid from one leaflet to the opposite leaflet of the bilayer?

- A) Lateral diffusion
- B) Rotation
- C) Flip-flop
- D) Swaying

Answer: Flip-flop

5. Which membrane proteins are firmly embedded in the hydrophobic core and require detergents for extraction?

- A) Peripheral proteins
- B) Lipid-anchored proteins
- C) Integral proteins
- D) Glycoproteins

Answer: Integral proteins

6. The carbohydrate-rich coating on the extracellular surface of the plasma membrane is called the:

- A) Cell wall
- B) Glycocalyx
- C) Cortex
- D) Capsule

Answer: Glycocalyx

7. Which factor increases membrane fluidity?

- A) Long, saturated fatty acid chains
- B) High cholesterol content at high temperatures
- C) Short, unsaturated fatty acid chains
- D) Low temperature

Answer: Short, unsaturated fatty acid chains

8. What is the primary role of aquaporins?

- A) Active transport of ions
- B) Facilitated diffusion of glucose
- C) Passive transport of water
- D) Endocytosis

Answer: Passive transport of water



Chapter 7

Evolution

FUNDAMENTAL CONCEPTS & HISTORICAL CONTEXT

A. Core Definitions

- **Evolution:** Descent with modification; change in allele frequencies in populations over time.
- **Organic Evolution:** Biological evolution through genetic change and natural selection.
- **Microevolution:** Change in allele frequencies within a population over generations.
- **Macroevolution:** Large-scale evolutionary changes (speciation, extinction) over geological time.
- **Common Descent:** All organisms share a common ancestor.

B. Two Competing Historical Views

Special Creation vs. Evolution

Aspect	Special Creation	Evolution
Origin of Species	Independently created	Descended from common ancestors
Change Over Time	Fixed, immutable	Continuously changing
Mechanism	Divine intervention	Natural processes (selection, drift, etc.)
Evidence Base	Religious texts	Multiple scientific disciplines
Scientific Status	Non-testable, non-scientific	Well-supported scientific theory

HISTORICAL DEVELOPMENT OF EVOLUTIONARY THOUGHT

A. Pre-Darwinian Era

Period/Concept	Key Figures	Main Ideas	Contributions & Limitations
Fixity of Species	Aristotle, Linnaeus	Species immutable; Scala Naturae (Great Chain of Being)	Organized biodiversity but denied change

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7. Evolution



Evolution: One-Liners

Core Definitions & Concepts

- **Evolution** is defined as **descent with modification** or a change in **allele frequencies** in a population over time.
- **Organic Evolution** refers to biological evolution through **genetic change** and **natural selection**.
- **Microevolution** is a change in **allele frequencies within a population** over generations.
- **Macroevolution** refers to large-scale evolutionary changes like **speciation** and **extinction** over geological time.
- **Common Descent** is the principle that all organisms share a **common ancestor**.

Historical Theories of Evolution

1. Lamarckism (Jean-Baptiste Lamarck, 1809)

- Lamarck proposed the first comprehensive evolutionary theory based on **use and disuse** of organs and the **inheritance of acquired characteristics**.
- He believed that organs used extensively become **larger and stronger**, while disused organs **deteriorate and disappear**.
- A classic example is the **giraffe's long neck**, which Lamarck explained as a result of generations stretching to reach leaves.
- His theory is considered **transformational**, suggesting individuals change during their lifetime and pass these changes to offspring.
- **Weismann's Germplasm Theory (1892)** disproved Lamarckism by distinguishing **heritable germ cells** from **non-heritable somatic cells**.
- **Experimental evidence** against Lamarckism includes Weismann's tail-cutting experiment in mice over 80 generations, which produced no tailless offspring.
- The theory is rejected because **acquired traits are not genetic** and cannot alter the **genotype**.

2. Darwinism (Charles Darwin & Alfred Russel Wallace, 1859)

- Darwin's theory is based on observations from his **HMS Beagle voyage (1831-1836)**, particularly in the **Galápagos Islands**.

Practice MCQs

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1. What is the primary mechanism of evolution according to Darwin's theory?

- A) Inheritance of acquired characteristics
- B) Use and disuse of organs
- C) Natural selection
- D) Genetic drift

Answer: Natural selection

2. Which scientist first proposed a comprehensive theory of evolution based on the inheritance of acquired characteristics?

- A) Charles Darwin
- B) Alfred Russel Wallace
- C) Jean-Baptiste Lamarck
- D) Gregor Mendel

Answer: Jean-Baptiste Lamarck

3. Structures that are similar in structure but different in function, indicating common ancestry, are called:

- A) Analogous structures
- B) Vestigial structures
- C) Homologous structures
- D) Convergent structures

Answer: Homologous structures

4. Which of the following is a condition required for Hardy-Weinberg equilibrium?

- A) Non-random mating
- B) Small population size
- C) No gene flow
- D) Presence of natural selection

Answer: No gene flow

5. The wing of a bird and the wing of an insect are examples of:

- A) Homologous structures
- B) Vestigial structures
- C) Analogous structures
- D) Divergent evolution

Answer: Analogous structures

6. What does the Hardy-Weinberg equation $p^2 + 2pq + q^2 = 1$ represent?

- A) Phenotype frequencies
- B) Allele frequencies
- C) Genotype frequencies
- D) Mutation rates

Answer: Genotype frequencies

7. Which of the following provides the strongest evidence for common ancestry among all aerobic organisms?

- A) Presence of hemoglobin
- B) Presence of chlorophyll
- C) Presence of cytochrome c
- D) Presence of cellulose

Answer: Presence of cytochrome c

8. According to Lamarck, the long neck of the giraffe evolved due to:

- A) Natural selection for longer necks
- B) Genetic drift in a small population
- C) Inheritance of characteristics acquired through stretching
- D) Mutation in the neck vertebrae gene

Answer: Inheritance of characteristics acquired through stretching

9. What is the ultimate source of new genetic variation in a population?

- A) Genetic drift
- B) Gene flow
- C) Mutation



Chapter 8

VARIATION AND GENETICS

Introduction to Genetics

- **Genetics** is the scientific study of **heredity** (transmission of traits from parents to offspring) and **variation** (differences among individuals).
- **Inheritance**, the process encompassing both heredity and variation, is crucial for evolution and speciation.
- Since **genes** control heredity and variation, genetics is fundamentally the study of genes.
- **Molecular Basis:** A gene is a specific DNA sequence that codes for a polypeptide via **transcription** (DNA to mRNA in nucleus) and **translation** (mRNA to protein at ribosome).

Fundamental Genetic Concepts

- **Gene** – Basic unit of heredity; a segment of DNA coding for a polypeptide/trait. (*Example: The gene for flower color in peas.*)
- **Allele** – Alternative form of a gene at the same locus. (*Example: The alleles for purple (P) or white (p) flowers.*)
- **Locus** – Specific position of a gene on a chromosome.
- **Genotype** – Genetic makeup of an individual. (*Example: PP, Pp, or pp.*)
- **Phenotype** – Observable expression of a trait. (*Example: Purple or white flowers.*)
- **Homozygous** – Having two identical alleles for a gene. (*Example: PP or pp.*)
- **Heterozygous** – Having two different alleles for a gene. (*Example: Pp.*)
- **Hemizygous** – Having only one allele for a gene (e.g., X-linked genes in males).
- **Wild type** – Most common phenotype in natural populations.
- **Mutant phenotype** – Trait alternative to wild type.
- **Gene Pool** – All alleles present in a breeding population at a given time.

Mendelian Principles & Crosses

- **Law of Segregation (Principle of Segregation)** – Alleles separate during gamete formation. (*Mendel's pea plant experiments.*)

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8. Variation & Genetics



Variation & Genetics: One Liners

BASIC GENETIC TERMINOLOGY

- **Genetics** is the scientific study of **heredity** (transmission of characteristics) and **variation** (differences among individuals).
- **Gene**: The **basic unit of heredity**; a specific DNA sequence that codes for a functional product (usually a protein).
- **Locus**: The specific **physical location of a gene** on a chromosome.
- **Allele**: **Alternative forms of the same gene** that occupy corresponding loci on homologous chromosomes.
- **Gene Pool**: The **complete set of all alleles** present in all individuals of a breeding population at a given time.
- **Phenotype**: The **observable characteristics** of an organism, resulting from genotype and environment.
- **Genotype**: The **genetic constitution** of an organism for a particular trait; the specific combination of alleles.
- **Homozygous**: A condition where **both alleles at a given locus are identical** (e.g., TT or tt).
- **Heterozygous**: A condition where **the two alleles at a given locus are different** (e.g., Tt).
- **Dominant Allele**: An allele that **expresses its phenotype even in a heterozygous state**.
- **Recessive Allele**: An allele whose **phenotypic effect is masked by a dominant allele** and is only expressed when homozygous.
- **True-breeding (Pure-breeding)**: Individuals that, upon self-fertilization, produce offspring identical to themselves for a given trait over generations.
- **Wild Type**: The normal gene or phenotype found in a natural population.
- **Mutant**: An organism or gene with a changed DNA sequence.
- **Carrier**: A heterozygous individual carrying a recessive allele for a genetic disorder without expressing it.
- **Test Cross**: A cross between an individual with a dominant phenotype (unknown genotype) and a homozygous recessive individual to determine the unknown genotype.

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8. Variation & Genetics



Practice MCQs

- 1. What is the basic unit of heredity that codes for a functional product like a protein?**
A) Allele
B) Locus
C) Gene
D) Chromosome
Answer: Gene
- 2. The specific physical location of a gene on a chromosome is called its:**
A) Allele
B) Genome
C) Locus
D) Phenotype
Answer: Locus
- 3. Alternative forms of the same gene that occupy corresponding loci on homologous chromosomes are known as:**
A) Genotypes
B) Phenotypes
C) Alleles
D) Linkage groups
Answer: Alleles
- 4. The complete set of all alleles present in all individuals of a breeding population at a given time is the:**
A) Genome
B) Karyotype
C) Gene pool
D) Genotype frequency
Answer: Gene pool
- 5. The genetic constitution of an organism for a particular trait is its:**
A) Phenotype
B) Allele
C) Genotype
D) Karyotype
Answer: Genotype
- 6. The observable characteristics resulting from genotype and environment define the:**
A) Genotype
B) Allele
C) Phenotype
D) Locus
Answer: Phenotype
- 7. An individual with two identical alleles at a given locus is said to be:**
A) Heterozygous
B) Hemizygous
C) Homozygous
D) Homogametic
Answer: Homozygous
- 8. An allele that expresses its phenotypic effect even in a heterozygous state is termed:**
A) Recessive
B) Codominant
C) Dominant
D) Incompletely dominant
Answer: Dominant
- 9. Who is recognized as the founder of classical genetics?**
A) Charles Darwin



Chapter 9

ECOLOGY & ECOSYSTEMS

FOUNDATIONAL CONCEPTS

Core Definitions

- **Ecology:** Scientific study of interactions between organisms and their biotic and abiotic environment. Coined by Ernst Haeckel from Greek *oikos* (household) + *logy* (study).
- **Ecosystem:** Dynamic complex of biotic communities and their abiotic environment interacting as a functional unit through energy flows and biogeochemical cycles. Coined by Arthur Tansley (1935) to emphasize interconnectedness.
- **Environment:** All abiotic (non-living: climate, soil, water) and biotic (living: plants, animals, microbes) factors influencing an organism.
- **Biosphere:** Thin, life-supporting layer of Earth where all ecosystems exist.

Levels of Ecological Organization

1. **Organism:** Individual living entity.
2. **Population:** Group of interbreeding individuals of the same species in a specific area.
3. **Community:** Assemblage of different populations living and interacting in a defined area.
4. **Ecosystem:** Community + physical environment, interacting through nutrient cycling and energy flow.
5. **Biome:** Large geographical region with distinct climate and characteristic community.
6. **Biosphere:** All ecosystems collectively.

Key Ecological Concepts

- **Habitat:** Physical space where an organism lives.
- **Ecological Niche:** Multidimensional concept describing the functional role of a species (resources used, conditions tolerated).
 - *Fundamental Niche:* Full range theoretically usable.
 - *Realized Niche:* Actual range occupied due to interspecific interactions.
- **Metapopulation:** Set of local populations linked by immigration/emigration. The **Glanville fritillary butterfly** in Finland exists as scattered local populations in dry meadows, connected by occasional migration.

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Ecology & Ecosystems: One-Liners

Foundational Concepts & Definitions

- **Ecology** is the scientific study of interactions between organisms and their **biotic** (living) and **abiotic** (non-living) environment.
- The term **ecology** was coined by the German zoologist **Ernst Haeckel**.
- **Environment** encompasses all abiotic (climate, soil, water) and biotic (other organisms) factors influencing an organism.
- An **ecosystem** is a dynamic complex of biotic communities and their abiotic environment interacting as a functional unit through energy flow and nutrient cycling.
- The term **ecosystem** was coined by British ecologist **Arthur Tansley (1935)**.
- The **Biosphere** is the thin, life-supporting layer of Earth (from ocean depths to the atmosphere) where all ecosystems exist.
- Ecological organization follows a hierarchy: **Organism** → **Population** → **Community** → **Ecosystem** → **Biome** → **Biosphere**.
- A **species** is a group of organisms that can interbreed freely in nature and produce fertile offspring.
- A **population** is a group of interbreeding individuals of the same species living in a specific geographical area at the same time.
- A **community** is an assemblage of different populations living and interacting in a defined area.
- A **biome** is a large geographical region with a distinct climate and characteristic community (e.g., rainforest, desert).
- **Habitat** is the physical space or location where an organism lives (its "address").
- **Ecological Niche** is the multidimensional functional role of a species, including resources used and conditions tolerated (its "profession").
- The **Fundamental Niche** is the full range of conditions and resources a species could theoretically use.
- The **Realized Niche** is the actual range a species occupies, often restricted by competition or other interactions.

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9. Ecology and Ecosystems

Practice MCQs

1. Who coined the term "ecology"?

- A) Arthur Tansley
- B) Ernst Haeckel
- C) Charles Darwin
- D) Joseph Grinnell

Answer: Ernst Haeckel

2. The term "ecosystem" was coined by:

- A) Ernst Haeckel
- B) Robert Paine
- C) Arthur Tansley
- D) Eugene Odum

Answer: Arthur Tansley

3. All the ecosystems on Earth collectively form the:

- A) Community
- B) Biome
- C) Biosphere
- D) Hydrosphere

Answer: Biosphere

4. A group of interbreeding individuals of the same species in a specific area is a:

- A) Community
- B) Population
- C) Guild
- D) Ecosystem

Answer: Population

5. The physical space where an organism lives is its:

- A) Niche
- B) Territory
- C) Habitat
- D) Biome

Answer: Habitat

6. The full range of conditions and resources a species could theoretically use defines its:

- A) Realized Niche
- B) Fundamental Niche
- C) Trophic Niche
- D) Spatial Niche

Answer: Fundamental Niche

7. A set of local populations linked by immigration and emigration is a:

- A) Community
- B) Metapopulation
- C) Species Complex
- D) Deme

Answer: Metapopulation

8. A close, long-term biological interaction between two different species is called:

- A) Competition
- B) Symbiosis
- C) Predation
- D) Commensalism

Answer: Symbiosis

9. Which of the following is an abiotic component of an ecosystem?

- A) Producer
- B) Herbivore
- C) Soil Texture
- D) Decomposer

Answer: Soil Texture

10. Liebig's Law of the Minimum states that productivity is limited by the:

- A) Most abundant resource
- B) Resource scarcest relative to needs
- C) Temperature
- D) Light availability

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9. Ecology and Ecosystems



ENDOCRINE SYSTEM

Introduction to Chemical Coordination

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The **endocrine system** is a major **regulatory and communication network** in animals, working in close coordination with the nervous system to maintain **homeostasis**. It consists of **ductless glands** and specialized cells that secrete **hormones** directly into the bloodstream or extracellular fluid. These chemical messengers travel to distant **target cells** possessing specific **receptors**, eliciting slow but prolonged responses. This system is crucial for regulating growth, development, metabolism, reproduction, and adaptation to environmental changes.

Hormones: Nature and Function

Definition and Role

A **hormone** is an **organic chemical messenger** secreted in minute quantities by endocrine tissues. It is transported via body fluids to specific target cells, where it regulates the rate of pre-existing biochemical processes without initiating new reactions.

Key Characteristics

- **High Potency:** Effective at extremely low concentrations (e.g., 10^{-12} M).
- **Specificity:** Acts only on target cells with complementary receptors (**Lock-and-Key Model**).
- **Regulatory Role:** Can stimulate or inhibit physiological processes.
- **Integrated Action:** Hormones often work in synergistic or antagonistic pairs (e.g., Insulin and Glucagon) to fine-tune responses.

Chemical Classification of Hormones

Chemical Class	Solubility	Examples	Key Features & Secretion Sites
Proteins/Polypeptides	Water-soluble (Hydrophilic)	Insulin, Glucagon, Growth Hormone (GH), ADH	Most common type. Stored in vesicles. Bind to cell surface receptors .



Endocrine System & Hormones: One-Liners

- The **endocrine system** consists of **ductless glands** that secrete **hormones** directly into the bloodstream.
- **Hormones** are **chemical messengers** that regulate and coordinate the body's **metabolic activities, growth, development, and homeostasis**.
- Over **50 hormones** have been identified in the human body.
- Hormones act specifically on **target cells** that possess complementary **receptors**.
- Body communication via hormones occurs between **two endocrine glands** or between an **endocrine gland and a target organ**.
- Chemically, hormones are classified as **steroids, proteins/polypeptides, glycoproteins, amines, or amino acid derivatives**.
- **Steroid hormones** (e.g., cortisol, testosterone) are secreted by the **adrenal cortex, gonads, and placenta**.
- **Proteinaceous/Peptide hormones** (e.g., insulin, GH) are secreted by the **anterior pituitary and pancreas**.
- **Amino acid derivatives** include **thyroxine** (from thyroid) and **catecholamines** like adrenaline (from adrenal medulla).
- Unlike enzymes, hormones **do not initiate** new reactions but **regulate** existing biochemical processes.
- The **lock-and-key model** describes the specific interaction between a hormone and its receptor.
- **Endocrinology** is the study of endocrine glands and their hormones.
- Hormones are effective in extremely small amounts and are not altered by the reactions they regulate.
- **Endocrine glands** are ductless and secrete hormones into tissue spaces and body fluids.

Practice MCQs

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1. Which of the following is NOT a characteristic of hormones?

- A) High potency at low concentrations
- B) Initiation of new metabolic reactions
- C) Specificity for target cells
- D) Regulation of existing processes

Answer: Initiation of new metabolic reactions

2. The "master integrator" linking the nervous and endocrine systems is the:

- A) Pituitary gland
- B) Hypothalamus
- C) Adrenal medulla
- D) Pineal gland

Answer: Hypothalamus

3. Which hormone is synthesized in the hypothalamus but stored and released from the posterior pituitary?

- A) Growth Hormone
- B) Prolactin
- C) Oxytocin
- D) Adrenocorticotropic Hormone

Answer: Oxytocin

4. Insulin and glucagon are secreted by which endocrine structure?

- A) Adrenal cortex
- B) Thyroid gland
- C) Islets of Langerhans
- D) Anterior pituitary

Answer: Islets of Langerhans

5. A lipid-soluble hormone that binds to intracellular receptors is:

- A) Insulin
- B) Epinephrine
- C) Cortisol
- D) Glucagon

Answer: Cortisol

6. Which of the following is a protein hormone?

- A) Testosterone
- B) Thyroxine
- C) Growth Hormone
- D) Aldosterone

Answer: Growth Hormone

7. The hormone primarily responsible for lowering blood calcium levels is:

- A) Parathyroid Hormone
- B) Calcitonin
- C) Calcitriol
- D) Aldosterone

Answer: Calcitonin

8. What is the primary effect of Antidiuretic Hormone (ADH)?

- A) Stimulates milk ejection
- B) Increases water reabsorption in kidneys
- C) Raises blood glucose
- D) Promotes sodium retention

Answer: Increases water reabsorption in kidneys

9. Which anterior pituitary hormone is tropic to the adrenal cortex?

- A) TSH
- B) ACTH
- C) FSH



Chapter 11

REPRODUCTION AND DEVELOPMENT

11. Reproduction and Development

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Developmental biology represents one of the most integrative fields in biological science, seeking to explain how **genetic information** is translated into **three-dimensional form and function**. At its core lies a profound paradox: unlike human-engineered machines that are built first and then function, organisms must **maintain physiological function** while simultaneously **constructing themselves** through embryonic development, growth, and repair. This field transcends traditional **embryology** (development from fertilization to birth) to encompass the entire lifespan, including:

- **Metamorphosis:** Radical post-embryonic transformation (e.g., caterpillar to butterfly)
- **Regeneration:** Replacement of lost body parts (e.g., salamander limbs, zebrafish heart)
- **Tissue Turnover:** Continuous renewal of cells in skin, gut, and blood
- **Aging:** Progressive changes in structure and function over time

Historical Foundations: The Epigenesis-Preformationism Debate

The philosophical struggle to understand development shaped early biological thought:

Preformationism (17th-18th Centuries)

- **Core Belief:** A miniature, fully formed organism (**homunculus**) existed preformed within the egg or sperm
- **Proponents:** Marcello Malpighi (observed structures in unincubated chicken eggs), Nicolas Hartsoeker (drew sperm containing tiny humans)
- **Supporting Observations:** Visible organization in early embryos; difficulty imagining how complexity could arise from simplicity
- **Fatal Flaws:** Could not explain **hybrid traits** (blending of parental characteristics), **regeneration**, or the existence of **parasites within parasites** (infinite regress problem)

Epigenesis (Gained Ascendancy in 18th-19th Centuries)



Reproduction & Development: One-liners

Developmental Biology

- **Developmental biology** is the study of how organisms grow and develop from a single fertilized egg into complex multicellular structures.
- It encompasses **embryology** (development from fertilization to birth) and post-embryonic processes like **metamorphosis**, regeneration, and aging.
- A central question is how a single **zygote** with one genome can produce over **250 different human cell types**.
- **Morphogenesis** is the process by which cells organize into tissues and organs through coordinated division, migration, shape change, and death.
- Development is precisely regulated to ensure organs and limbs grow to the correct size, shape, and symmetry.
- **Germ cells** (sperm and egg) are set aside early in development to pass genetic information to the next generation.
- Some animals, like salamanders, can **regenerate** limbs, while mammals rely on **stem cells** for more limited repair.
- Environmental factors like **temperature** can influence development, as seen in **Temperature-Dependent Sex Determination (TSD)** in many reptiles.
- Evolutionary changes in developmental processes, such as alterations in gene regulation, lead to new body forms (e.g., evolution of the one-toed horse).
- Historically, **epigenesis** (development from scratch) was opposed to **preformationism** (performed miniature homunculus); the modern synthesis combines genetic instructions with epigenetic construction.
- The typical animal life cycle includes **fertilization, cleavage, gastrulation, organogenesis**, and sometimes **metamorphosis**.

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11. Reproduction and Development

Practice MCQs

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1. What is the primary focus of developmental biology?

- A) Study of genetic mutations in adults
- B) Study of how multicellular organisms grow and develop from a zygote
- C) Analysis of evolutionary relationships only
- D) Examination of animal behavior

Answer: Study of how multicellular organisms grow and develop from a zygote

2. The historical concept that a miniature, fully formed organism pre-exists in the gamete is called?

- A) Epigenesis
- B) Homunculus theory
- C) Modern synthesis
- D) Germ layer theory

Answer: Homunculus theory

3. Which of the following is the correct sequence of early developmental stages in animals?

- A) Gastrulation, Cleavage, Fertilization, Organogenesis
- B) Fertilization, Cleavage, Gastrulation, Organogenesis
- C) Cleavage, Fertilization, Organogenesis, Gastrulation
- D) Organogenesis, Gastrulation, Cleavage, Fertilization

Answer: Fertilization, Cleavage, Gastrulation, Organogenesis

4. During gastrulation, which germ layer gives rise to the nervous system and epidermis?

- A) Mesoderm
- B) Endoderm
- C) Ectoderm
- D) Trophoblast

Answer: Ectoderm

5. Von Baer's laws of embryology state that:

- A) Embryos of higher animals pass through adult stages of lower animals
- B) General features appear before specialized features
- C) Embryonic development is identical across all species
- D) All embryos look the same at birth

Answer: General features appear before specialized features

6. Cleavage pattern in mammals is typically:

- A) Meroblastic and discoidal
- B) Holoblastic and isolecithal
- C) Superficial
- D) Meroblastic and superficial

Answer: Holoblastic and isolecithal

7. Which gastrulation movement involves the infolding of a cell sheet?

- A) Involution
- B) Ingression
- C) Delamination
- D) Invagination

Answer: Invagination



PART 2: ENGLISH



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Chapter 1

The Noun

1. The Noun

Definition of Noun

A noun is a word that functions as the name of a:

- **Person:** child, woman, Ali, teacher
- **Place:** city, Lahore, park
- **Thing:** table, car, money
- **Animal:** dog, elephant, bird
- **Idea, Quality, or State:** happiness, bravery, knowledge, poverty
- **Action:** (Gerunds) swimming, reading, driving

In simple terms, a noun is a naming word. The name of everything is a noun.

Types of Nouns

Nouns can be categorized into eight primary types for a clearer understanding of their usage.

1. Proper Noun

A proper noun is the specific name of a particular person, place, or thing.

- **Rule 1:** It always begins with a **capital letter**.
- **Rule 2:** It can not be changed into a plural form (e.g., *There are two Ali's in my class*).

2. Common Noun

A common noun is a general name that is common to all persons, places, or things of the same kind. It denotes no particular entity.

Proper Noun	Common Noun
Ali	boy
Lahore	city
Badshahi Mosque	mosque

3. Material Noun

A material noun is the name of a substance or matter from which things are made. These often exist in different states of matter: solid, liquid, gas, and plasma. Things in a solid state are sometimes called concrete nouns.

- **Examples:** wood, gold, water, air, plastic, cement.

4. Abstract Noun

An abstract noun is the name of an idea, quality, state, or feeling that does not exist in a physical or material form.

Examples: love, honesty, anger, childhood, poverty, wisdom.

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Material Noun	Abstract Noun
Water	Honesty
Iron	Strength
Milk	Whiteness

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5. Countable Noun

Countable nouns refer to objects or items that can be counted. They have both singular and plural forms.

- **Examples:** an egg, three oranges, many chairs, several ideas.

6. Uncountable Noun

Uncountable nouns (or mass nouns) refer to substances, concepts, or masses that cannot be counted as separate items. They are generally treated as singular.

- **Examples:** sugar, milk, flour, advice, information, furniture, luggage.

Countable Noun	Uncountable Noun
an egg	sugar
three chairs	some flour
several problems	important information

7. Collective Noun

A collective noun is a single word that denotes a group or collection of similar individuals, considered as one complete whole. It shows a collective identity.

- **Examples:** team, committee, class, herd, fleet, crowd, jury.

8. Compound Noun

A compound noun is formed by joining two or more words together to create a single noun with a new meaning.

- **Examples:**
 - **One word:** toothpaste, bedroom, haircut
 - **Hyphenated:** mother-in-law, check-in, well-being
 - **Separate words:** swimming pool, post office, driving license

Noun Correction Rules



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Rule 1: Countable Nouns and Articles

Countable nouns can be used in both singular and plural forms. When used in the singular, they typically require an article (a, an, the) or another determiner (like 'this' or 'my').

- He is **a good man**. They are good **men**.
- She is **a kind lady**. They are kind **ladies**.

Rule 2: The Basic Rule for Uncountable Nouns

Uncountable nouns have no plural form. They take a singular verb, a singular pronoun, and generally no indefinite article (a/an).

- Her **hair is** black and **it** looks beautiful.
- **Jealousy is** a destructive emotion.
- **Music entertains** people.

Rule 3: Using "The" with Specified Uncountable Nouns

Uncountable nouns may take the definite article "the" when they are specified or defined in a particular context.

- **The jealousy** of people can check our progress.
- **The water** in the jug is not drinkable.
- **The air** in the room is not fresh.

Rule 4: Using "A/An" with Specified Abstract Nouns

Some uncountable nouns, especially abstract ones like *experience, honour, knowledge,* and *fear,* can take the indefinite article "a/an" when they are used in a particular sense to mean "a kind of" or "an instance of."

- **Experience** comes with time. (General sense)
 - I had **a bitter experience** yesterday. (Particular instance)
- We prefer **honour** to everything else. (General sense)
 - It is **an honour** for us to go there. (A particular honour)

Rule 5: Nouns That Are Always Plural (I)

Some nouns have only a plural form and always take plural verbs and pronouns. These often include words ending in "-s".

- Your **belongings are** safe here.
- The **surroundings are** beautiful.
- Give him my **congratulations**.

Rule 6: Nouns That Are Always Plural (II) - Objects with Two Parts

Things that are considered to have two main parts are also treated as plural nouns.

- These **scissors are** dull.



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- My **trousers are** torn.
- His **glasses are** new.

Rule 7: Nouns that are Plural in Meaning

Some nouns appear to be singular but are treated as plural and take plural verbs and pronouns.

- The **police are** investigating the case.
- The **poultry are** being fed.
- The **cattle are** grazing in the field.
- **People are** waiting outside.

Rule 8: Nouns that are Singular in Meaning

Some nouns appear to be plural in form (ending in "-s") but are actually singular in meaning and take singular verbs and pronouns. These often include names of academic subjects, games, and diseases.

- This **news is** surprising.
- **Politics is** a complicated field.
- **Physics has** always been my favorite subject.
- **Measles is** a contagious disease.

Rule 9: Quantifying Uncountable Nouns

Since uncountable nouns cannot be counted directly, we use specific phrases to express quantity.

- two **pieces of** advice
- three **slices of** bread
- several **articles of** furniture
- many **pieces of** mail/information

Rule 10: Collective Nouns – Singular or Plural Verb

A collective noun can take a singular verb when the group is acting as a single unit. It takes a plural verb when the focus is on the individual members acting separately.

- The **team has** won the championship. (The team as one unit)
- The **team are** arguing about the strategy. (Individual team members)

Rule 11: Nouns with Identical Singular and Plural Forms

Some nouns have the same form for both singular and plural. The meaning is determined by the context and verb used.

- That **sheep is** white. | Those **sheep are** black.
- A **deer was** spotted. | Many **deer were** spotted.
- I caught a **fish**. | I caught five **fish**.

Rule 12: Plural of Foreign Origin Nouns



Many nouns borrowed from Latin and Greek retain their original plural forms.

- **-is** → **-es**: analysis → analyses, crisis → crises, basis → bases
- **-um** → **-a**: datum → data, bacterium → bacteria, curriculum → curricula
- **-us** → **-i**: syllabus → syllabi, nucleus → nuclei, fungus → fungi
- **-a** → **-ae**: formula → formulae/formulas, vertebra → vertebrae
- **-ex/-ix** → **-ices**: index → indices/indexes, matrix → matrices

Rule 13: Subject-Verb Agreement with "Number of" vs. "A Number of"

M The phrases "the number of" and "a number of" are followed by different verb forms.

- **The number of** students **is** increasing. (Refers to the number itself, which is singular)
- **A number of** students **are** absent today. (Means "several," referring to the students, which is plural)

Rule 14: Nouns Ending in "-ics" (Academic Subjects)

P Names of academic subjects ending in "-ics" are generally singular. However, when they refer to specific activities, qualities, or practical applications, they can be plural.

- **Mathematics is** easy for her. (As a field of study)
- Her **mathematics are** weak. (Referring to her mathematical skills/calculations)

Rule 15: Agreement with Paired Nouns

P When two or more singular nouns are connected by "and" and refer to the same person or thing, they take a singular verb. Otherwise, they take a plural verb.

- **Bread and butter is** my favorite breakfast. (Treated as a single item)
- The **principal and secretary has** arrived. (One person holding both positions)
- The **principal and the secretary have** arrived. (Two different persons)



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Practice MCQ

1. The Noun

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1. Identify the type of noun for the word "team" in the sentence: "The team won the championship."

- A. Common Noun
- B. Collective Noun
- C. Abstract Noun
- D. Compound Noun

Answer: B

2. Which of the following is an abstract noun?

- A. Water
- B. Honesty
- C. Lahore
- D. Chair

Answer: B

3. Choose the correct sentence according to noun rules.

- A. The scissor is on the table.
- B. The scissors is on the table.
- C. The scissors are on the table.
- D. A scissor are on the table.

Answer: C

4. The noun "poultry" in the sentence "The poultry are being fed" is an example of a noun that:

- A. Is always singular
- B. Appears singular but takes a plural verb
- C. Is a material noun
- D. Is uncountable

Answer: B

5. Which of the following nouns is always plural in form and takes a plural verb?

- A. News
- B. Economics
- C. Trousers
- D. Politics

Answer: C

6. Identify the compound noun.

- A. Beautifully
- B. Swimming pool
- C. Quickly
- D. Happiness

Answer: B

7. Select the sentence where an uncountable noun is used correctly.

- A. She gave me some good advices.
- B. The furnitures in this room are new.
- C. Her hair are long and black.
- D. The information provided was incorrect.

Answer: D

8. The word "people" in "Many people attend the fair" is a noun that:

- A. Is singular
- B. Appears singular but takes a plural verb
- C. Is a collective noun
- D. Is a proper noun

Answer: B

9. The use of the indefinite article 'a' with the normally uncountable noun 'experience' in the sentence "I had a bitter experience" is justified because:

- A. The noun is used in a general sense to refer to the concept as a whole.
- B. The noun is specified and particularized, referring to a single instance or kind of that concept.
- C. All abstract nouns can take indefinite articles.
- D. The noun is being used as a proper noun in this context.

Answer: B

10. Identify the material noun from the list below.

- A. Anger
- B. Love
- C. Wood

D. Crowd
Answer: C

11. The sentence "The committee _____ divided in their opinions" requires a plural verb because:

- A. The collective noun "committee" is always treated as plural.
- B. The focus is on the individual members within the group acting separately, not as a single unit.
- C. The word "opinions" that follows forces the verb to be plural.
- D. It is preceded by the definite article "the".

Answer: B

12. Which of the following is a common noun?

- A. Ali
- B. Badshahi Mosque
- C. Boy
- D. Lahore

Answer: C

13. The grammatical structure "three pieces of mail" is used because the noun 'mail' is:

- A. A collective noun that must be quantified individually.
- B. An uncountable noun that requires a counter or a unit of measurement to express plurality.
- C. A countable noun that has an irregular plural form.
- D. A compound noun that is always used in the singular.

Answer: B

14. Select the sentence with a correct subject-verb agreement for a noun that appears plural but is singular.

- A. Physics are a difficult subject.
- B. Mathematics are my favorite.
- C. The news are at ten.

D. Politics is a complex field.
Answer: D

15. Which of the following statements about the noun 'series' is CORRECT?

- A. It is a noun that appears plural and always takes a plural verb.
- B. It is a noun that appears singular but must always take a plural verb.
- C. It is a noun that can be both singular and plural in form and usage, depending on the context.
- D. It is an uncountable noun and therefore has no plural form.

Answer: C

16. The noun "surroundings" falls under which category?

- A. Nouns that have only a plural form
- B. Abstract Nouns
- C. Compound Nouns
- D. Material Nouns

Answer: A

17. In the sentence "The jealousy of her friend was obvious," the article "the" is used with "jealousy" because:

- A. It is a countable noun
- B. It is specified
- C. It is a proper noun
- D. It is always used with 'the'

Answer: B

18. Identify the uncountable noun from the options.

- A. Egg
- B. Orange
- C. Sugar
- D. Chair

Answer: C

19. Which sentence violates the noun correction rules?

- A. His savings are enough for retirement.
- B. The cattle is grazing in the field.



C. These trousers are too long.
D. The police have arrested the suspect.
Answer: B (Cattle takes a plural verb)

20. The word "mumps" is an example of a noun that:

- A. Is always plural
- B. Appears plural but is singular
- C. Is a collective noun
- D. Is a compound noun

Answer: B

21. According to the rules, which noun can be used with an indefinite article in a particular sense?

- A. Water
- B. Music
- C. Experience
- D. Hair

Answer: C

22. "A group of students" - The word "group" is a:

- A. Common Noun
- B. Collective Noun
- C. Compound Noun

D. Abstract Noun

Answer: B

23. Choose the correct sentence.

- A. The scenery of Swat are beautiful.
- B. The scenery of Swat is beautiful.
- C. A scenery of Swat is beautiful.
- D. Sceneries of Swat are beautiful.

Answer: B

24. Which of the following is NOT a collective noun?

- A. Team
- B. Class
- C. Honesty
- D. Committee

Answer: C

25. The noun "bread" in "a few slices of bread" is:

- A. Countable
- B. Uncountable
- C. Collective
- D. Abstract

Answer: B



Chapter 2

The Pronoun

2. The Pronoun

Definition of Pronoun

A pronoun is a word used in place of a noun or a noun phrase to avoid repetition. It refers to a noun that has been mentioned before or is clearly understood from the context.

- *Example:* "Ali is a doctor. **He** works in a hospital." (The pronoun "He" replaces the noun "Ali").

Types of Pronouns

Pronouns can be categorized into nine main types:

1. Personal Pronoun
2. Possessive Pronoun
3. Reflexive Pronoun
4. Demonstrative Pronoun
5. Indefinite Pronoun
6. Relative Pronoun
7. Interrogative Pronoun
8. Distributive Pronoun
9. Reciprocal Pronoun

1. Personal Pronoun

Personal pronouns refer to specific people or things and change form based on person (first, second, third), number (singular, plural), case (subject, object), and gender (he, she, it).

Person	Subject Pronoun	Object Pronoun	Possessive Adjective	Possessive Pronoun	Reflexive Pronoun
First (Singular)	I	me	my	mine	myself
First (Plural)	we	us	our	ours	ourselves
Second (Singular/Plural)	you	you	your	yours	yourself / yourselves
Third (Masc.)	he	him	his	his	himself
Third (Fem.)	she	her	her	hers	herself
Third (Neutral)	it	it	its	its	itself
Third (Plural)	they	them	their	theirs	themselves

2. Possessive Pronoun

A possessive pronoun shows ownership and is used **when the noun is not expressed**.

- *Examples:* mine, his, hers, ours, yours, theirs.

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- This is my book. That one is **yours** (your book).
- Their house is big, but **ours** (our house) is more comfortable.

3. Reflexive Pronoun

A reflexive pronoun ends in **-self** or **-selves** and is used when the subject and the object of a verb are the same person or thing.

- *Examples:* myself, ourselves, yourself, yourselves, himself, herself, itself, themselves.
- She taught **herself** how to play the guitar.
- The cat cleaned **itself**.

4. Demonstrative Pronoun

A demonstrative pronoun points to a specific noun (its antecedent) and replaces it.

- *Examples:* **this, that, these, those, such.**
- I love **these** flowers. **These** are my favorite.
- **That** was a remarkable achievement.

5. Indefinite Pronoun

An indefinite pronoun refers to people or things in a general, non-specific way.

- *Examples:* **all, another, any, anybody, anyone, anything, each, everybody, everyone, everything, few, many, nobody, none, one, several, some, somebody, someone.**
- **Everyone** is welcome to attend the meeting.
- **Some** are born great.

6. Relative Pronoun

A relative pronoun introduces a relative clause and relates it back to a noun or pronoun (called its antecedent) mentioned before it.

- *Examples:* **who, whom, whose, which, that.**
 - The man **who** called you is my uncle.
 - This is the book **that** I told you about.
- Rule:** A relative pronoun should be placed as near as possible to its antecedent to avoid ambiguity.

7. Interrogative Pronoun

An interrogative pronoun is used to ask a question.

- *Examples:* **who, whom, whose, which, what.**
- **Who** is at the door?
- **What** is your name?

8. Distributive Pronoun



A distributive pronoun refers to individual members of a group one at a time. They are always **singular** and take a **singular verb**.

- *Examples:* **each, either, neither, everyone, everybody, everything.**
- **Each** of the students **has** a textbook.
- **Neither** of the answers **is** correct.

9. Reciprocal Pronoun

Reciprocal pronouns express a mutual or reciprocal relationship.

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- **Each other:** Used for two persons.
 - **One another:** Generally used for more than two persons.
 - The two sisters love **each other**.
 - The team members support **one another**.

Pronoun Correction Rules

Mastering these rules is essential for accurate and grammatically correct English.

Rule 1: Subject vs. Object Pronoun

Use a **subject pronoun** when the pronoun is the **doer** of the action (subject). Use an **object pronoun** when it is the **receiver** of the action (object) or comes after a preposition.

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- **Ali and I** will travel. (Subject)
 - He helped **Hamza and me**. (Object)
 - This is between **you and me**. (After preposition)

Rule 2: Possessive Adjective with Gerunds

Use a possessive adjective (**my, your, his, etc.**) before a gerund (the -ing form of a verb used as a noun).

- I appreciate **your helping** me.
- Do you mind **my opening** the window?

Rule 3: Possessive Pronoun vs. Adjective

Use a **possessive adjective** before a noun. Use a **possessive pronoun** when the noun is implied.

- This is **my** book. (Adjective + Noun)
- This book is **mine**. (Pronoun, noun is implied)

Rule 4: Possessive with Body Parts

Use a possessive adjective, not the definite article 'the', when referring to body parts and personal belongings.

- She broke **her** arm. (Not "the arm")
- He lost **his** phone.



Rule 5: Subject Pronoun after Conjunctions

Use a **subject pronoun** after conjunctions like *than, as, but*.

- He is taller than **I** (am).
- She works as hard as **he** (does).

Rule 6: 'As' vs. 'Like'

As (a conjunction) is followed by a **subject pronoun**. **Like** (a preposition) is followed by an **object pronoun**.

- They passed the exam, **as we** (did).
- Everybody comes late **like me**.

Rule 7: Who vs. Which vs. That

- **Who** refers to people.
- **Which** refers to animals and things.
- **That** can refer to people, animals, and things.
- The man **who** called is my boss.
- The book, **which** is on the table, is mine.
- This is the car **that** I want to buy.

Rule 8: Restrictive vs. Non-Restrictive Clauses

- Use **who** or **which** after a comma for non-essential (non-restrictive) information.
- Use **that** without a comma for essential (restrictive) information. *'That' can often be omitted.*
- My brother, **who** lives in London, is a doctor. (Extra info)
- The book **that** you lent me is fantastic. (Essential info)

Rule 9: Who vs. Whom

- **Who** is used as the subject of a verb (like 'he').
- **Whom** is used as the object of a verb or preposition (like 'him').
- **Who** wrote this letter? (He wrote)
- **Whom** did you meet? (You met him)

Rule 10: Placement of Relative Pronouns

Place the relative pronoun immediately after its antecedent to avoid confusion.

- **Incorrect:** The book is on the table that I bought.
- **Correct:** The book that I bought is on the table.

Rule 11: Avoiding Ambiguous Pronouns

Ensure the pronoun clearly refers to only one antecedent.

- **Ambiguous:** Maria told Ayesha that **she** was late.
- **Clear:** Maria told Ayesha, "**I** am late."

Rule 12: Reflexive for Same Subject-Object

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Use a reflexive pronoun when the subject and object are the same.

- The students can correct **themselves**.

Rule 13: Emphatic Pronouns

Use a reflexive pronoun for emphasis (emphatic pronoun). It can be removed without changing the core meaning of the sentence.

- I **myself** built this house.
- The CEO **himself** announced the news.

Rule 14: Pronoun Order (Politeness)

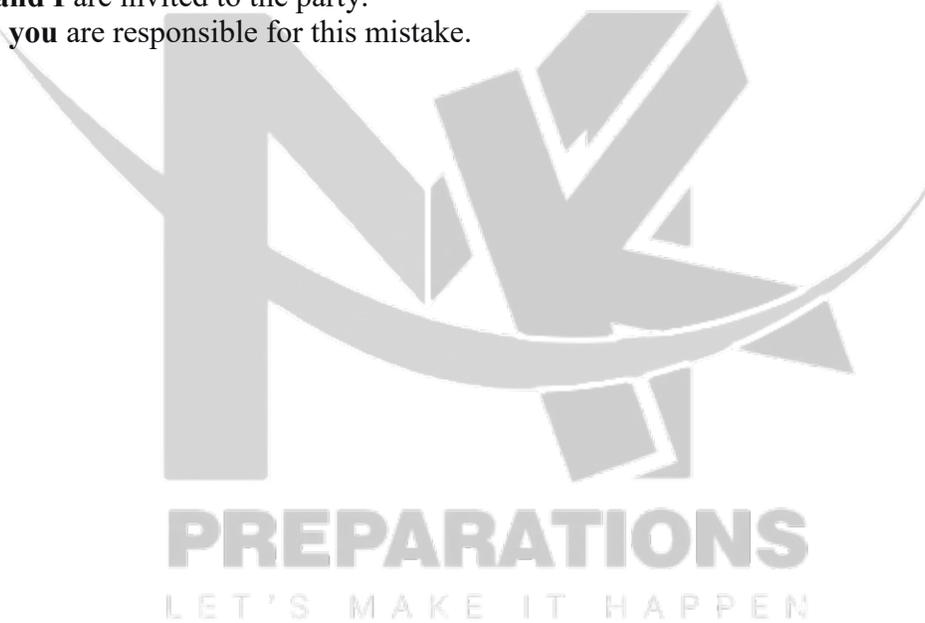
For positive/pleasant contexts: **You, He/She, and I.**

- For negative contexts (like admitting fault): **I, He/She, and You.**
- **You, he, and I** are invited to the party.
- **I, he, and you** are responsible for this mistake.

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2. The Pronoun





Practice MCQs

2. The Pronoun

- 1. Choose the sentence that is grammatically correct.**
 A. This matter is between you and I.
 B. This matter is between you and me.
 C. This matter is between yourself and myself.
 D. This matter is among you and I.

M Answer: B

- 2. Which of the following is a distributive pronoun?**
 A. Themselves
 B. Someone
 C. Each
 D. This

P Answer: C

- 3. Identify the sentence with the correct use of a relative pronoun.**
 A. The man which called is my uncle.
 B. The man, that called, is my uncle.
 C. The man who called is my uncle.
 D. The man whom called is my uncle.

P Answer: C

- 4. Fill in the blank: She is smarter than ____.**
 A. me
 B. I
 C. myself
 D. mine

A Answer: B

- 5. The grammatical error in the sentence "She told her mother that she was wrong" is related to:**
 A. The misuse of a possessive adjective.
 B. The omission of a reflexive pronoun.
 C. The use of an ambiguous pronoun.
 D. The incorrect case of a personal pronoun.

N Answer: C

- 6. Select the correct possessive form: That book is ____.**
 A. your's
 B. yours
 C. your
 D. you're's

Answer: B

- 7. In the sentence "One should always respect ____ elders," the correct pronoun is:**
 A. his
 B. one's
 C. their
 D. your

Answer: B

- 8. The pronoun in "The two rivals blamed each other" is a/an:**
 A. Reciprocal pronoun
 B. Reflexive pronoun
 C. Indefinite pronoun
 D. Demonstrative pronoun

Answer: A

- 9. Choose the sentence with the correct pronoun order for a positive context.**
 A. I, you, and he must collaborate on the project.
 B. You, I, and he must collaborate on the project.
 C. You, he, and I must collaborate on the project.
 D. He, you, and I must collaborate on the project.

Answer: C

- 10. Identify the interrogative pronoun in the following sentence: "Whose is this notebook?"**
 A. Whose
 B. this
 C. is

D. notebook

Answer: A

11. Which of the following sentences uses a reflexive pronoun correctly?

- A. He bought himself a new car.
- B. He bought hisself a new car.
- C. He bought him a new car.
- D. He bought he a new car.

M **Answer: A**

12. Select the correct sentence:

- A. Whom do you think will win the election?
- B. Who do you think will win the election?
- C. Which do you think will win the election?
- D. Whose do you think will win the election?

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Answer: B

13. The pronoun "who" in the sentence "The student who studies hard will succeed" is a:

- A. Interrogative Pronoun
- B. Relative Pronoun
- C. Demonstrative Pronoun
- D. Personal Pronoun

Answer: B

14. Fill in the blank: Neither of the boys has finished ___ homework.

- A. their
- B. his
- C. our
- D. them

Answer: B

15. The sentence "I myself will oversee the project" uses 'myself' as a/an:

- A. Reflexive Pronoun
- B. Emphatic Pronoun
- C. Object Pronoun
- D. Personal Pronoun

Answer: B

16. Identify the sentence that follows the rule for using possessive adjectives with

gerunds.

- A. I appreciate you helping me.
- B. I appreciate your helping me.
- C. I appreciate yours helping me.
- D. I appreciate yourself helping me.

Answer: B

17. Which of the following pronouns is always singular?

- A. Many
- B. Few
- C. Several
- D. Each

Answer: D

18. Choose the option that correctly completes the sentence: "It was ___ who volunteered."

- A. her
- B. she
- C. herself
- D. hers

Answer: B

19. The error in the sentence "The data which was collected is invalid" is that:

- A. 'Which' should be replaced by 'who'.
- B. 'Which' should be replaced by 'that'.
- C. 'Was' should be replaced by 'were'.
- D. There is no error.

Answer: B (In restrictive clauses, 'that' is preferred.)

20. Identify the demonstrative pronoun in the following: "Such are the demands of time."

- A. Such
- B. are
- C. the
- D. demands

Answer: A

21. Fill in the blank: Everyone must carry ___ own luggage.

- A. their



- B. his
- C. her
- D. his or her

Answer: D (Modern usage accepts "their," but for formal exams, "his or her" is often considered correct.)

22. The sentence "Between you and I, this plan will not work" is incorrect because:

- A. 'Between' should be followed by subject pronouns.
- B. 'Between' should be followed by object pronouns.
- C. 'I' should be replaced by 'myself'.
- D. 'You and I' should be replaced by 'we'.

Answer: B

23. Which of the following is an indefinite pronoun?

- A. These
- B. Whom
- C. Nobody
- D. Ours

Answer: C

24. Select the correct sentence:

- A. The committee submitted their report.
- B. The committee submitted its report.
- C. The committee submitted it's report.
- D. The committee submitted ours report.

Answer: B

25. The pronoun 'whom' in "Whom did you meet?" is in the ___ case.

- A. Nominative
- B. Possessive
- C. Objective
- D. Reflexive

Answer: C

26. Identify the sentence with a correct relative clause structure.

- A. I met a man at the party who wife is a doctor.
- B. I met a man at the party whom wife is a

doctor.

C. I met a man at the party whose wife is a doctor.

D. I met a man at the party which wife is a doctor.

Answer: C

27. Fill in the blank: She is one of those writers who ___ always thinking of new ideas.

- A. is
- B. are
- C. was
- D. has been

Answer: B (The verb agrees with the antecedent of 'who', which is 'writers'.)

28. The phrase "each other" is used for:

- A. More than two persons or things.
- B. Two persons or things.
- C. An indefinite number.
- D. Emphasizing an action.

Answer: B

29. Which rule applies to the sentence: "He is as tall as I"?

- A. Use object pronoun after 'as'.
- B. Use subject pronoun after 'as' (when a verb is implied).
- C. Always use 'me' after 'as'.
- D. Use reflexive pronoun after 'as'.

Answer: B

30. Choose the sentence that violates the pronoun agreement rule.

- A. Each of the players has his own strategy.
- B. Every student must bring their own book.
- C. Either of the options has its merits.
- D. Someone has left his umbrella.

Answer: B ('Every student' is singular, 'their' is plural.)

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Chapter 3

The Verb

3. The Verb

Definition of Verb

A verb is fundamentally a word that denotes an **action** (*run, synthesize*), indicates a **state of being** (*is, exist*), or describes an **occurrence** (*happen, become*). It forms the essential predicate that tells something about the subject.

A Conceptual Classification of Verb

Understanding verb types is crucial for mastering sentence structure, tense usage, and voice.

1. Transitive Verbs: The Action Transferers

A transitive verb requires one or more objects to complete its meaning. The action originates with the subject and is transferred to an object.

- **Example 1:** The scientist **conducted** *the experiment*.
- **Analysis:** The verb "conducted" is meaningless without its object "the experiment." It answers "conducted what?"
- **Example 2:** The author **wrote** *a compelling novel*.
- **Analysis:** "Wrote" requires the object "a compelling novel" to complete the thought.

2. Intransitive Verbs: The Self-Contained Actions

An intransitive verb expresses a complete action without transferring that action to an object. It may be followed by an adverb, a prepositional phrase, or nothing.

- **Example 1:** The results **emerged** *slowly*.
- **Analysis:** The verb "emerged" is complete in itself. "Slowly" merely modifies the action; it is not an object.
- **Example 2:** All the guests **arrived** *before noon*.
- **Analysis:** "Arrived" does not need an object; "before noon" is a prepositional phrase indicating time.

3. Ditransitive Verbs: The Double Object Handlers

A subset of transitive verbs that take two objects: a **direct object** (the thing that is given/told) and an **indirect object** (the person/thing that receives it).

- **Structure:** Subject + Verb + Indirect Object + Direct Object
- **Example 1:** She **gave** *the student* *a book*.
- **Analysis:** "A book" (Direct Object - what was given), "the student" (Indirect Object - to whom it was given).
- **Example 2:** The manager **offered** *his team* *a new proposal*.
- **Analysis:** "A new proposal" (Direct Object), "his team" (Indirect Object).

4. Linking (Copular) Verbs: The Connectors

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Linking verbs do not express action. Instead, they link the subject to a **subject complement**—a word or phrase that renames or describes the subject.

- **Common Linking Verbs:** *be, become, seem, appear, feel, look, sound, smell, taste, remain, stay, grow, turn, prove.*
- **Example 1:** His hypothesis **proved** correct.
- **Analysis:** "Proved" connects the subject "hypothesis" to the adjective "correct," which describes it.
- **Example 2:** She **became** a renowned scientist.

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- **Analysis:** "Became" links the subject "She" to the noun phrase "a renowned scientist," which renames her.

5. Causative Verbs: The Instigators

Causative verbs indicate that the subject causes someone else to perform an action. The three primary causatives (*make, have, get*) differ in force and structure.

P

- **Make + Agent + Base Form:** Implies force or compulsion.

R

- **Example 1:** The manager **made** the team **work** overtime.
- **Example 2:** The strict regulations **made** the company **change** its policy.

E

- **Have + Agent + Base Form:** Implies delegation or arrangement.

P

- **Example 1:** I **had** the technician **install** the software.
- **Example 2:** She **had** her assistant **draft** the report.

A

- **Get + Agent + To-Infinitive:** Implies persuasion or effort.

R

- **Example 1:** She **got** her brother **to help** her move.
- **Example 2:** They finally **got** the government **to listen** to their demands.

A

6. Auxiliary (Helping) Verbs: The Tense and Mood Formers

Auxiliary verbs are used in conjunction with a main verb to express grammatical nuances of tense, mood, and voice.

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- **Primary Auxiliaries:** *be, have, do.* They can also function as main verbs.

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- **Example (Tense):** They **are** *discussing* the proposal. (Present Continuous)

O

- **Example (Voice):** The proposal **was** *discussed* by them. (Passive Voice)

N

- **Modal Auxiliaries:** *can, could, will, would, shall, should, may, might, must.* They express ability, permission, possibility, necessity, or obligation.

S

- **Example (Obligation):** Candidates **must** *submit* the form by Friday.

- **Example (Possibility):** It **might** *rain* later today.

Verb Forms:

Base Form (V1)	Past Simple (V2)	Past Participle (V3)	Present Participle (V4)
abide	abode	abode	abiding



arise	arose	arisen	arising
awake	awoke	awoken	awaking
be	was/were	been	being
bear	bore	borne	bearing
beat	beat	beaten	beating
become	became	become	becoming
begin	began	begun	beginning
bend	bent	bent	bending
bet	bet	bet	betting
bid	bid	bid	bidding
bind	bound	bound	binding
bite	bit	bitten	biting
bleed	bled	bled	bleeding
blow	blew	blown	blowing
break	broke	broken	breaking
bring	brought	brought	bringing
build	built	built	building
burn	burnt/burned	burnt/burned	burning
burst	burst	burst	bursting
buy	bought	bought	buying
catch	caught	caught	catching



choose	chose	chosen	choosing
cling	clung	clung	clinging
come	came	come	coming
cost	cost	cost	costing
creep	crept	crept	creeping
cut	cut	cut	cutting
deal	dealt	dealt	dealing
dig	dug	dug	digging
do	did	done	doing
draw	drew	drawn	drawing
dream	dreamt/dreamed	dreamt/dreamed	dreaming
drink	drank	drunk	drinking
drive	drove	driven	driving
eat	ate	eaten	eating
fall	fell	fallen	falling
feed	fed	fed	feeding
feel	felt	felt	feeling
fight	fought	fought	fighting
find	found	found	finding
flee	fled	fled	fleeing
fly	flew	flown	flying



forbid	forbade	forbidden	forbidding
forget	forgot	forgotten	forgetting
forgive	forgave	forgiven	forgiving
freeze	froze	frozen	freezing
get	got	got/gotten	getting
give	gave	given	giving
go	went	gone	going
grind	ground	ground	grinding
grow	grew	grown	growing
hang	hung	hung	hanging
have	had	had	having
hear	heard	heard	hearing
hide	hid	hidden	hiding
hit	hit	hit	hitting
hold	held	held	holding
hurt	hurt	hurt	hurting
keep	kept	kept	keeping
kneel	knelt	knelt	kneeling
know	knew	known	knowing
lay	laid	laid	laying
lead	led	led	leading



lean	leant/leaned	leant/leaned	leaning
leap	leapt/leaped	leapt/leaped	leaping
learn	learnt/learned	learnt/learned	learning
leave	left	left	leaving
lend	lent	lent	lending
let	let	let	letting
lie	lay	lain	lying
light	lit/lighted	lit/lighted	lighting
lose	lost	lost	losing
make	made	made	making
mean	meant	meant	meaning
meet	met	met	meeting
pay	paid	paid	paying
put	put	put	putting
quit	quit	quit	quitting
read	read	read	reading
ride	rode	ridden	riding
ring	rang	rung	ringing
rise	rose	risen	rising
run	ran	run	running
say	said	said	saying



see	saw	seen	seeing
seek	sought	sought	seeking
sell	sold	sold	selling
send	sent	sent	sending
set	set	set	setting
shake	shook	shaken	shaking
shine	shone	shone	shining
shoot	shot	shot	shooting
show	showed	shown/showed	showing
shrink	shrank	shrunk	shrinking
shut	shut	shut	shutting
sing	sang	sung	singing
sink	sank	sunk	sinking
sit	sat	sat	sitting
sleep	slept	slept	sleeping
slide	slid	slid	sliding
speak	spoke	spoken	speaking
spend	spent	spent	spending
spin	spun	spun	spinning
spit	spat	spat	spitting
split	split	split	splitting



spread	spread	spread	spreading
spring	sprang	sprung	springing
stand	stood	stood	standing
steal	stole	stolen	stealing
stick	stuck	stuck	sticking
sting	stung	stung	stinging
stink	stank	stunk	stinking
strike	struck	struck/stricken	striking
swear	swore	sworn	swearing
sweep	swept	swept	sweeping
swim	swam	swum	swimming
swing	swung	swung	swinging
take	took	taken	taking
teach	taught	taught	teaching
tear	tore	torn	tearing
tell	told	told	telling
think	thought	thought	thinking
throw	threw	thrown	throwing
understand	understood	understood	understanding
wake	woke	woken	waking
wear	wore	worn	wearing



weep	wept	wept	weeping
win	won	won	winning
write	wrote	written	writing

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- **Base Form (V1):** Used for the infinitive, imperative, and present tense (except 3rd person singular).
- **Past Simple (V2):** Used for the simple past tense.
- **Past Participle (V3):** Used with auxiliaries to form perfect tenses (*has written*) and the passive voice (*was written*).
- **Present Participle (V4):** Used with auxiliaries to form continuous tenses (*is writing*).

Verb Correction Rules

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Rule 1: Verb Patterns: Gerund vs. Infinitive

The choice between a gerund (V+ing) and an infinitive (to+V) after a verb is not random but is dictated by the preceding verb.

- **Verbs followed by Gerunds:** *enjoy, avoid, consider, deny, postpone, practice, risk, suggest.*
 - *Incorrect:* He avoided **to answer** the question.
 - *Correct:* He avoided **answering** the question.
 - *Incorrect:* She suggested **to leave** early.
 - *Correct:* She suggested **leaving** early.
- **Verbs followed by Infinitives:** *agree, decide, expect, hope, manage, offer, plan, refuse, want.*
 - *Incorrect:* She plans **starting** her own business.
 - *Correct:* She plans **to start** her own business.
 - *Incorrect:* They refused **accepting** the terms.
 - *Correct:* They refused **to accept** the terms.
- **Verbs that can take both (with change in meaning):** *remember, forget, stop, try, regret.*
 - *I stopped to smoke.* (I stopped another activity in order to smoke.)
 - *I stopped smoking.* (I quit the habit of smoking.)
 - *I remembered to lock the door.* (I didn't forget to lock it.)
 - *I remember locking the door.* (I have a memory of doing it.)

Rule 2: The 'Enjoy' Paradigm and Reflexive Usage

The verb *enjoy* is always followed by a gerund, not an infinitive. When referring to a pleasurable experience had by the subject, it can take a reflexive pronoun (*myself, yourself*).

- *Incorrect:* We enjoyed **to travel**.
- *Correct:* We enjoyed **traveling**.
- *Incorrect:* He enjoys **to read** historical fiction.



- **Correct:** He enjoys **reading** historical fiction.
- **Correct (Reflexive):** We really **enjoyed ourselves** at the concert.
- **Correct (Reflexive):** Did you **enjoy yourself** at the party?

Rule 3: Verbs That Typically Exclude Reflexive Pronouns

In English, many actions are inherently understood as being performed by the subject upon themselves. Adding a reflexive pronoun is often redundant and unidiomatic. Such verbs include: *bathe, concentrate, dress, hide, qualify, relax, rest, shave, spread, stop, wake.*

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- **Unidiomatic:** He **hid himself** behind the tree.
- K
- **Idiomatic:** He **hid** behind the tree.
 - **Unidiomatic:** You need to **prepare yourself** for the exam.
 - **Idiomatic:** You need to **prepare** for the exam.
 - **Unidiomatic:** She **dressed herself** quickly.
 - **Idiomatic:** She **dressed** quickly.

Rule 4: Distinguishing Tricky Verb Pairs

Master the distinction between these commonly confused pairs:

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- **Lie vs. Lay :**
 - *Lie* means to recline. (lie, lay, lain). *Please lie down.* / *He lay on the bed yesterday.* / *He has lain there for hours.*
 - *Lay* means to put or place something. (lay, laid, laid). *Please lay the files on the desk.* / *She laid the baby in the crib.* / *They have laid the foundation.*
 - **Rise vs. Raise :**
 - *Rise* means to move upward on its own. (rise, rose, risen). *The sun will rise at 6 AM. / Prices rose significantly. / The dough has risen well.*
 - *Raise* means to lift something else up. (raise, raised, raised). *Please raise your hand.* / *They raised their voices.* / *We have raised enough funds.*
 - **Sit vs. Set:**
 - *Sit* means to be seated. (sit, sat, sat). *Please sit here.* / *She sat on the chair.* / *He has sat there all day.*
 - *Set* means to place something. (set, set, set). *Please set the timer.* / *He set the book on the table.* / *She has set the rules.*

Rule 5: The Principle of Subject-Verb Agreement

The verb must agree with its subject in number (singular/plural), regardless of intervening phrases.

- **Intervening Phrases:** Ignore phrases beginning with *as well as, along with, together with, in addition to.*
- **Example:** The CEO, along with her advisors, **is** attending. (Subject is "CEO")



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- *Example:* The **project**, in addition to all its sub-tasks, **requires** approval. (Subject is "project")
- **Indefinite Pronouns:** *Each, every, either, neither, anyone, everybody, someone* are singular.
- *Example:* **Each** of the candidates **has** submitted a portfolio.
- *Example:* **Everybody** in the offices **has** a computer.
- **Collective Nouns:** Treat as singular if the group acts as one unit; plural if members act individually.
- *Example (Unit):* The ****committee has** reached its decision.
- *Example (Individuals):* The ****committee are** divided in their opinions.

Rule 6: Sequence of Tenses in Complex Sentences

The tense in a subordinate clause is often dependent on the tense in the main clause.

- If the main clause verb is in the past, the subordinate clause verb is usually in a past form.
- *Incorrect:* He **said** that he **is** the manager.
- *Correct:* He **said** that he **was** the manager.
- *Incorrect:* She **knew** that she **has** a chance.
- *Correct:* She **knew** that she **had** a chance.
- An exception is made for universal truths.
- *Correct:* The teacher **taught** that the earth **revolves** around the sun.
- *Correct:* He **knew** that water **boils** at 100 degrees Celsius.



Practice MCQs

3. The Verb

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1. Identify the type of verb in: "She became a doctor after years of study."

- A. Transitive Verb
- B. Intransitive Verb
- C. Linking Verb
- D. Causative Verb

Answer: C

2. Which sentence uses a ditransitive verb?

- A. The sun rises in the east.
- B. She sang a beautiful song.
- C. He told the children a story.
- D. They arrived late.

Answer: C

3. Choose the correct causative structure:

- A. I made him to apologize.
- B. I had him apologize.
- C. I got him apologize.
- D. I let him to leave.

Answer: B

4. The verb in "The flowers smell wonderful" is:

- A. Transitive
- B. Intransitive
- C. Linking
- D. Auxiliary

Answer: C

5. Which verb is followed by a gerund?

- A. decide
- B. want
- C. avoid
- D. hope

Answer: C

6. Select the correct sentence:

- A. She suggested to go early.
- B. She suggested going early.
- C. She suggested go early.

D. She suggested to going early.

Answer: B

7. Identify the intransitive verb:

- A. write
- B. build
- C. arrive
- D. make

Answer: C

8. "The committee has reached its decision." Here 'has' is:

- A. Main verb
- B. Primary auxiliary
- C. Modal auxiliary
- D. Linking verb

Answer: B

9. Which sentence shows correct verb agreement?

- A. The list of items are long.
- B. Each of the students are present.
- C. Neither answer is correct.
- D. The team are winning.

Answer: C

10. Choose the correct past participle form:

- A. swimmmed
- B. swam
- C. swum
- D. swim

Answer: C

11. The error in "She laid on the bed all day" is:

- A. Wrong tense
- B. Wrong verb form
- C. Missing object
- D. Subject-verb disagreement

Answer: B (Should be 'lay')

12. Which modal verb expresses necessity?



- A. can
 - B. may
 - C. must
 - D. might
- Answer: C**

13. Identify the transitive verb:

- A. sleep
 - B. laugh
 - C. eat
 - D. exist
- Answer: C**

14. "I got him to confess." This uses:

- A. Transitive verb
 - B. Causative verb
 - C. Linking verb
 - D. Intransitive verb
- Answer: B**

15. Which verb takes an infinitive?

- A. enjoy
 - B. finish
 - C. plan
 - D. avoid
- Answer: C**

16. Select the correct sequence of tenses:

- A. He said he is coming.
- B. He said he was coming.
- C. He says he was coming.

- D. He had said he is coming.
- Answer: B**

17. The primary auxiliary in "They have been waiting" is:

- A. They
 - B. have
 - C. been
 - D. waiting
- Answer: B**

18. Which sentence uses a reflexive pronoun correctly?

- A. He qualified himself for the job.
 - B. She enjoyed herself at the party.
 - C. They prepared themselves for exam.
 - D. We applied ourselves for the position.
- Answer: B**

19. Identify the linking verb:

- A. run
 - B. become
 - C. create
 - D. destroy
- Answer: B**

20. "The prices have risen sharply." Here 'risen' is:

- A. Base form
 - B. Past tense
 - C. Past participle
 - D. Present participle
- Answer: C**



Chapter 4

Subject-Verb Agreement

Introduction

Subject-verb agreement is a fundamental rule of English grammar. It states that the verb in a sentence must agree in number with its subject. A singular subject requires a singular verb, and a plural subject requires a plural verb. This chapter outlines the key rules and exceptions to ensure grammatical accuracy in your writing and speech.

Subject Verb Agreement Correction Rules

Rule 1: The Interrupting Phrase

When the subject is followed by a phrase like *as well as*, *along with*, *together with*, *in addition to*, *including*, *besides*, or *accompanied by*, the verb agrees with the **original subject**, not the noun in the phrase.

- The **manager**, as well as the team members, **is** attending the conference.
- My **parents**, along with my uncle, **are** visiting us.

Rule 2: Compound Subjects with "And"

- **General Rule:** Two or more subjects joined by **and** take a **plural verb**.
- Ali **and** Sana **are** studying for the exam.
- **Exception:** When the compound subject refers to a **single idea or item**, use a **singular verb**.
- Bread **and** butter **is** a common breakfast. (One food item)
- My friend **and** mentor **has** left the company. (One person)

Rule 3: Indefinite Pronouns

The following indefinite pronouns **always take a singular verb**:

each, either, neither, anyone, anybody, anything, everyone, everybody, everything, someone, somebody, something, no one, nobody, nothing.

- **Everyone** in the office **has** a assigned parking space.
 - **Neither** of the answers **is** correct.
 - **Each** of the students **has** passed the test.
- Note on "None":** "None" can be singular or plural. However, it is often treated as singular, especially in formal writing.
- **None** of the information **was** useful. (Singular)
 - **None** of the options **are** acceptable. (Plural, implying "not any")

Rule 4: Flexible Quantity Words

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4. Subject - Verb Agreement



The pronouns *all*, *any*, *more*, *most*, and *some* can be singular or plural, depending on whether they refer to a countable or uncountable noun.

- All the **water has** evaporated. (Uncountable = Singular Verb)
- All the **students have** left. (Countable = Plural Verb)
- **Some** of the **advice was** helpful. (Uncountable)
- **Some** of the **books were** missing. (Countable)

Rule 5: Collective Nouns

M A collective noun (e.g., *team*, *jury*, *crowd*, *committee*, *family*) can be singular or plural.

- Use a **singular verb** when the group acts as a **single unit**.
 - The **jury has** reached its verdict.
 - Use a **plural verb** when the members of the group are **acting individually**.

- The **jury are** still debating their opinions.

Rule 6: "A Number" vs. "The Number"

- **A number of...** means "many" and takes a **plural verb**.
 - **A number of students were** absent today.
 - **The number of...** refers to a specific figure and takes a **singular verb**.
 - **The number of absent students was** surprisingly high.

Rule 7: Amounts and Quantities

R When a plural noun refers to a **single amount, quantity, or unit**, it takes a **singular verb**.

- **Fifty dollars is** too much to pay for that.
- **Three years seems** like a long time to wait.
- **Two-thirds of the city was** without power.

Rule 8: Titles and Names

The **titles of books, movies, companies, and countries** are always singular, even if they contain plural words.

- "**Great Expectations**" is a classic novel.
- **Feroze Sons is** a well-known publisher.

Rule 9: "Many" vs. "Many A"

- **Many** is always plural.
 - **Many athletes compete** for the prize.
 - **Many a** is always singular and is followed by a singular noun and verb (though it has a plural meaning).

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- Many an athlete competes for the prize.

Rule 10: "Or," "Nor," "Either...Or," "Neither...Nor"

When subjects are joined by *or*, *nor*, *either...or*, or *neither...nor*, the verb agrees with the **subject closest to it**.

- Neither the teacher nor the **students are** in the classroom.
- Neither the students nor the **teacher is** in the classroom.

Rule 11: "Here," "There," and "Where"

In sentences beginning with *here*, *there*, or *where*, the verb agrees with the **true subject** that comes after it.

- **There are** many reasons for this decision.
- **Here is** the file you requested.

Rule 12: Relative Pronouns ("Who," "Which," "That")

The verb in a relative clause should agree with the pronoun's **antecedent** (the word it refers to).

- I respect the **woman** who **works** hard. ("Who" refers to "woman," so the verb is singular)
- I respect the **women** who **work** hard. ("Who" refers to "women," so the verb is plural)

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4. Subject - Verb Agreement





Practice MCQs

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1. The criteria for selection _____ significantly more rigorous this year.
 (a) is
 (b) are
 (c) was
 (d) were
Answer: (b) are

2. A series of lectures on quantum mechanics _____ scheduled for this semester.
 (a) is
 (b) are
 (c) have been
 (d) were
Answer: (a) is

3. Neither the shareholders nor the CEO _____ content with the quarterly report.
 (a) is
 (b) are
 (c) were
 (d) have been
Answer: (a) is

4. The number of applicants for the prestigious fellowship _____ exceeded expectations.
 (a) have
 (b) has
 (c) are
 (d) were
Answer: (b) has

5. Fifty percent of the data _____ been corrupted and _____ unrecoverable.
 (a) has, is
 (b) have, are
 (c) has, are
 (d) have, is
Answer: (a) has, is

6. _____ either of the candidates submitted their portfolio yet?
 (a) Has
 (b) Have
 (c) Do
 (d) Does
Answer: (a) Has

7. The jury _____ divided in their opinions, which _____ the deliberation process.
 (a) is, prolong
 (b) are, prolongs
 (c) is, prolongs
 (d) are, prolong
Answer: (b) are, prolongs

8. "The Brothers Karamazov" _____ one of the most profound novels ever written.
 (a) is
 (b) are
 (c) were
 (d) have been
Answer: (a) is

9. More than one scientist _____ attempting to replicate the controversial experiment.
 (a) is
 (b) are
 (c) were
 (d) have been
Answer: (a) is

10. All of the research, including the preliminary findings, _____ a radical new hypothesis.
 (a) support
 (b) supports
 (c) are supporting

4. Subject - Verb Agreement



(d) have supported
Answer: (b) supports

(d) were issuing
Answer: (a) has issued

11. There _____ several compelling reasons to reconsider the proposed policy.
 (a) is
 (b) are
 (c) has been
 (d) was
Answer: (b) are

16. Many a student _____ struggled with the philosophical concepts in that text.
 (a) have
 (b) has
 (c) are
 (d) were
Answer: (b) has

12. The majority of the senate _____ in favor of the bill, but a vocal minority _____ it vehemently.
 (a) is, oppose
 (b) are, opposes
 (c) is, opposes
 (d) are, oppose
Answer: (c) is, opposes

17. Not only the project manager but also the entire team _____ responsible for the failure.
 (a) is
 (b) are
 (c) were
 (d) have been
Answer: (a) is

13. Each of the employees working in the hazardous environment _____ a protective suit.
 (a) wear
 (b) wears
 (c) have worn
 (d) are wearing
Answer: (b) wears

18. Two hundred dollars _____ the estimated cost for the repairs.
 (a) are
 (b) is
 (c) were
 (d) have been
Answer: (b) is

14. Statistics _____ a branch of mathematics, but the statistics from that study _____ unreliable.
 (a) is, is
 (b) are, are
 (c) is, are
 (d) are, is
Answer: (c) is, are

19. The phenomena observed by the researchers _____ all previous theories.
 (a) contradict
 (b) contradicts
 (c) are contradicting
 (d) has contradicted
Answer: (a) contradict

15. The committee, after lengthy debates, _____ its final recommendation.
 (a) has issued
 (b) have issued
 (c) are issuing

20. Every one of the participants who _____ the training session _____ a certificate.
 (a) attend, receive
 (b) attends, receives
 (c) attend, receives
 (d) attends, receive
Answer: (b) attends, receives

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4. Subject - Verb Agreement



Chapter 5

The Adverb

5. The Adverb

Definition of Adverb

An adverb is a word that modifies (qualifies) a verb, an adjective, another adverb, a preposition, a conjunction, or even an entire sentence. It provides additional information about time, manner, place, frequency, degree, and certainty.

Core Function: To add descriptive detail to show how, when, where, why, or to what extent something happens.

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The Versatile Roles of an Adverb

Adverbs can modify various parts of speech:

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➤ **Modifying a Verb:**

- She sang **beautifully**.
- He runs **quickly**.

➤ **Modifying an Adjective:**

- She is **extremely** intelligent.
- This is a **very** interesting book.

➤ **Modifying Another Adverb:**

- He works **incredibly** efficiently.
- She spoke **almost** inaudibly.

➤ **Modifying a Preposition:**

- The ball landed **just** inside the boundary.
- He arrived **shortly** after noon.

➤ **Modifying a Conjunction:**

- I like him, **simply** because he is honest.
- She left **soon** after the meeting began.

➤ **Modifying an Entire Sentence:**

- **Fortunately**, the weather remained clear.

Types of Adverb

Adverbs can be categorized based on the specific information they provide.

1. Adverbs of Manner



Describe *how* an action is performed.

- **Questions Answered:** How? In what manner?
- **Examples:** quickly, slowly, carefully, beautifully, well, fast
- He solved the problem **efficiently**.
- They danced **gracefully**.

2. Adverbs of Place

Describe *where* an action occurs.

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- **Questions Answered:** Where? Where to?
 - **Examples:** here, there, everywhere, somewhere, inside, outside
 - Please wait **outside**.
 - The children are playing **upstairs**.

3. Adverbs of Time

Describe *when* an action occurs.

- P
R
E
P
- **Questions Answered:** When? How long? How often?
 - **Examples:** now, then, today, yesterday, soon, already, yet
 - I will call you **tomorrow**.
 - She has **already** finished her work.

4. Adverbs of Frequency

Describe *how often* an action occurs.

- A
R
A
T
- **Questions Answered:** How often?
 - **Examples:** always, often, sometimes, rarely, never, usually, frequently
 - He **always** arrives on time.
 - I **sometimes** go for a walk in the evening.

5. Adverbs of Degree

Describe the *intensity* or *degree* of an action, adjective, or another adverb.

- I
O
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S
- **Questions Answered:** To what extent? How much?
 - **Examples:** very, too, quite, almost, fully, completely, entirely
 - She is **very** talented.
 - I am **almost** ready.

6. Adverbs of Affirmation and Negation

Express certainty, agreement, or denial.

- **Examples:** certainly, definitely, surely, probably, perhaps, not, never
 - I will **certainly** help you.



- He will **probably** arrive late.

7. Interrogative Adverbs

Used to ask questions.

- **Examples:** when, where, why, how
- **When** will you arrive?
- **Why** are you late?

8. Relative Adverbs

Introduce relative clauses and relate back to an antecedent (expressed or understood).

- **Examples:** when, where, why
- This is the house **where** I was born. (Antecedent: 'house')
- I remember the day **when** we met. (Antecedent: 'day')
- Tell me **why** you are upset. (Antecedent understood: 'the reason')

Degrees of Comparison in Adverbs

Like adjectives, many adverbs have comparative and superlative forms.

Regular Formation

- **One-syllable adverbs:** Add -er (comparative) and -est (superlative).

Positive	Comparative	Superlative
soon	sooner	soonest
hard	harder	hardest
fast	faster	fastest

- **Adverbs ending in -ly:** Use *more* (comparative) and *most* (superlative).

Positive	Comparative	Superlative
quickly	more quickly	most quickly
beautifully	more beautifully	most beautifully
efficiently	more efficiently	most efficiently

Irregular Formation

Positive	Comparative	Superlative
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well	better	best
badly	worse	worst
much	more	most
little	less	least
far	farther/further	farthest/furthest

M Adverb Placement and Order

K **General Rule:** The standard order when multiple adverbs appear together is **Manner - Place - Time (MPT)**.

- P • They sang **beautifully (M)** in the hall (**P**) yesterday (**T**).
- P • He worked **diligently (M)** at the office (**P**) all day (**T**).

R Positioning Rules:

- E • **Adverbs of Frequency** usually come before the main verb but after the verb 'to be'.
 - o She **often** visits the library.
 - o He is **always** punctual.
- P • **Adverbs of Manner** typically come after the verb and its object.
 - o She drove the car **carefully**.
- A • **Adverbs of Time** can often be placed at the beginning or end of a sentence.
 - o **Yesterday**, we went to the market. / We went to the market **yesterday**.

A Adverb Correction Rules

T **Rule 1: Avoid Double Negatives**

- I • **Incorrect:** He **cannot hardly** wait.
- I • **Correct:** He **can hardly** wait.

O **Rule 2: Use 'Much' vs. 'Very' Correctly**

- N • Use '**much**' to modify comparative degrees and past participles used as adjectives.
- N • Use '**very**' to modify adjectives and adverbs in the positive degree.
- S • **Incorrect:** I am **very** pleased to see you.
- S • **Correct:** I am **much** pleased to see you.
- S • **Correct:** She is **very** happy.

Rule 3: Inversion with Negative Adverbs

When negative adverbs like **never, hardly, seldom, rarely, no sooner** begin a sentence, the subject and auxiliary verb are inverted.



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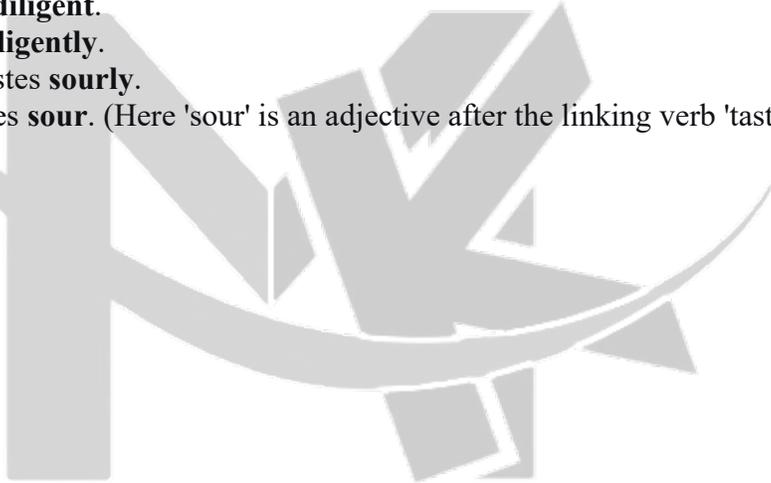
- **Incorrect:** Never before I have seen such a sight.
 - **Correct:** Never before have I seen such a sight.
 - **Incorrect:** Hardly I had entered the room when the phone rang.
 - **Correct:** Hardly had I entered the room when the phone rang.
- Rule 4: 'Too' vs. 'Very'**

- 'Too' implies excess, often leading to a negative result.
- 'Very' simply intensifies.
- **Incorrect:** He is **too** rich. (Unless you mean it's a problem)
- **Correct:** He is **very** rich.
- **Correct:** He is **too** poor **to afford** a car.

Rule 5: Adjective vs. Adverb Confusion

Ensure that you use an adverb, not an adjective, to modify a verb, adjective, or another adverb.

- **Incorrect:** She works **diligent**.
- **Correct:** She works **diligently**.
- **Incorrect:** The fruit tastes **sourly**.
- **Correct:** The fruit tastes **sour**. (Here 'sour' is an adjective after the linking verb 'tastes')



PREPARATIONS
LET'S MAKE IT HAPPEN

Practice MCQs

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1. Identify the type of adverb in the sentence: "He will probably complete the project by tomorrow."

- A. Adverb of Manner
- B. Adverb of Time
- C. Adverb of Affirmation
- D. Adverb of Degree

Answer: C

2. Choose the sentence with the correct adverb order:

- A. She sang beautifully at the concert last night.
- B. She sang at the concert beautifully last night.
- C. She beautifully sang last night at the concert.
- D. Last night at the concert she sang beautifully.

Answer: A

3. The error in the sentence "I am very pleased to meet you" is:

- A. Incorrect use of 'very'
- B. Incorrect verb tense
- C. Wrong pronoun
- D. No error

Answer: A (Should be 'much pleased')

4. Which sentence uses the correct comparative form of the adverb?

- A. She works more harder than anyone else.
- B. She works harder than anyone else.
- C. She works more hard than anyone else.
- D. She works hardest than anyone else.

Answer: B

5. Identify the relative adverb in: "I remember the day when we first met."

- A. I
- B. remember
- C. day

D. when

Answer: D

6. The sentence "He reached the station lately" is incorrect because:

- A. 'lately' means recently, not 'late'
- B. Wrong preposition
- C. Incorrect verb form
- D. Missing article

Answer: A

7. Choose the correct negative inversion:

- A. Hardly had I left when the storm began.
- B. Hardly I had left when the storm began.
- C. Hardly I left when the storm began.
- D. I had left hardly when the storm began.

Answer: A

8. Which adverb modifies the entire sentence?

- A. quickly
- B. here
- C. unfortunately
- D. very

Answer: C

9. The error in "She is too beautiful" is that:

- A. 'too' implies excess and should be 'very'
- B. Wrong adjective form
- C. Incorrect verb agreement
- D. No error

Answer: A

10. Identify the adverb of degree: "The project is almost complete."

- A. project
- B. is
- C. almost
- D. complete

Answer: C

5. The Adverb

11. Which sentence demonstrates correct use of 'much' and 'very'?

- A. I am very much tired after the long journey.
- B. I am very tired after the long journey.
- C. I am much tired after the long journey.
- D. Both A and B are correct.

Answer: B

12. Choose the correct superlative form: "Of all the students, she solves problems _____."

- A. most intelligently
- B. intelligentlyest
- C. more intelligently
- D. most intelligent

Answer: A

13. Identify the adverb modifying a preposition: "The ball landed just outside the boundary."

- A. ball
- B. landed
- C. just
- D. outside

Answer: C

14. The sentence "Never I have seen such dedication" is incorrect because:

- A. Missing auxiliary verb
- B. Wrong adverb placement
- C. No subject-verb inversion
- D. Incorrect tense

Answer: C

15. Which of these is an adverb of frequency?

- A. always
- B. quickly
- C. here
- D. very

Answer: A

16. Choose the sentence with proper adverb usage:

- A. She speaks English good.
- B. She speaks English well.
- C. She speaks English goodly.
- D. She speaks English best.

Answer: B

17. Identify the interrogative adverb: "Why are you leaving so early?"

- A. Why
- B. are
- C. leaving
- D. early

Answer: A

18. The error in "He can hardly never complete his work on time" is:

- A. Double negative
- B. Wrong adverb order
- C. Incorrect verb form
- D. Missing preposition

Answer: A

19. Which sentence uses an adverb to modify an adjective?

- A. She runs extremely fast.
- B. He is quite intelligent.
- C. They arrived very late.
- D. Both B and C

Answer: D

20. Choose the correct sentence:

- A. No sooner had she left than it started raining.
- B. No sooner she had left than it started raining.
- C. No sooner she left than it started raining.
- D. No sooner had she left then it started raining.

Answer: A



Chapter 6

The Adjective

6. The Adjective

Definition of Adjective

An adjective is a word that modifies a noun or a pronoun by describing, identifying, or quantifying it. It adds meaning by answering questions like *What kind? Which one? How many?* or *How much?*

Core Function: To provide more information about a noun or pronoun.

Placement Rules:

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K

1. **Before a Noun (Attributive Position):** A **brilliant** idea, the **blue** sky
2. **After a Linking Verb (Predicative Position):** The idea is **brilliant**. The sky appears **blue**.

Types of Adjective

P

Adjectives can be categorized based on their specific function and meaning.

R

1. Proper Adjective

E

Formed from proper nouns and used to describe something related to that noun.

P

- **Examples:** Chinese food, Pakistani culture, Victorian era, Shakespearean drama

A

2. Descriptive Adjective (Adjective of Quality)

R

Describes the quality, state, or kind of a noun.

Examples: a brave soldier, a sick patient, a beautiful painting, an honest person

A

3. Adjective of Quantity

T

Indicates the amount or quantity of a noun (used with uncountable nouns).

Examples: some water, much effort, little hope, enough time, all people

I

4. Adjective of Number (Numeral Adjective)

O

Shows the number or order of nouns (used with countable nouns).

N

- **Definite Numeral:** one, two, first, second (shows exact number)
- **Indefinite Numeral:** many, few, several, some (shows approximate number)
- **Distributive Numeral:** each, every, either, neither (refers to individual members)

S

5. Demonstrative Adjective

Points out or demonstrates which specific noun is being referred to.

- **Definite Demonstrative:** this, that, these, those, the
- **Indefinite Demonstrative:** a, an, any, one, certain, some, other, another

6. Interrogative Adjective



Used with a noun to ask a question.

Examples: Which book do you prefer? **Whose** bag is this? **What** time is it?

7. Possessive Adjective

Shows possession or ownership.

Examples: my book, your pen, his car, her dress, our house, their garden

Degrees of Comparison

M Most descriptive adjectives, along with *much/many* and *little/few*, have three degrees of
K comparison.

1. Positive Degree

- The base form of the adjective.
- Used when no comparison is made.
- **Example:** This is a **long** road. She is **intelligent**.

2. Comparative Degree

- Used to compare **two** entities.
- Formed by adding **-er** or using *more* before the adjective.
- Often followed by *than*.
- **Example:** This road is **longer than** that one. She is **more intelligent than** her brother.

3. Superlative Degree

- Used to compare **three or more** entities.
- Formed by adding *-est* or using *most* before the adjective.
- Almost always preceded by *the*.
- **Example:** This is the **longest** road in the city. She is the **most intelligent** student in the class.

Formation Rules:

Positive	Comparative	Superlative	Rule
tall	taller	tallest	Add -er/-est to one-syllable adjectives
big	bigger	biggest	Double the consonant + -er/-est
happy	happier	happiest	Change -y to -i + -er/-est
beautiful	more beautiful	most beautiful	Use more/most with 2+ syllable adjectives
good/well	better	best	Irregular forms

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bad/ill	worse	worst	Irregular forms
much/many	more	most	Irregular forms
little	less	least	Irregular forms
far	farther/further	farthest/furthest	Irregular forms

Adjective Rules and Exceptions

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Rule 1: Adjectives vs. Adverbs with Specific Verbs

- **Action Verbs** require **adverbs**: She sang **beautifully**. He drives **carefully**.
- **Linking Verbs & Verbs of Perception** require **adjectives**: You look **tired**. The food smells **delicious**. She feels **happy**.
- **Common Linking/Perception Verbs**: be, become, seem, appear, feel, look, smell, sound, taste, grow, remain, prove, turn

Rule 2: Adjectives Ending in '-ly'

Some words ending in *-ly* are adjectives, not adverbs. They often describe a manner or characteristic.

- **Adjectives**: friendly, lively, lovely, lonely, silly, cowardly, motherly, fatherly
- **Incorrect**: She spoke to me **friendly**.
- **Correct**: She spoke to me **in a friendly manner**.

Rule 3: 'Good' vs. 'Well'

- **Good** is an adjective: She is a **good** singer. This tastes **good**.
- **Well** is usually an adverb: She sings **well**. He plays **well**.
- **Exception**: *Well* can be an adjective meaning "in good health": I don't feel **well**.

Rule 4: Avoiding Double Comparatives and Superlatives

- **Incorrect**: This is the **most finest** jewel.
- **Correct**: This is the **finest** jewel.
- **Incorrect**: She is **more taller** than me.
- **Correct**: She is **taller** than me.

Rule 5: 'Few' vs. 'Little'

- **Few/A Few/The Few**: Used with countable plural nouns.
 - **Few** books (not many), **a few** books (some), **the few** books (the specific small number)
- **Little/A Little/The Little**: Used with uncountable nouns.
 - **Little** water (not much), **a little** water (some), **the little** water (the specific small amount)

Rule 6: Absolute Adjectives (Non-Gradable)



Some adjectives represent an absolute or perfect state and should not be used in comparative or superlative forms.

- **Common Absolute Adjectives:** perfect, unique, universal, ideal, chief, excellent, extreme, utmost, worldwide, complete, round, square, eternal, fatal
- **Incorrect:** This is the **most perfect** score.
- **Correct:** This is a **perfect** score.

Rule 7: Comparatives Taking 'To' Instead of 'Than'

M Some comparative adjectives are followed by *to*, not *than*.

- **These adjectives take 'to':** superior, inferior, senior, junior, prior, elder, preferable
- **Examples:** He is **senior to** me. This model is **superior to** that one.

Rule 8: Participle Adjectives

- **Present Participle (-ing):** Describes the cause of a feeling (boring, shocking, interesting).
- **Past Participle (-ed):** Describes the feeling itself (bored, shocked, interested).
- **Examples:** The news was **shocking**. We were **shocked** by the news.

Rule 9: 'Comparatively' and 'Relatively'

E These words already imply a comparison. Use the **positive degree** of the adjective with them.

- **Incorrect:** This task is **comparatively easier**.
- **Correct:** This task is **comparatively easy**.

Rule 10: Adjectives Following Nouns

R Some adjectives are placed immediately **after** the noun they modify.

- **Common Postpositive Adjectives:** God **Almighty**, time **immemorial**, something **special**, the president **elect**, a court **martial**
- **Fixed Phrases:** heir **apparent**, notary **public**, body **politic**

MK PREPARATIONS
LET'S MAKE IT HAPPEN

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Practice MCQS

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1. Identify the type of adjective in the phrase: "He has sufficient evidence to prove his point."

- A. Adjective of Quality
- B. Adjective of Quantity
- C. Demonstrative Adjective
- D. Proper Adjective

Answer: B

2. Choose the sentence that correctly uses a proper adjective:

- A. We studied about the Shakespearean era in literature class.
- B. We studied about the Shakespeare era in literature class.
- C. We studied about the Shakespeare's era in literature class.
- D. We studied about Shakespearean era in literature class.

Answer: A

3. The error in the sentence "This is the most perfect specimen I have ever seen" is:

- A. Incorrect use of superlative degree
- B. 'Perfect' is an absolute adjective
- C. Wrong verb tense
- D. Missing article

Answer: B

4. Which sentence demonstrates correct use of adjectives after linking verbs?

- A. The flowers smell sweetly.
- B. The flowers smell sweet.
- C. The flowers are smelling sweetly.
- D. The flowers are smelling sweet.

Answer: B

5. Identify the demonstrative adjective: "Those buildings across the street are historical landmarks."

- A. Those

- B. buildings
- C. across
- D. historical

Answer: A

6. Choose the correct comparative form: "Her performance was _____ than expected."

- A. more better
- B. better
- C. gooder
- D. more good

Answer: B

7. The sentence "He is senior than all other officers" is incorrect because:

- A. Wrong preposition after 'senior'
- B. Incorrect use of comparative degree
- C. Wrong subject-verb agreement
- D. Missing article

Answer: A

8. Which of these is an adjective of number?

- A. several
- B. much
- C. some
- D. enough

Answer: A

9. Identify the sentence with correct adjective order:

- A. She wore a beautiful red silk dress.
- B. She wore a red beautiful silk dress.
- C. She wore a silk beautiful red dress.
- D. She wore a beautiful silk red dress.

Answer: A

10. The error in "She feels badly about the situation" is:

- A. 'Badly' should be 'bad' after linking verb
- B. Wrong adverb form

6. The Adjective



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- C. Incorrect preposition
- D. Missing subject

Answer: A

11. Choose the correct usage of 'few' and 'little':

- A. There are few students in the class today.
- B. There is few students in the class today.
- C. There are little students in the class today.
- D. There is little students in the class today.

Answer: A

12. Identify the possessive adjective: "Our team performed better than their team."

- A. Our
- B. team
- C. better
- D. their

Answer: A

13. Which sentence uses an absolute adjective correctly?

- A. This is the most unique opportunity.
- B. This is a very unique opportunity.
- C. This is a unique opportunity.
- D. This is the unquest opportunity.

Answer: C

14. The phrase "God Almighty" demonstrates:

- A. Proper adjective usage
- B. Adjective following the noun
- C. Superlative degree
- D. Demonstrative adjective

Answer: B

15. Choose the sentence with correct participle adjective usage:

- A. The bored lecture put everyone to sleep.

- B. The boring lecture put everyone to sleep.
- C. The lecture was bored everyone.
- D. Everyone was boring by the lecture.

Answer: B

16. Identify the interrogative adjective: "Which route should we take to avoid traffic?"

- A. Which
- B. route
- C. should
- D. take

Answer: A

17. The error in "This is more preferable than that option" is:

- A. Double comparative
- B. Wrong preposition
- C. Incorrect adjective form
- D. Missing article

Answer: A

18. Which sentence demonstrates correct use of 'elder':

- A. She is elder than her sister.
- B. She is elder to her sister.
- C. She is older than her sister.
- D. Both B and C are correct.

Answer: D

19. Identify the adjective of quality: "The magnificent palace stood against the golden sky."

- A. The
- B. magnificent
- C. stood
- D. golden

Answer: B

20. Choose the correct superlative form: "This is the _____ movie I have ever seen."

- A. most interesting
- B. interestingest



- C. most interest
- D. more interesting

Answer: A

21. The sentence "He gave a cowardly reply" is:

- A. Correct - 'cowardly' is an adjective
- B. Incorrect - should be 'coward'
- C. Incorrect - should be 'cowardlyly'
- D. Correct - but informal

Answer: A

22. Which of these is NOT a proper adjective?

- A. Victorian
- B. Pakistani
- C. London
- D. American

Answer: C

23. Identify the sentence with correct adjective usage:

- A. The news was shocked.
- B. The news was shocking.
- C. The news were shocking.
- D. The news were shocked.

Answer: B

24. The phrase "a worth-seeing sight" demonstrates:

- A. Adjective following noun
- B. Proper adjective
- C. Compound adjective
- D. Demonstrative adjective

Answer: C

25. Choose the correct comparative:

"This method is _____ to the previous one."

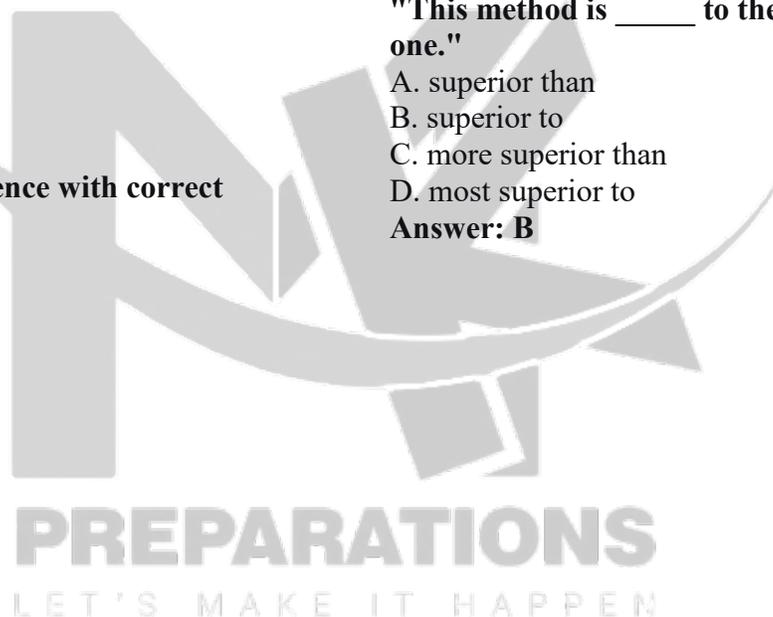
- A. superior than
- B. superior to
- C. more superior than
- D. most superior to

Answer: B

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6. The Adjective





Chapter 7

Preposition

Introduction

A preposition is a word that shows a relationship between a noun (or pronoun) and another word in a sentence. This relationship can be one of time, place, direction, manner, or agency. Prepositions are essential for providing context and clarity.

Common Prepositions: in, on, at, with, under, above, into, by, of, to, for, from, about, between, among.

Prepositions of Time

Preposition	Usage	Example
At	Specific times, night, holidays	At 5 o'clock, at night, at Eid
On	Days, specific dates	On Monday, on 25th March
In	Months, seasons, years, centuries, long periods, parts of the day (except 'night')	In August, in winter, in 2006, in the morning
Since	From a specific point in time (past until now)	She has lived here since 2010.
For	A duration of time (past until now)	He studied for two hours.
From...to	Start and end of a period	The shop is open from Monday to Friday.
Until/Till	Up to a certain time	He is on holiday until Friday.
By	At the latest; a deadline	I will finish by noon.
Before	Earlier than a certain time	Before 2004
After	Later than a certain time	After the meeting
Ago	A time in the past from now	He left ten minutes ago .
Past/To	Telling the time	Ten past six (6:10), Ten to six (5:50)

Prepositions of Place and Location

These prepositions tell us where something is located.

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7. Preposition

Preposition	Usage	Example
In	Enclosed spaces, countries, cities, streets, books	In the kitchen, in Pakistan, in a book, in the car
On	Surfaces, public transport, rivers, floors, attached	On the wall, on the bus, on the Thames, on the 2nd floor
At	Specific points, addresses, events, tables	At the door, at 21 Main Street, at a concert, at the table
By/Beside/Next to	Adjacency (left or right of something)	She stood by the car.
Under	Directly below (and often covered by)	The cat is under the table.
Below	Lower than something else (not directly under)	The valley is below the mountain.
Over	Covered by; above; across to the other side	Put a blanket over the bed. He jumped over the wall.
Above	Higher than something else	The picture hangs above the sofa.
Across	From one side to the other	Walk across the bridge.
Through	Movement from one end to the other in a 3D space	Drive through the tunnel.
Between	In the space separating two things	The ball is between the chair and the table.
Among	In the middle of a group (more than two)	She was among friends.

Prepositions of Direction and Movement

These prepositions indicate the direction in which someone or something is moving.

Preposition	Usage	Example
To	Movement towards a destination	Go to school, go to bed
Into	Movement from outside to inside	Walk into the room.
Out of	Movement from inside to outside	Get out of the car.



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Towards	Movement in the direction of (not necessarily arriving)	He walked towards the park.
Onto	Movement to the top of a surface	The cat jumped onto the chair.
From	Point of origin	This gift is from my mother.
Through	Movement in one side and out the other	We walked through the forest.
Across	Movement from one side to the other	She swam across the river.

Prepositions of Manners

➤ Preposition of Agent (By, With)

Indicates who or what performs an action or causes something.

- **By:** for the doer of the action (often in passive voice).
 - The novel was written **by** Dickens.
- **With:** for the tool or instrument used.
 - He opened the door **with** a key.

➤ Preposition for Device, Instrument, or Machine (By, With, On)

- **By:** for modes of transport and communication.
 - She travels **by** bus. He sent it **by** email.
- **On:** for using specific devices or being aboard transport.
 - She is **on** the phone. We are **on** the plane.
- **With:** for using a physical tool.
 - He wrote **with** a pen.

Prepositional Phrases (Verb + Preposition)

A prepositional verb is a combination of a verb and a specific preposition. Using the wrong preposition is a common error.

Prepositional Verb	Usage	Example
Apologize to (sb) for (sth)	Say sorry	He apologized to me for being late.
Believe in	Have faith in the existence of	Do you believe in ghosts?



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Belong to	Be owned by	This book belongs to me.
Care about	Be concerned for	I care about the environment.
Care for	Look after; like	Nurses care for the sick.
Depend on	Rely on	It depends on the weather.
Listen to	Pay attention to sound	Listen to this song.
Look at	Direct your eyes towards	Look at this picture.
Look for	Search for	I am looking for my keys.
Look after	Take care of	Can you look after my dog?
Rely on	Depend on	You can rely on me.
Wait for	Stay until someone arrives	Wait for me!

Common Preposition Errors and Correct Usage

This list addresses frequent mistakes by showing the correct preposition to use after certain words

1. **Absorbed in** his work. (Not *at*)
2. **Accused of** stealing. (Not *for*)
3. **Accustomed to** hot weather. (Not *with*)
4. **Afraid of** the dark. (Not *from*)
5. **Angry with** a person. (Not *against*)
6. **Anxious about** his health. (Not *for*)
7. **Arrive at** a building, **in** a city/country. (Not *to*)
8. **Ashamed of** his behavior. (Not *from*)
9. **Believe in** God. (Not *to*)
10. **Boast of** or **about** his wealth. (Not *for*)
11. **Composed of** thirty students. (Not *from*)
12. **Congratulate on** your success. (Not *for*)
13. **Consist of** twelve months. (Not *from*)
14. **Covered with** snow. (Not *by*)
15. **Cure of** a disease. (Not *from*)
16. **Depend on** him. (Not *from*)
17. **Die of** an illness. (Not *from*)
18. **Different from** yours. (Not *than*)
19. **Disappointed in** his work. (Not *from*)
20. **Divide into** parts. (Not *in*)
21. **Dressed in** black. (Not *with*)
22. **Exception to** the rule. (Not *of*)
23. **Exchange for** machinery. (Not *by*)
24. **Fail in** an exam. (Not *from*)
25. **Full of** water. (Not *with* or *from*)
26. **Good at** mathematics. (Not *in*)
27. **Independent of** his parents. (Not *from*)
28. **Interested in** history. (Not *for*)
29. **Jealous of** his brother. (Not *from*)
30. **Leave for** London. (Not *to*)
31. **Live on** his salary. (Not *from*)
32. **Look at** the board. (Not *to*)
33. **Married to** her cousin. (Not *with*)
34. **Prefer tea to** coffee. (Not *from* or *than*)
35. **Proud of** his son. (Not *for*)
36. **Related to** him. (Not *with*)
37. **Similar to** mine. (Not *with*)
38. **Sit at** a desk. (Not *on*)
39. **Spend money on** books. (Not *for*)



- 40. **Succeed in** his career. (Not *at*)
- 41. **Superior to** this model. (Not *than* or *from*)
- 42. **Sure of** his honesty. (Not *for*)
- 43. **Surprised at** the news. (Not *for*)
- 44. **Suspect of** a crime. (Not *for*)
- 45. **Tired of** waiting. (Not *from*)
- 46. **Translate into** English. (Not *to*)
- 47. **Tremble with** fear. (Not *from*)
- 48. **Write in** ink. (Not *with* ink)

Nouns, Adjectives, and Verbs with Prepositions

M A. Common Noun + Preposition Combinations

- K** • **advantage of** (doing) something | **advantage to** (being) something
- K** • **cause of** the problem
- K** • **cheque for** £100
- K** • **damage to** the car
- P** • **demand for** skilled workers
- P** • **difference between** A and B
- R** • **increase in** prices
- E** • **invitation to** the party
- E** • **reason for** the delay
- P** • **solution to** a problem
- P** • **relationship with** someone

A B. Common Adjective + Preposition Combinations

- R** • **afraid of** spiders
- R** • **angry with** someone **about** something
- A** • **aware of** a fact
- T** • **bad at** languages
- T** • **capable of** achieving
- I** • **different from** others
- I** • **excited about** the trip
- O** • **famous for** its cuisine
- O** • **fed up with** the situation
- N** • **full of** people
- S** • **good at** sports
- S** • **interested in** art
- S** • **keen on** football
- S** • **proud of** his work
- S** • **responsible for** a task
- S** • **similar to** mine
- S** • **sorry about** a situation | **sorry for** someone

- **sure of / about** something
- **surprised at / by** the news
- **tired of** working

C. Common Verb + Preposition Combinations (Beyond Prepositional Verbs)

- **Apologize to** someone **for** something.
- **Apply for** a job.
- **Ask for** information.
- M** • **Belong to** me.
- K** • **Blame** someone **for** a mistake | **Blame** a mistake **on** someone.
- **Complain to** someone **about** something.
- **Concentrate on** your work.
- **Congratulate** someone **on** a success.
- P** • **Consist of** several parts.
- **Decide on** a plan.
- R** • **Hear about** an event | **Hear from** a person (receive a call/letter) | **Hear of** something (be aware of its existence).
- E** • **Laugh at** a joke.
- P** • **Pay for** a product. (But: **pay** a bill - no preposition)
- A** • **Protect** someone **from** danger.
- **Provide** someone **with** something.
- R** • **Rely on** a friend.
- **Remind** someone **about** an appointment | **Remind** someone **of** a person/thing (cause to remember).
- A** • **Search for** your keys.
- T** • **Speak / Talk to** someone **about** something.
- **Spend money on** something.
- I** • **Suffer from** an illness.
- **Think about** an idea (consider) | **Think of** an idea (have an idea).
- O** • **Warn** someone **about / of** a danger.
- **Thank** someone **for** something.

Word + Preposition Combinations Table

Word	Preposition	Meaning (Word + Preposition)
A		
Absorbed	in	کسی کام میں محو ہونا
Accuse	of	کسی چیز کا الزام لگانا

Accustomed	to	کسی چیز کا عادی ہونا
Adapt	to	کسی چیز کے مطابق ڈھل جانا
Add	to	کسی چیز میں اضافہ کرنا
Adept	at	کسی کام میں ماہر ہونا
Admit	to	کسی بات کا اعتراف کرنا
Advise	on	کسی معاملے پر مشورہ دینا
Afraid	of	کسی چیز سے ڈرنا
Agree	with	کسی شخص سے متفق ہونا
B		
Base	on	کسی چیز پر مبنی ہونا
Beg	for	کسی چیز کی التجا کرنا
Begin	with	کسی چیز سے آغاز کرنا
Believe	in	کسی چیز پر یقین رکھنا
Belong	to	کسی کی ملکیت ہونا
Benefit	from	کسی چیز سے فائدہ اٹھانا
Blame	for	کسی چیز کا الزام لگانا
Boast	about	کسی چیز پر فخر کرنا
Borrow	from	کسی سے ادھار لینا
Bump	into	کسی سے اچانک ملاقات ہونا
C		
Capable	of	کسی کام کے قابل ہونا
Care	about	کسی چیز کی پرواہ کرنا
Charge	with	کسی کام کی ذمہ داری سونپنا
Choose	between	دو چیزوں میں سے انتخاب کرنا
Clash	with	کسی سے متصادم ہونا
Collaborate	with	کسی کے ساتھ مل کر کام کرنا
Combine	with	کسی چیز کے ساتھ ملانا
Comment	on	کسی چیز پر تبصرہ کرنا
Communicate	with	کسی سے بات چیت کرنا

Compare	with	کسی چیز کا موازنہ کرنا
D		
Deal	with	کسی معاملے کو نمٹانا
Decide	on	کسی چیز کا فیصلہ کرنا
Dedicate	to	کسی کام کے لیے وقف کرنا
Depend	on	کسی چیز پر انحصار کرنا
Derive	from	کسی چیز سے اخذ کرنا
Describe	to	کسی کو کچھ بیان کرنا
Desire	for	کسی چیز کی خواہش رکھنا
Differ	from	کسی چیز سے مختلف ہونا
Disagree	with	کسی سے اختلاف کرنا
Disappear	from	کسی جگہ سے غائب ہونا
E		
Eager	for	کسی چیز کے لیے بے تاب ہونا
Eligible	for	کسی چیز کے لیے اہل ہونا
Engage	in	کسی کام میں مصروف ہونا
Enthusiastic	about	کسی چیز کے بارے میں پرجوش ہونا
Excel	in	کسی میدان میں ماہر ہونا
Exchange	for	کسی چیز کے بدلے دینا
Exclude	from	کسی چیز سے خارج کرنا
Excuse	for	کسی بات کی معافی
Experienced	in	کسی میدان میں تجربہ کار ہونا
Explain	to	کسی کو سمجھانا
F		
Face	with	کسی مشکل کا سامنا کرنا
Fail	in	کسی کام میں ناکام ہونا
Familiar	with	کسی چیز سے واقف ہونا
Famous	for	کسی چیز کے لیے مشہور ہونا
Fed up	with	کسی چیز سے تنگ آجانا
Fight	for	کسی چیز کے لیے لڑنا

Fill	with	کسی چیز سے بھرنا
Focus	on	کسی چیز پر توجہ دینا
Forgive	for	کسی بات کے لیے معاف کرنا
Free	from	کسی چیز سے آزاد ہونا
G		
Generous	with	کسی چیز میں سخی ہونا
Glad	about	کسی بات پر خوش ہونا
Good	at	کسی کام میں ماہر ہونا
Grateful	for	کسی چیز کے لیے شکر گزار ہونا
Guilty	of	کسی جرم کا مرتکب ہونا
H		
Happy	about	کسی بات پر خوش ہونا
Hear	about	کسی چیز کے بارے میں سننا
Hesitate	to	کرنے سے ہچکچانا
Hope	for	کسی چیز کی امید رکھنا
Hungry	for	کسی چیز کی شدید خواہش ہونا
I		
Identical	to	کسی چیز کے ہو بہو
Impressed	with	کسی چیز سے متاثر ہونا
Improve	on	کسی چیز میں بہتری لانا
Include	in	کسی چیز میں شامل کرنا
Indifferent	to	کسی چیز کے بارے میں بے پروا
Infer	from	کسی چیز سے نتیجہ اخذ کرنا
Influence	on	کسی چیز پر اثر
Inform	about	کسی چیز کے بارے میں آگاہ کرنا
Innocent	of	کسی جرم سے بے گناہ
Insist	on	کسی بات پر اصرار کرنا
J		
Jealous	of	کسی سے حسد کرنا
Join	in	کسی کام میں شامل ہونا

Jump	at	کسی موقع پر فوراً قبول کرنا
Justify	to	کسی کے سامنے جواز پیش کرنا
K		
Keen	on	کسی چیز کا شوقین ہونا
Keep	from	کسی کام سے روکنا
Kind	to	کسی کے ساتھ مہربان
Know	about	کسی چیز کے بارے میں جاننا
L		
Laugh	at	کسی پر ہنسنا
Lead	to	کسی چیز کی طرف لے جانا
Learn	about	کسی چیز کے بارے میں سیکھنا
Listen	to	کسی چیز کو سننا
Look	at	کسی چیز کو دیکھنا
Look	for	کسی چیز کو ڈھونڈنا
Look	forward to	کسی چیز کا انتظار کرنا
Lucky	at	کسی کام میں خوش قسمت
M		
Married	to	کسی سے شادی شدہ
Mean	to	کسی کے ساتھ برا سلوک
Mention	to	کسی کے سامنے ذکر کرنا
Mistake	for	کسی چیز کو غلط سمجھنا
N		
Necessary	for	کسی چیز کے لیے ضروری
Need	for	کسی چیز کی ضرورت
Nervous	about	کسی چیز کے بارے میں گھبراہٹ
Nice	to	کسی کے ساتھ اچھا سلوک
Notorious	for	کسی چیز کے لیے بدنام
O		
Object	to	کسی بات پر اعتراض
Obliged	to	کسی کا احسان مند

Obsessed	with	کسی چیز کا دیوانہ
Obtain	from	کسی سے حاصل کرنا
Occur	to	ذہن میں آنا
P		
Participate	in	کسی کام میں حصہ لینا
Pay	for	کسی چیز کی قیمت ادا کرنا
Persist	in	کسی کام میں ڈٹے رہنا
Pleased	with	کسی چیز سے خوش
Polite	to	کسی کے ساتھ شائستہ
Q		
Qualified	for	qualified کسی کام کے لیے
Quick	at	کسی کام میں تیز
R		
React	to	کسی چیز پر رد عمل
Recover	from	کسی چیز سے صحتیاب
Refer	to	کسی چیز کا حوالہ
Regard	as	کسی چیز کے طور پر دیکھنا
Rely	on	کسی پر بھروسہ
S		
Save	from	کسی چیز سے بچانا
Scared	of	کسی چیز سے ڈرنا
Search	for	کسی چیز کی تلاش
Separate	from	کسی چیز سے الگ
Share	with	کسی کے ساتھ بانٹنا
T		
Take	after	کسی کے مشابہ
Talk	about	کسی چیز کے بارے میں بات
Thank	for	کسی چیز کے لیے شکریہ
Think	about	کسی چیز کے بارے میں سوچ
Tired	of	کسی چیز سے اکتایا ہوا



U		
Unaware	of	کسی چیز سے بے خبر
Upset	about	کسی بات پر پریشان
Used	to	کسی چیز کا عادی
V		
Value	for	کسی چیز کی قدر
Vote	for	کسی کے لیے ووٹ
Vouch	for	کسی کی ضمانت
W		
Wait	for	کسی کا انتظار
Warn	about	کسی چیز کے بارے میں خبردار
Wish	for	کسی چیز کی خواہش
Wonder	about	کسی چیز کے بارے میں حیران
Worry	about	کسی چیز کے بارے میں پریشان
Y		
Yearn	for	کسی چیز کی شدید خواہش



Practice MCQs

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1. The renowned architect is absorbed _____ the design of a revolutionary sustainable city.

- (a) at
- (b) by
- (c) in
- (d) with

Answer: (c) in

2. His thesis provides a compelling argument, but I must disagree _____ his fundamental premise.

- (a) to
- (b) with
- (c) on
- (d) against

Answer: (b) with

3. The CEO was accused _____ the board _____ gross financial misconduct.

- (a) by, for
- (b) to, of
- (c) by, of
- (d) from, with

Answer: (c) by, of

4. The artist's work, which consists _____ found objects, comments _____ consumerist society.

- (a) of, on
- (b) with, about
- (c) from, for
- (d) in, to

Answer: (a) of, on

5. The country's economy is largely dependent _____ the export _____ crude oil.

- (a) on, of
- (b) from, for
- (c) by, in
- (d) with, about

Answer: (a) on, of

6. The investigator warned the public _____ a sophisticated new phishing scam.

- (a) for
- (b) from
- (c) about
- (d) on

Answer: (c) about

7. Her latest novel is reminiscent _____ the magical realism of Gabriel García Márquez.

- (a) to
- (b) with
- (c) of
- (d) from

Answer: (c) of

8. The diplomat was anxious _____ the potential repercussions _____ the trade agreement.

- (a) for, from
- (b) about, of
- (c) with, for
- (d) at, with

Answer: (b) about, of

9. The new policy is inferior _____ the previous one _____ almost every measurable aspect.

- (a) than, in
- (b) to, in
- (c) from, for
- (d) against, by

Answer: (b) to, in

10. He is highly regarded _____ his peers _____ his integrity and work ethic.

- (a) by, for
- (b) from, about
- (c) with, in
- (d) to, because of

Answer: (a) by, for



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11. The scientist's theory is based _____ years _____ meticulous research.

- (a) on, of
- (b) in, for
- (c) at, with
- (d) by, during

Answer: (a) on, of

12. The merger will result _____ significant synergies, benefiting both companies.

- (a) in
- (b) to
- (c) from
- (d) with

Answer: (a) in

13. The jury was completely convinced _____ the defendant's guilt.

- (a) for
- (b) about
- (c) of
- (d) with

Answer: (c) of

14. She has a remarkable talent _____ translating complex concepts _____ layman's terms.

- (a) for, into
- (b) in, to
- (c) with, for
- (d) at, in

Answer: (a) for, into

15. The protest was a response _____ the government's indifference _____ the crisis.

- (a) to, to
- (b) for, for
- (c) against, of
- (d) from, about

Answer: (a) to, to

16. His account of the event differed drastically _____ that of the other

witnesses.

- (a) than
- (b) from
- (c) to
- (d) with

Answer: (b) from

17. The director insisted _____ absolute perfection _____ every single scene.

- (a) for, in
- (b) on, in
- (c) with, for
- (d) about, at

Answer: (b) on, in

18. This species of plant is unique _____ this particular valley.

- (a) in
- (b) to
- (c) for
- (d) with

Answer: (b) to

19. The professor's lecture focused _____ the interplay _____ technology and sociology.

- (a) on, between
- (b) in, of
- (c) at, among
- (d) with, for

Answer: (a) on, between

20. We are all accountable _____ our actions, regardless _____ the circumstances.

- (a) for, of
- (b) to, for
- (c) with, about
- (d) of, from



Chapter 8

Sentence, Phrase and Clause

8. Sentence, Phrase and Clause

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The Sentence

Definition

A **sentence** is a grammatically complete set of words that expresses a clear thought. It typically contains a subject and a predicate. A sentence begins with a capital letter and ends with a terminal punctuation mark: a period (.), a question mark (?), or an exclamation mark (!).

Examples:

- He goes to school.
- She is eating an apple.
- Who are you?
- What a beautiful flower!

Parts of a Sentence

Every sentence can be divided into two essential parts:

1. **Subject:** The person, place, thing, or idea that is performing an action or being described. It tells us *who* or *what* the sentence is about.
2. **Predicate:** The part of the sentence that contains the verb and tells us something about the subject. It describes the action or state of being.

Sentence	Subject	Predicate
The sun shines brightly.	The sun	shines brightly.
She is writing a letter.	She	is writing a letter.
Allama Iqbal is our national poet.	Allama Iqbal	is our national poet.

Other Elements in a Sentence

- **Object:** A word or group of words that receives the action of the verb.
 - **Direct Object:** Answers "what?" or "whom?" after the verb.
 - Example: I threw **the ball**.
 - **Indirect Object:** Answers "to whom?" or "for whom?" the action is done. It comes before the direct object.
 - Example: She gave **me** the book.
- **Complement:** A word or group of words that completes the meaning of the subject or object.



- **Subject Complement:** Follows a linking verb (e.g., is, am, are, seem, become) and describes the subject.
 - Example: He is **a teacher**. (Noun) | He seems **tired**. (Adjective)
- **Object Complement:** Follows and describes the direct object.
 - Example: They made him **the captain**. (Noun) | The news made her **happy**. (Adjective)

Types of Sentences by Function

Sentences can be categorized based on their purpose and the emotion they convey.

Type	Function	Punctuation	Example
Declarative	Makes a statement or expresses an opinion.	Period (.)	The sky is blue.
Interrogative	Asks a question.	Question Mark (?)	Where do you live?
Imperative	Gives a command, makes a request, or offers advice.	Period (.) or Exclamation (!)	Please close the door. Stop!
Exclamatory	Expresses strong emotion or surprise.	Exclamation Mark (!)	What a stunning victory!
Optative	Expresses a wish, prayer, or blessing.	Exclamation Mark (!) or Period (.)	May you live long! Long live the king.

Phrase vs. Clause

Understanding the difference between a phrase and a clause is crucial for analyzing sentence structure.

Feature	Phrase	Clause
Definition	A group of related words that does NOT contain both a subject and a verb.	A group of related words that does contain both a subject and a verb.
Expresses a complete thought?	No. It is a fragment.	Independent Clause: Yes.



		Dependent Clause: No.
Example	He is standing near the wall	He is laughing at a joker.

- In the sentence "He is laughing at a joker," "He is laughing" is a **clause** (Subject: He, Verb: is laughing). "at a joker" is a **phrase** (no subject or verb).

Types of Phrases

A phrase functions as a single part of speech within a sentence.

- **Noun Phrase:** Acts as the subject or object.
 - Example: **The clever student** solved the puzzle.
- **Verb Phrase:** The main verb and its helpers.
 - Example: She **has been working** all day.
- **Adjective Phrase:** Describes a noun.
 - Example: The man **with the black hat** is my uncle.
- **Adverb Phrase:** Describes a verb, adjective, or another adverb.
 - Example: He drove **with great care**.

Types of Clauses

A clause is a group of words containing a subject and a verb. Clauses are the building blocks of sentences and are primarily of two types:

1. Independent (or Main) Clause

- **Definition:** Expresses a complete thought and can stand alone as a sentence.
- **Example:** **She sings.** | **The company launched a new product** after months of research.

2. Dependent (or Subordinate) Clause

- **Definition:** Cannot stand alone as a sentence because it does not express a complete thought. It begins with a subordinating conjunction or a relative pronoun.
- **Example:** ...because she loves music. | ...which was a huge success.

Dependent clauses are further classified based on their function in a sentence:

- **Noun Clause:** Acts as a noun (subject, object, or complement).
 - **Example:** **What he said** is true. (Acts as the subject)
- **Adjective (or Relative) Clause:** Acts as an adjective to describe a noun or pronoun. Usually begins with a relative pronoun (who, whom, whose, which, that).
 - **Example:** The book **that I borrowed** is fascinating.

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- **Adverb Clause:** Acts as an adverb to modify a verb, adjective, or another adverb. It tells *how, when, where, why, to what extent, or under what condition*. Begins with a subordinating conjunction (e.g., because, although, when, if, since).
- **Example:** He called **when he arrived at the station**.

Types of Sentences by Structure

Sentences are classified based on the number and type of clauses they contain.

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1. Simple Sentence

- Contains **one independent clause**.
- It has one subject and one predicate (though either can be compound).
- **Examples:**
 - Birds fly.
 - **Ali and Sana** went to the market **and bought some fruits**.

2. Compound Sentence

- Contains **two or more independent clauses**.
- The clauses are joined by:
 - A **coordinating conjunction** (FANBOYS: for, and, nor, but, or, yet, so).
 - A **semicolon (;)**.
- **Examples:**
 - I like tea, **but** my brother prefers coffee.
 - She finished her work; she was tired.

3. Complex Sentence

- Contains **one independent clause and at least one dependent clause**.
- The clauses are joined by a **subordinating conjunction** (e.g., because, although, since, when, if, unless) or a **relative pronoun** (that, who, which).
- **Punctuation Note:** Use a comma after a dependent clause if it begins the sentence.
- **Examples:**
 - I met the boy **who had helped me**.
 - **Although he is ill**, he is playing well. (Comma used)
 - He is playing well **although he is ill**. (No comma)

4. Compound-Complex Sentence

1. Contains **at least two independent clauses and at least one dependent clause**.
2. **Example:**
 - He went to college, and I went to the market **where I bought a book**.
 - I like mathematics, but my brother likes biology **because he wants to be a doctor**.

8. Sentence, Phrase and Clause

Practice MCQs

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1. _____, the renowned scientist presented her groundbreaking research on quantum computing.
- (a) After years of meticulous experimentation
 - (b) A woman of great intellect and determination
 - (c) In the prestigious international conference
 - (d) Which was attended by Nobel laureates
- Answer: (c) In the prestigious international conference** (This is a prepositional phrase setting the scene. The other options are either a dependent clause (a, d) or a noun phrase (b) that cannot stand alone before the comma.)

2. The hypothesis, _____, was later proven to be fundamentally flawed.
- (a) although initially met with great acclaim
 - (b) the result of an inspired guess
 - (c) a complex and seemingly logical construct
 - (d) which the young researcher had passionately defended
- Answer: (d) which the young researcher had passionately defended** (This is an adjective clause correctly modifying "hypothesis." Option (a) is an adverb clause, (b) and (c) are appositive phrases.)

3. Which of the following is a classic example of a compound-complex sentence?
- (a) The storm raged, and the sailors fought bravely.
 - (b) Although the storm raged, the sailors fought bravely, and they eventually reached the shore.
 - (c) The brave sailors fought the raging

storm.

(d) Fighting the storm, the brave sailors persevered.

Answer: (b) Although the storm raged, the sailors fought bravely, and they eventually reached the shore. (It has two independent clauses and one dependent clause.)

4. In the sentence "His ultimate goal is to decipher the enigmatic code," the phrase "to decipher the enigmatic code" functions as a:
- (a) Noun Phrase
 - (b) Adjective Phrase
 - (c) Adverb Phrase
 - (d) Prepositional Phrase
- Answer: (a) Noun Phrase** (It acts as a subject complement, renaming the subject "goal.")

5. "The committee will approve the proposal provided that the necessary funds are allocated." The underlined segment is a/an:
- (a) Adverb Clause of Condition
 - (b) Noun Clause as Object
 - (c) Adjective Clause
 - (d) Independent Clause
- Answer: (a) Adverb Clause of Condition** (It begins with the subordinating conjunction "provided that" and shows the condition for the main action.)

6. Which sentence is correctly punctuated?
- (a) May you succeed in all your endeavors, and may you find true happiness.
 - (b) May you succeed in all your endeavors and may you find true happiness.

8. Sentence, Phrase and Clause

(c) May you succeed, in all your endeavors, and may you find true happiness.

(d) May you succeed in all your endeavors; and may you find true happiness.

Answer: (a) May you succeed in all your endeavors, and may you find true happiness. (It correctly uses a comma before the coordinating conjunction "and" to join the two independent clauses in this compound sentence.)

7. **"What the witness claimed under oath was later contradicted by forensic evidence." The subject of this sentence is:**

- (a) the witness
- (b) forensic evidence
- (c) What the witness claimed under oath
- (d) was later contradicted

Answer: (c) What the witness claimed under oath (This is a noun clause acting as the complete subject of the sentence.)

8. **The sentence "The artist, whose work has been both praised and vilified, remains an enigmatic figure" contains:**

- (a) An appositive phrase
- (b) An adverb clause
- (c) A relative clause
- (d) A prepositional phrase

Answer: (c) A relative clause (The clause "whose work has been both praised and vilified" is an adjective clause modifying "the artist.")

9. **Which of the following is an optative sentence?**

- (a) Could you please pass the salt?
- (b) What a magnificent view this is!
- (c) I wish you a safe journey.
- (d) Long live the spirit of freedom.

Answer: (d) Long live the spirit of

freedom. (It expresses a wish or blessing, characteristic of an optative sentence.)

10. **In the sentence "The director considered the actor's performance utterly captivating," the word "captivating" is a/an:**

- (a) Direct Object
- (b) Subject Complement
- (c) Object Complement
- (d) Indirect Object

Answer: (c) Object Complement (It describes the direct object "performance.")

11. **"She excelled in her studies because she was immensely disciplined." This is an example of a _____ sentence.**

- (a) Simple
- (b) Compound
- (c) Complex
- (d) Compound-Complex

Answer: (c) Complex (It has one independent clause and one dependent adverb clause.)

12. **The grammatical function of the clause "that the universe is expanding" in the sentence "Scientists have confirmed that the universe is expanding" is that of a:**

- (a) Subject
- (b) Object
- (c) Adjective
- (d) Adverb

Answer: (b) Object (It is a noun clause acting as the direct object of the verb "confirmed.")

13. **Which of these groups of words is a phrase?**

- (a) When the sun sets
- (b) The sun sets
- (c) Setting over the horizon
- (d) It sets gloriously



Answer: (c) Setting over the horizon (It lacks a subject and a finite verb.)

14. "The proposal was so innovative that it immediately garnered widespread support." The underlined section is a/an:

- (a) Adverb Clause of Result
- (b) Adjective Clause
- (c) Noun Clause
- (d) Independent Clause

Answer: (a) Adverb Clause of Result (It shows the result of the proposal being innovative.)

15. A sentence comprising a single independent clause with a compound subject and a compound predicate is classified as:

- (a) Compound
- (b) Complex
- (c) Simple
- (d) Compound-Complex

Answer: (c) Simple (It still contains only one independent clause.)

16. "The fact that he achieved this without any formal training is remarkable." The underlined segment is a/an:

- (a) Appositive Phrase
- (b) Noun Clause in Apposition
- (c) Adjective Clause
- (d) Adverb Clause

Answer: (b) Noun Clause in Apposition (It renames or explains the noun "fact.")

17. Which sentence has a *subject complement*?

- (a) The board appointed her the new CEO.
- (b) She became the new CEO.
- (c) They offered her the position of CEO.
- (d) The new CEO is she.

Answer: (b) She became the new

CEO. ("The new CEO" follows the linking verb "became" and describes the subject "She.")

18. "The architect designed the building, and the engineers approved the plans." This sentence can be correctly described as:

- (a) A complex sentence
- (b) A simple sentence with a compound predicate
- (c) A compound sentence
- (d) A compound-complex sentence

Answer: (c) A compound sentence (It has two independent clauses joined by "and.")

19. "His insistence on proceeding with the risky venture, despite numerous warnings, ultimately led to his downfall." The part "despite numerous warnings" is a/an:

- (a) Adverb Clause
- (b) Prepositional Phrase
- (c) Absolute Phrase
- (d) Noun Phrase

Answer: (b) Prepositional Phrase (It begins with the preposition "despite.")

20. The sentence "I wonder whether the delegation will arrive on time" contains a dependent clause that acts as a/an:

- (a) Subject
- (b) Object of the verb
- (c) Object of a preposition
- (d) Adjective

Answer: (b) Object of the verb (The noun clause "whether the delegation will arrive on time" is the direct object of the verb "wonder.")



Chapter 9

Active and Passive Voice

Introduction

Voice is a form of a verb that indicates whether the subject performs the action or receives the action. There are two voices in English: Active and Passive.

- M** • **Active Voice:** The subject performs the action.
- K** ○ Example: **The chef** cooked the meal.
- **Passive Voice:** The subject receives the action.
- Example: **The meal** was cooked by the chef.

P **Key Principle:** Only transitive verbs (verbs that take an object) can be changed from active to passive voice.

Rules for Converting Active to Passive Voice

- P** 1. The **object** of the active verb becomes the **subject** of the passive verb.
- A** 2. The **subject** of the active verb becomes the **agent** in the passive sentence, usually introduced by the preposition "by." The agent can be omitted if it is unknown or unimportant.
- R** 3. The main verb is changed into its **past participle** form (V3).
- A** 4. An appropriate **helping verb** (a form of 'be' or modals) is added, which must agree with the new subject in number and person.

Tense-wise Conversion Charts

1. Present Indefinite Tense

- **Active Structure:** Subject + V1(s/es) + Object
- **Passive Structure:** Subject + is/am/are + V3 + by + Agent

Active Voice	Passive Voice
She writes a letter.	A letter is written by her.
They do not play hockey.	Hockey is not played by them.
Does he respect his teachers?	Are his teachers respected by him?

2. Present Continuous Tense

9. Active and Passive Voice

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- **Active Structure:** Subject + is/am/are + V-ing + Object
- **Passive Structure:** Subject + is/am/are + being + V3 + by + Agent

Active Voice	Passive Voice
I am reading a book.	A book is being read by me.
Why are you blaming me?	Why am I being blamed by you?

M 3. Present Perfect Tense

- **Active Structure:** Subject + has/have + V3 + Object
- **Passive Structure:** Subject + has/have + been + V3 + by + Agent

Active Voice	Passive Voice
The police have caught the thief.	The thief has been caught by the police.
Has she finished her work?	Has her work been finished by her?

P 4. Past Indefinite Tense

- **Active Structure:** Subject + V2 + Object
- **Passive Structure:** Subject + was/were + V3 + by + Agent

Active Voice	Passive Voice
He killed a snake.	A snake was killed by him.
They did not invite us.	We were not invited by them.

P 5. Past Continuous Tense

- **Active Structure:** Subject + was/were + V-ing + Object
- **Passive Structure:** Subject + was/were + being + V3 + by + Agent

Active Voice	Passive Voice
She was cooking dinner.	Dinner was being cooked by her.
They were building a house.	A house was being built by them.

O 6. Past Perfect Tense

- **Active Structure:** Subject + had + V3 + Object

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- **Passive Structure:** Subject + had + been + V3 + by + Agent

Active Voice	Passive Voice
The rain had destroyed the crops.	The crops had been destroyed by the rain.
Had she posted the letter?	Had the letter been posted by her?

7. Future Indefinite Tense

- **Active Structure:** Subject + will/shall + V1 + Object
- **Passive Structure:** Subject + will be/shall be + V3 + by + Agent

Active Voice	Passive Voice
I will finish the project.	The project will be finished by me.
They will not accept the proposal.	The proposal will not be accepted by them.

8. Future Perfect Tense

- **Active Structure:** Subject + will/shall + have + V3 + Object
- **Passive Structure:** Subject + will/shall + have been + V3 + by + Agent

Active Voice	Passive Voice
She will have completed the task by noon.	The task will have been completed by her by noon.

Special Cases and Modals

A. Imperative Sentences (Commands & Requests)

- **Structure:** Let + Object + be + V3

Active Voice	Passive Voice
Open the window.	Let the window be opened.
Do not waste time.	Let time not be wasted.
Please help the poor.	Let the poor be helped.

B. Optative Sentences (Wishes & Prayers)

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9. Active and Passive Voice



- **Structure:** May + Subject + be + V3 + by + Agent

Active Voice	Passive Voice
May God bless you.	May you be blessed by God.
May you have a long life.	May a long life be lived by you.

C. Sentences with Modals (can, could, may, might, must, should, etc.)

- **Structure:** Subject + Modal + be + V3 + by + Agent

Active Voice	Passive Voice
You must obey the rules.	The rules must be obeyed by you.
She can solve this problem.	This problem can be solved by her.

D. Sentences with Modal Perfects (may have, must have, should have, etc.)

- **Structure:** Subject + Modal + have been + V3 + by + Agent

Active Voice	Passive Voice
They should have completed the work.	The work should have been completed by them.
She might have sent the email.	The email might have been sent by her.

E. Sentences with "to" Infinitives (has to, have to, is to, etc.)

- **Structure:** Subject + Helper + to be + V3 + by + Agent

Active Voice	Passive Voice
She has to do this assignment.	This assignment has to be done by her.
They are going to build a new school.	A new school is going to be built by them.

When to Use Passive Voice

While active voice is usually preferred for its clarity and directness, passive voice is useful in these situations:

1. When the **doer of the action is unknown, obvious, or unimportant.**
 - *Example:* My car was stolen last night. (We don't know who did it.)

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2. When the **action itself is more important than the doer**.
 - *Example:* The new policy was implemented in January.
3. In scientific or formal writing, to maintain an **objective tone**.
 - *Example:* The solution was heated to 100°C.
4. To be **tactful** and not place blame.
 - *Example:* A mistake was made in the report.

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9. Active and Passive Voice

Practice MCQs

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1. **Given the active voice sentence: "They are building a new suspension bridge over the river." Which passive voice transformation is correct?**

- (a) A new suspension bridge is built over the river by them.
- (b) A new suspension bridge was being built over the river by them.
- (c) A new suspension bridge is being built over the river by them.
- (d) A new suspension bridge has been built over the river by them.

Answer: (c) A new suspension bridge is being built over the river by them.

2. **"Someone has stolen my confidential files from the server." The most appropriate passive voice is:**

- (a) My confidential files were stolen from the server by someone.
- (b) My confidential files have been stolen from the server.
- (c) Someone has been stolen my confidential files from the server.
- (d) My confidential files are stolen from the server by someone.

Answer: (b) My confidential files have been stolen from the server.

3. **The active sentence "The board of directors will have made a decision by the next quarter" becomes in the passive:**

- (a) A decision will be made by the board of directors by the next quarter.
- (b) A decision will have been made by the board of directors by the next quarter.
- (c) A decision is being made by the board of directors by the next quarter.
- (d) A decision had been made by the board of directors by the next quarter.

Answer: (b) A decision will have been

made by the board of directors by the next quarter.

4. **Identify the correct passive form for the modal perfect: "You should have handled that sensitive matter with more discretion."**

- (a) That sensitive matter should be handled with more discretion by you.
- (b) That sensitive matter should have been handled with more discretion by you.
- (c) That sensitive matter had been handled with more discretion by you.
- (d) That sensitive matter was handled with more discretion by you.

Answer: (b) That sensitive matter should have been handled with more discretion by you.

5. **The imperative sentence "Do not reveal the secret under any circumstances" is best transformed into the passive as:**

- (a) The secret was not revealed under any circumstances.
- (b) Let the secret not be revealed under any circumstances.
- (c) You are ordered not to reveal the secret under any circumstances.
- (d) The secret should not be revealed under any circumstances.

Answer: (b) Let the secret not be revealed under any circumstances.

6. **Which of the following sentences cannot be converted into a passive voice form?**

- (a) She sleeps peacefully.
- (b) The chef prepared a magnificent feast.
- (c) Someone rang the doorbell.
- (d) They are discussing the merger.



Answer: (a) She sleeps peacefully. (Intransitive verb 'sleeps' has no object)

manipulate its stock prices.

Answer: (c) Both (a) and (b) are correct.

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7. **Choose the correct passive voice for the sentence with a double object: "The committee awarded him the 'Researcher of the Year' prize."**

- (a) He was awarded the 'Researcher of the Year' prize by the committee.
- (b) The 'Researcher of the Year' prize was awarded him by the committee.
- (c) He was awarded by the committee the 'Researcher of the Year' prize.
- (d) Both (a) and (b) are correct, but (a) is more common.

Answer: (d) Both (a) and (b) are correct, but (a) is more common.

8. **"The scientists' groundbreaking research suggests that a paradigm shift is imminent." The most accurate passive construction is:**

- (a) A paradigm shift is suggested to be imminent by the scientists' groundbreaking research.
- (b) It is suggested by the scientists' groundbreaking research that a paradigm shift is imminent.
- (c) That a paradigm shift is imminent is suggested by the scientists' groundbreaking research.
- (d) Both (b) and (c) are correct.

Answer: (d) Both (b) and (c) are correct.

9. **The passive form of "People believe that the company is manipulating its stock prices" can be:**

- (a) It is believed that the company is manipulating its stock prices.
- (b) The company is believed to be manipulating its stock prices.
- (c) Both (a) and (b) are correct.
- (d) The company was believed to

10. **Identify the sentence where the passive voice is used most appropriately for formal writing.**

- (a) The experiment was conducted under controlled conditions, and the results were meticulously recorded.
- (b) I conducted the experiment under controlled conditions, and I recorded the results meticulously.
- (c) Someone conducted the experiment under controlled conditions.
- (d) They recorded the results meticulously after conducting the experiment.

Answer: (a) The experiment was conducted under controlled conditions, and the results were meticulously recorded.

11. **"What measures are you going to take to address this issue?" The correct passive form is:**

- (a) What measures are going to be taken by you to address this issue?
- (b) What measures are to be taken to address this issue by you?
- (c) By you, what measures are going to be taken to address this issue?
- (d) What measures were going to be taken to address this issue?

Answer: (a) What measures are going to be taken by you to address this issue?

12. **The active sentence "The noise of the traffic had disturbed the residents all night" becomes in the passive:**

- (a) The residents were disturbed by the noise of the traffic all night.
- (b) The residents had been disturbed by the noise of the traffic all night.

9. Active and Passive Voice



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(c) The residents have been disturbed by the noise of the traffic all night.
 (d) The residents are disturbed by the noise of the traffic all night.
Answer: (b) The residents had been disturbed by the noise of the traffic all night.

13. Which passive transformation for the phrase "They might have overlooked the critical error" is correct?
 (a) The critical error might be overlooked by them.
 (b) The critical error might have been overlooked by them.
 (c) The critical error was overlooked by them.
 (d) The critical error had been overlooked by them.
Answer: (b) The critical error might have been overlooked by them.

14. The optative sentence "May you achieve all your aspirations in life" is correctly transformed into the passive as:
 (a) You may be achieved all your aspirations in life.
 (b) May all your aspirations be achieved in life by you.
 (c) All your aspirations may be achieved in life.
 (d) You might achieve all your aspirations in life.
Answer: (b) May all your aspirations be achieved in life by you.

15. "Whom did the panel select as the most promising candidate?" The correct passive form is:
 (a) Who was selected as the most promising candidate by the panel?
 (b) Whom was selected as the most promising candidate by the panel?
 (c) Who was being selected as the most

promising candidate by the panel?
 (d) By the panel, whom was selected as the most promising candidate?
Answer: (a) Who was selected as the most promising candidate by the panel?

16. Identify the sentence that is already in the passive voice.
 (a) The project deadline is fast approaching.
 (b) The documents have been signed and notarized.
 (c) She feels overwhelmed by the workload.
 (d) They are considering several proposals.
Answer: (b) The documents have been signed and notarized.

17. The active sentence "We must confront the challenges posed by climate change" becomes in the passive:
 (a) The challenges posed by climate change must be confronted by us.
 (b) The challenges posed by climate change must confront us.
 (c) The challenges posed by climate change must have been confronted.
 (d) The challenges posed by climate change were confronted by us.
Answer: (a) The challenges posed by climate change must be confronted by us.

18. "The architect designed the villa to maximize natural light." The most precise passive construction is:
 (a) The villa was designed by the architect to maximize natural light.
 (b) To maximize natural light, the villa was designed by the architect.
 (c) The villa is designed to maximize natural light by the architect.
 (d) Both (a) and (b) are correct.



Answer: (d) Both (a) and (b) are correct.

19. The passive form of the sentence "Has the internal audit committee reviewed the financial statements?" is:
- (a) Have the financial statements been reviewed by the internal audit committee?
 - (b) Has the financial statements been reviewed by the internal audit committee?
 - (c) Were the financial statements reviewed by the internal audit committee?
 - (d) Are the financial statements reviewed by the internal audit committee?

Answer: (a) Have the financial statements been reviewed by the internal audit committee?

20. "The discovery of this new element could revolutionize the field of materials science." The correct passive voice is:

- (a) The field of materials science could be revolutionized by the discovery of this new element.
- (b) The field of materials science could revolutionize the discovery of this new element.
- (c) The discovery of this new element could have been revolutionized the field of materials science.
- (d) The field of materials science is revolutionized by the discovery of this new element.

Answer: (a) The field of materials science could be revolutionized by the discovery of this new element.

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Chapter 10

Direct and Indirect Narration

1. Introduction

Speech or narration can be reported in two ways:

- Direct Narration:** We quote the exact words of the speaker, enclosed within quotation marks.
 - Example: He said, "I am busy."
- Indirect Narration:** We report the substance of what the speaker said without using their exact words. Quotation marks are not used.
 - Example: He said that **he was busy**.
 - Reporting Speech:** The part outside the quotation marks (e.g., He said).
 - Reported Speech:** The part inside the quotation marks (e.g., "I am busy.").

Essential Pronoun Changes

Pronouns in the reported speech change to maintain the perspective of the reporter. The following table is crucial for understanding these changes:

Subject (Nominative)	Object (Accusative)	Possessive	Reflexive
I	Me	My / Mine	Myself
We	Us	Our / Ours	Ourselves
You	You	Your / Yours	Yourself / Yourselves
He	Him	His	Himself
She	Her	Her / Hers	Herself
It	It	Its	Itself
They	Them	Their / Theirs	Themselves

Rules:

- First Person (I, we)** changes according to the **subject** of the reporting verb.
- Second Person (you)** changes according to the **object** of the reporting verb.
- Third Person (he, she, it, they)** generally remains **unchanged**.

Changes in Tenses

The tense of the reported speech often changes when the reporting verb is in the past tense.

Rule 1: Reporting Verb in Past Tense

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10. Direct and Indirect Narration



If the reporting verb (e.g., said, told) is in the past tense, the verb in the reported speech changes as follows:

Direct Speech (Tense)	Indirect Speech (Tense)
Present Indefinite	Past Indefinite
Present Continuous	Past Continuous
Present Perfect	Past Perfect
Present Perfect Continuous	Past Perfect Continuous
Past Indefinite	Past Perfect
Past Continuous	Past Perfect Continuous
Past Perfect	No Change (Past Perfect)
Future (will/shall)	Conditional (would)
Can	Could
May	Might
Must (obligation)	Had to
Must (general truth)	No Change (must)

Examples:

- Direct: He said, "I write a letter." (Present Indefinite)
- Indirect: He said that he wrote a letter. (Past Indefinite)
- Direct: She said, "I have finished my work." (Present Perfect)
- Indirect: She said that she had finished her work. (Past Perfect)
- Direct: He said, "I will go." (Future)
- Indirect: He said that he would go. (Conditional)

Rule 2: Exceptions to Tense Change

The tense does **not** change in the following cases:

- **Universal Truths/Habitual Facts:**
 - Direct: The teacher said, "The sun rises in the east."
 - Indirect: The teacher said that the sun rises in the east.
- **Reporting Verb in Present or Future Tense:**
 - Direct: He says, "I am tired."
 - Indirect: He says that he is tired.

Changes in Time and Place Words

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10. Direct and Indirect Narration



Words indicating nearness in time or place change to words indicating distance.

Direct Speech	Indirect Speech
this	that
these	those
here	there
now	then
today	that day
tomorrow	the next day / the following day
yesterday	the previous day / the day before
ago	before
tonight	that night
last night	the previous night
next week	the following week
come	go

Examples:

- Direct: She said, "I will do **this now**."
- Indirect: She said that she would do **that then**.
- Direct: He said, "I saw her **yesterday**."
- Indirect: He said that he had seen her **the previous day**.

Rules for Different Sentence Types

A. Assertive Sentences (Statements)

- Use the conjunction **that**.
- The reporting verb **said to** changes to **told**.

Examples:

1. Direct: He said to me, "You are late."
○ Indirect: He **told** me **that** I was late.
2. Direct: She said, "I cannot find my keys."

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10. Direct and Indirect Narration



- Indirect: She said **that** she could not find her keys.

B. Interrogative Sentences (Questions)

- The reporting verb changes to asked, inquired, wondered, etc.
- The conjunction **that is not used**.
- The structure changes from question form (verb before subject) to statement form (subject before verb).
- For "Yes/No" questions, use **if** or **whether**.
- For "Wh-" questions, use the same "Wh-" word (what, why, how, etc.) as the connector.

Examples:

1. Direct: He said to me, "Are you happy?"
○ Indirect: He asked me **if I was** happy.
2. Direct: She said, "Where do you live?"
○ Indirect: She asked **where I lived**.

C. Imperative Sentences (Commands, Requests, Advice)

- The reporting verb changes to ordered, commanded, requested, advised, told, forbade, instructed, etc., based on the context.
- The imperative verb (e.g., go, be) is changed to the **infinitive** (to go, to be).
- For negative commands (beginning with Do not), use **not to**.

Examples:

1. Direct: The officer said to the soldier, "Stand at ease."
○ Indirect: The officer **ordered** the soldier **to stand** at ease.
2. Direct: She said to me, "Please help me."
○ Indirect: She **requested** me **to help** her.
3. Direct: Mother said, "Do not play with fire."
○ Indirect: Mother **told** me **not to play** with fire.

D. Exclamatory Sentences (Exclamations)

- The reporting verb changes to **exclaimed with joy/sorrow/wonder/anger**, cried out, prayed, wished, etc.
- Words like alas, hurrah, wow are omitted.
- The exclamation is converted into a statement.

Examples:

1. Direct: He said, "Alas! I am ruined."
○ Indirect: He **exclaimed with sorrow** that he was ruined.
2. Direct: The children said, "Hurrah! We have won!"
○ Indirect: The children **exclaimed with joy** that they had won.
3. Direct: She said, "What a beautiful painting!"
○ Indirect: She **exclaimed with wonder** that it was a very beautiful painting.

E. Optative Sentences (Wishes & Prayers)

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- The reporting verb changes to wished or prayed.
- The conjunction that is used.

Examples:

1. Direct: He said, "May you live long!"
○ Indirect: He **prayed that I might live long.**
2. Direct: She said, "Would that I were rich!"
○ Indirect: She **wished that she were rich.**

Special Case: Use of "Let"

The word let is used in two senses, leading to different changes.

A. "Let" as a Proposal or Suggestion

- Reporting verb changes to proposed or suggested.
- Use that as a conjunction and should in the reported clause.

Example:

- Direct: He said, "Let us go for a walk."
○ Indirect: He **proposed that we should go** for a walk.

B. "Let" as a Permission

- Reporting verb changes to requested or asked.
- The verb let is changed to to let.

Example:

- Direct: I said to my father, "Let me watch the movie."
○ Indirect: I **asked my father to let me watch** the movie.

Conversion of Common Expressions

Direct Speech	Indirect Speech
He said, "Thank you!"	He thanked me.
She said, "Happy Birthday!"	She wished me a happy birthday.
He said, "Congratulations!"	He congratulated me.
She said, "Good morning."	She wished me good morning.
He said, "Curse this rain!"	He cursed the rain.
My friend said, "Goodbye."	My friend bade me goodbye.

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Practice MCQs – Direct and Indirect Narration

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1. "By God," he exclaimed, "I have never seen such a magnificent sight in my life."

- a) He exclaimed by God that he had never seen such a magnificent sight in his life.
- b) He swore by God that he has never seen such a magnificent sight in his life.
- c) He exclaimed and swore that he had never seen such a magnificent sight in his life.
- d) He swore by God that he had never seen such a magnificent sight in his life.

Answer: d) He swore by God that he had never seen such a magnificent sight in his life.

2. "If you had told me about your predicament, I would have helped you," she said to him.

- a) She told him that if he had told her about his predicament, she would have helped him.
- b) She told him that if he told her about his predicament, she would have helped him.
- c) She told him that if he had told her about his predicament, she would help him.
- d) She said to him that if he told her about his predicament, she would have helped him.

Answer: a) She told him that if he had told her about his predicament, she would have helped him.

3. The philosopher said, "Man is mortal, but his ideas can be immortal."

- a) The philosopher said that man is mortal, but his ideas can be immortal.
- b) The philosopher said that man was mortal, but his ideas could be immortal.
- c) The philosopher said that man is

mortal, but his ideas could be immortal.
d) The philosopher said that man was mortal, but his ideas can be immortal.

Answer: a) The philosopher said that man is mortal, but his ideas can be immortal.

4. "Please, please don't leave me alone here," the child cried to his mother.

- a) The child pleaded to his mother not to leave him alone there.
- b) The child cried and pleaded his mother not to leave him alone there.
- c) The child earnestly pleaded with his mother not to leave him alone there.
- d) The child told his mother to not leave him alone there.

Answer: c) The child earnestly pleaded with his mother not to leave him alone there.

5. "Fool!" she shouted at the man, "You have ruined everything."

- a) She shouted at the man that he was a fool and had ruined everything.
- b) She called the man a fool and shouted that he had ruined everything.
- c) She exclaimed that he was a fool and had ruined everything.
- d) She called him a fool and said that he has ruined everything.

Answer: b) She called the man a fool and shouted that he had ruined everything.

6. He said, "Let's wait here till the rain stops."

- a) He said that we should wait here till the rain stopped.
- b) He suggested that they should wait there till the rain stopped.
- c) He proposed that they should wait there till the rain stops.

10. Direct and Indirect Narration



d) He suggested that we wait here until the rain stopped.

Answer: b) He suggested that they should wait there till the rain stopped.

7. "I must go to the bank tomorrow," she said, "as I have no cash left."

- a) She said that she must go to the bank the next day as she had no cash left.
- b) She said that she had to go to the bank the next day as she had no cash left.
- c) She said that she must go to the bank tomorrow as she has no cash left.
- d) She said that she should go to the bank the next day as she has no cash left.

Answer: b) She said that she had to go to the bank the next day as she had no cash left.

8. "Would that I were a bird!" the prisoner sighed.

- a) The prisoner sighed that he would be a bird.
- b) The prisoner wished that he were a bird.
- c) The prisoner said that he would like to be a bird.
- d) The prisoner exclaimed that he would be a bird.

Answer: b) The prisoner wished that he were a bird.

9. The notice read, "Passengers are requested to keep their luggage with them at all times."

- a) The notice read that passengers are requested to keep their luggage with them at all times.
- b) The notice said that passengers were requested to keep their luggage with them at all times.
- c) The notice stated that passengers are requested to keep their luggage with them at all times.
- d) The notice said that passengers are

requested to keep their luggage with them at all times.

Answer: c) The notice stated that passengers are requested to keep their luggage with them at all times.

10. "How dare you speak to me like that!" he roared at the junior clerk.

- a) He roared at the junior clerk how he dared to speak to him like that.
- b) He asked the junior clerk angrily how he dared to speak to him like that.
- c) He roared at the junior clerk and asked how he dared to speak to him like that.
- d) He demanded of the junior clerk how he dared to speak to him like that.

Answer: d) He demanded of the junior clerk how he dared to speak to him like that.

11. She said, "I was studying law when the war broke out."

- a) She said that she studied law when the war broke out.
- b) She said that she was studying law when the war had broken out.
- c) She said that she had been studying law when the war broke out.
- d) She said that she had been studying law when the war had broken out.

Answer: c) She said that she had been studying law when the war broke out.

12. The scientist said, "This discovery will revolutionize the field of medicine."

- a) The scientist said that that discovery would revolutionize the field of medicine.
- b) The scientist said that this discovery will revolutionize the field of medicine.
- c) The scientist said that that discovery will revolutionize the field of medicine.
- d) The scientist said that this discovery would revolutionize the field of medicine.

Answer: a) The scientist said that that



discovery would revolutionize the field of medicine.

13. "Don't you know the way home?" I said to her.

- a) I asked her whether she did not know the way home.
- b) I said to her if she didn't know the way home.
- c) I asked her if she does not know the way home.
- d) I told her that she didn't know the way home.

Answer: a) I asked her whether she did not know the way home.

14. "May God forgive you for your transgressions," the priest said to the repentant man.

- a) The priest told the repentant man that God may forgive him for his transgressions.
- b) The priest prayed that God might forgive the repentant man for his transgressions.
- c) The priest wished that God would forgive the repentant man for his transgressions.
- d) The priest said to the repentant man that God might forgive him for his transgressions.

Answer: b) The priest prayed that God might forgive the repentant man for his transgressions.

15. He said, "I could finish the work if I had the proper tools."

- a) He said that he could finish the work if he had the proper tools.
- b) He said that he could have finished the work if he had the proper tools.
- c) He said that he could finish the work if he had had the proper tools.
- d) He said that he can finish the work if he has the proper tools.

Answer: a) He said that he could finish the work if he had the proper tools.

16. "What a pity you didn't come to the party!" she said to me.

- a) She told me that it was a pity I didn't come to the party.
- b) She exclaimed that it was a pity I hadn't come to the party.
- c) She told me that it was a pity I hadn't come to the party.
- d) She exclaimed with sorrow that it was a pity I had not come to the party.

Answer: d) She exclaimed with sorrow that it was a pity I had not come to the party.

17. The judge said, "I shall now pronounce the verdict."

- a) The judge said that he should then pronounce the verdict.
- b) The judge said that he would then pronounce the verdict.
- c) The judge said that he shall then pronounce the verdict.
- d) The judge said that he will then pronounce the verdict.

Answer: b) The judge said that he would then pronounce the verdict.

18. "Let me see what is in that box," the curious boy said.

- a) The curious boy suggested that he should see what was in that box.
- b) The curious boy requested that he might see what was in that box.
- c) The curious boy asked to let him see what was in that box.
- d) The curious boy said to let him see what is in that box.

Answer: c) The curious boy asked to let him see what was in that box.

19. "I used to live in Paris," he mentioned casually.



- a) He mentioned casually that he used to live in Paris.
- b) He mentioned casually that he had been used to living in Paris.
- c) He mentioned casually that he had used to live in Paris.
- d) He mentioned casually that he was used to living in Paris.

Answer: a) He mentioned casually that he used to live in Paris.

20. "The meeting will have been concluded by 5 PM," the manager assured us.

- a) The manager assured us that the meeting would have been concluded by 5 PM.
- b) The manager assured us that the meeting will have been concluded by 5 PM.
- c) The manager assured us that the meeting would be concluded by 5 PM.
- d) The manager assured us that the meeting will be concluded by 5 PM.

Answer: a) The manager assured us that the meeting would have been concluded by 5 PM.

21. She said, "You needn't wait for me, I might be very late."

- a) She said that I needn't wait for her as she might be very late.
- b) She said that I didn't need to wait for her as she might be very late.
- c) She said that I needn't wait for her as she may be very late.
- d) She said that I wouldn't need to wait for her as she might be very late.

Answer: b) She said that I didn't need to wait for her as she might be very late.

22. "Oh! The house is on fire!" he screamed.

- a) He screamed that the house was on

fire.

- b) He exclaimed with fear that the house is on fire.
- c) He screamed that the house is on fire.
- d) He exclaimed with terror that the house was on fire.

Answer: d) He exclaimed with terror that the house was on fire.

23. The teacher said, "Columbus discovered America in 1492."

- a) The teacher said that Columbus discovered America in 1492.
- b) The teacher said that Columbus had discovered America in 1492.
- c) The teacher said that Columbus discovered America in 1492.
- d) The teacher said that Columbus has discovered America in 1492.

Answer: a) The teacher said that Columbus discovered America in 1492.

24. "I'd rather you didn't smoke in here," she said to her guest.

- a) She told her guest that she would rather he didn't smoke in there.
- b) She told her guest that she had rather he didn't smoke in there.
- c) She told her guest that she would rather he hadn't smoked in there.
- d) She told her guest that she rather he not smoke in there.

Answer: a) She told her guest that she would rather he didn't smoke in there.

25. "Could you pass the salt, please?" he said.

- a) He asked if I could pass the salt.
- b) He requested me to pass the salt.
- c) He said if I could pass the salt please.
- d) He asked if I can pass the salt.

Answer: b) He requested me to pass the salt.

Chapter 11

Idioms and Phrasal Verbs

Introduction to Idioms and Phrasal Verbs

- **Idiom:** A group of words established by usage as having a meaning not deducible from the individual words (e.g., *rain cats and dogs*). They add color and depth to the language.
- **Phrasal Verb:** A verb combined with a preposition or an adverb (or both) to create a new verbal phrase with a meaning different from the original verb (e.g., *give up, look into*). They are fundamental to fluent and natural English.

Idioms:

Idiom	English Meaning	Urdu Meaning	Example
Above board	Honest and open.	دیانتداری، صاف بازی	Don't worry, the deal was completely above board.
To smell a rat	To suspect foul dealings.	شک کرنا، کھوتا محسوس کرنا	When he offered to double my investment, I began to smell a rat.
To throw dust in someone's eyes	To deceive or mislead someone.	کسی کی آنکھوں میں دھول جھونکنا، دھوکہ دینا	The report threw dust in the public's eyes about the true environmental impact.
To give a false coloring	To misrepresent something.	غلط رنگ چڑھانا، مسخ کرنا	He gave a false coloring to the events to make himself look like a hero.
To play fast and loose	To behave in an unreliable and insincere way.	عہد شکنی کرنا، بے وفائی کرنا	You can't trust him; he plays fast and loose with the truth.
Sharp practices	Dishonest business dealings.	عیاری، بددیانتی	The company was accused of sharp practices to eliminate competition.
Crocodile tears	Pretended or insincere sorrow.	مگر مچھ کے آنسو، دکھاوے کے آنسو	She shed crocodile tears at his dismissal, though she had advocated for it.

A wolf in sheep's clothing	A person who appears harmless but is actually dangerous.	بھیڑے جیسا شخص، منافق	Be careful of him; he's a wolf in sheep's clothing.
To fight tooth and nail	To fight with all one's might.	دانت کھٹے کرنا، خوب جدوجہد کرنا	The community fought tooth and nail to save the local park.
To be in a tight corner	To be in a difficult situation.	مشکل میں پھنس جانا، مصیبت میں گھر جانا	The sudden market crash put many investors in a tight corner.
To burn the candle at both ends	To overwork oneself by doing too much.	دونوں سروں سے موم جلی جانا، حد سے زیادہ محنت کرنا	You'll get sick if you keep burning the candle at both ends.
To bell the cat	To face a risk or perform a dangerous task.	خطرہ مول لینا، مشکل کام کرنے کا عہد کرنا	Everyone agreed to complain, but no one was ready to bell the cat.
To have an axe to grind	To have a private reason for being involved in something.	ذاتی غرض ہونا	His criticism isn't impartial; he has an axe to grind.
A storm in a teacup	A lot of fuss about something trivial.	رائی کا پہاڑ بنانا	Their argument about who should make the coffee was a storm in a teacup.
A bolt from the blue	A complete surprise.	اچانک اور بے انتہا حیرت انگیز واقعہ	The news of the merger was a bolt from the blue for the employees.
To bite off more than one can chew	To take on a task that is too big or difficult.	اپنی استطاعت سے زیادہ کام لے لینا	By accepting three major projects, he bit off more than he could chew.
To strain every nerve	To make the utmost effort.	پوری کوشش کرنا، از حد جدوجہد کرنا	The doctors strained every nerve to save the patient.
To go the extra mile	To make a special effort.	ضرورت سے زیادہ محنت کرنا	She always goes the extra mile for her clients.

A uphill battle	A very difficult struggle.	مشکل جدوجہد	Getting the new law passed was an uphill battle.
To bear fruit	To produce successful results.	پھل لانا، کامیاب ہونا	His years of research finally bore fruit.
To make one's mark	To achieve recognition.	اپنا لوہا منوانا، نمایاں کامیابی حاصل کرنا	She made her mark in the field of molecular biology.
To end in smoke	To come to nothing; to fail.	دھوئیں کے حوالے کرنا، ناکام ہو جانا	All his ambitious plans ended in smoke.
To lose heart	To become discouraged.	ہمت ہارنا	Don't lose heart; you will succeed next time.
A far cry	A long way from; very different from.	بہت مختلف، کوئی موازنہ نہ ہونا	The current situation is a far cry from what we had hoped for.
On its last legs	About to fail or collapse.	اپنے انجام کو پہنچنے والا	My old laptop is on its last legs.
To hold out bright prospects	To offer the possibility of future success.	خوش کن امکانات پیدا کرنا	The new job holds out bright prospects for advancement.
To break new ground / To break fresh ground	To do something innovative.	نئی راہیں کھولنا، انوکھا کام کرنا	This research breaks new ground in cancer treatment.
To turn the tables	To reverse a situation to one's advantage.	پانساپلٹ جانا	The defense lawyer turned the tables with a key piece of evidence.
To work wonders	To be very effective or successful.	چمکار کر دکھانا، بہت کامیاب ہونا	This new fertilizer has worked wonders for my garden.
A blessing in disguise	Something that seems bad at first but results in something good.	مصیبت میں نعمت	Losing that job was a blessing in disguise; it pushed me to start my own business.

To hit the jackpot	To achieve great success or wealth, often suddenly.	بڑی کامیابی حاصل کرنا، قمار خانے میں جیک پاٹ جیتنا	The company hit the jackpot with their new smartphone.
A fair-weather friend	A person who is only a friend in good times.	موقع پرست دوست	When I lost my money, I found out who my fair-weather friends were.
To leave someone in the lurch	To desert someone in a difficult situation.	مشکل وقت میں ساتھ چھوڑ دینا	He left his partner in the lurch when the business faced losses.
To give someone the cold shoulder	To ignore someone deliberately.	冷淡 نظر انداز کرنا، برتاؤ کرنا	She has been giving him the cold shoulder ever since their argument.
Bad blood	Feelings of hatred or bitterness between people.	کینہ، بغض	There is bad blood between the two families.
To bury the hatchet	To make peace; to end a quarrel.	صلح کر لینا، جھگڑا ختم کرنا	After years of rivalry, the two companies decided to bury the hatchet.
To be hand in glove with	To be in very close association, often for a bad purpose.	گٹھ جوڑ کرنا، سانٹھا ہونا	The corrupt official was hand in glove with the local smugglers.
A snake in the grass	A treacherous person.	غدار، دغا باز	Be careful of him; he's a snake in the grass.
To stab someone in the back	To betray someone.	پیچھے میں چھرا گھونپنا، دھوکہ دینا	He stabbed me in the back by spreading rumors.
To see eye to eye	To agree fully with someone.	متفق ہونا، ایک رائے ہونا	My brother and I don't always see eye to eye on politics.
To beat about the bush	To avoid coming to the main point.	گول مول بات کرنا	Stop beating about the bush and tell me what happened.
To talk through one's hat	To talk nonsense.	بکواس کرنا، فضول باتیں کرنا	He's talking through his hat; he knows nothing about the subject.

To blow one's own trumpet	To praise oneself; to boast.	اپنی تعریف آپ کرنا	I don't like people who are always blowing their own trumpet.
A straight from the horse's mouth	Information received directly from the original source.	براہ راست معلومات، معتبر ذریعے سے	I know it's true; I heard it straight from the horse's mouth.
To read between the lines	To understand a hidden or implied meaning.	سطروں کے درمیان پڑھنا، اشارہ سمجھنا	If you read between the lines, his email suggests he's unhappy.
To put in a word for someone	To recommend or support someone.	کسی کی سفارش کرنا	Can you put in a word for me with the manager?
To go off on a tangent	To suddenly start talking about a different subject.	بات سے بات ہٹ جانا	The professor went off on a tangent about his travels.
To spill the beans	To reveal a secret.	راز فاش کر دینا	Who spilled the beans about the surprise party?
To get the wrong end of the stick	To misunderstand a situation completely.	غلط فہمی میں مبتلا ہونا	You've got the wrong end of the stick; I never said that.
To pay through the nose	To pay an excessively high price.	بہت زیادہ قیمت ادا کرنا	We paid through the nose for tickets to the final match.
To sell like hot cakes	To be sold quickly and in large quantities.	گرم کیک کی طرح بکنا، تیزی سے فروخت ہونا	The new smartphone is selling like hot cakes.
To make a clean breast of something	To confess fully.	سب کچھ اقرار کر لینا	He decided to make a clean breast of his crime.
A bad debt	A debt that is not recoverable.	نا قابل وصول قرض	The bank had to write off the loan as a bad debt.
To play ducks and drakes with	To squander or waste money recklessly.	پیسے اڑانا، ضائع کرنا	He played ducks and drakes with his inheritance.
To be rolling in money	To be very rich.	پیسے میں لتھڑا ہوا ہونا	They must be rolling in money to afford a house like that.

For a song	Very cheaply.	نہایت سستے داموں	He bought that antique desk for a song.
To tighten one's belt	To spend less money.	کم کرکنا، اخراجات کم کرنا	After losing his job, the family had to tighten their belts.
A cash cow	A business or product that provides a steady income.	آمدنی کا ذریعہ	Their original software remains a cash cow for the company.
To make hay while the sun shines	To make the most of an opportunity while it lasts.	موقع کو ہاتھ سے نہ جانے دینا	Business is good now, so we should make hay while the sun shines.
High time	The appropriate time for something (often implying it's already late).	بالکل صحیح وقت (اکثر تاخیر کے احساس کے ساتھ)	It's high time you started taking your studies seriously.
By and by	Gradually; after a short time.	آہستہ آہستہ، تھوڑی دیر میں	Don't worry, by and by you will feel better.
At the eleventh hour	At the last possible moment.	آخری لمحات میں	The peace agreement was reached at the eleventh hour.
Once and for all	Finally and conclusively.	ایک بار ہمیشہ کے لیے	Let's settle this matter once and for all.
In the nick of time	Just in time; at the last possible moment.	بالکل صحیح وقت پر	The ambulance arrived in the nick of time.
A man of straw	A person of no substance or weak character.	کمزور شخصیت کا مالک	Don't be afraid of him; he's a man of straw.
A black sheep	A person who is considered a disgrace to their family or group.	بد نصیب، خاندان کا بدنام فرد	He was the black sheep of the family.
A close-fisted man	A miser; a stingy person.	کنجوس، بخیل	He is a close-fisted man who never donates to charity.
A turncoat	A person who deserts one party or cause to join an opposing one.	موقع پرست، غدار	He was labeled a turncoat for joining the rival party.

A chip off the old block	Someone who resembles their parent in character or appearance.	باپ کا بیٹا	He's as stubborn as his father—a real chip off the old block.
Out and out	Thoroughly; complete.	مکمل طور پر	He is an out and out professional.
To the backbone	Thoroughly; completely.	ہڈ سے لے کر، پورے طور پر	She is a patriot to the backbone.
A dark horse	A person who surprises others by having unknown knowledge or skills.	چھپا ہوا	He's a dark horse; I had no idea he was a brilliant pianist.

High-Frequency Idioms

Idiom	English Meaning	Urdu Meaning	Example
A piece of cake	Something very easy to do.	بہت آسان کام	The math test was a piece of cake.
Break a leg!	Good luck! (Often said to performers.)	کامیابی کی دعا، خاص طور پر پر فارمرز کے لیے	You're going to be great in the play. Break a leg!
Cut corners	To do something in the easiest or cheapest way, often sacrificing quality.	کم خرچ میں کام نکالنا، معیار کو نظر انداز کرنا	They cut corners on materials, and the building wasn't safe.
Get out of hand	To become difficult to control.	قابو سے باہر ہو جانا	The party got out of hand after midnight.
Hit the road	To begin a journey.	سفر کا آغاز کرنا	It's getting late; we should hit the road.
It takes two to tango	Both parties involved in a situation are equally responsible.	دونوں فریق برابر کے ذمہ دار ہیں	She blames him entirely, but it takes two to tango.

Kill two birds with one stone	To achieve two things with a single action.	ایک پتھر سے دو شکار کرنا	By cycling to work, I kill two birds with one stone: I save money and get exercise.
On the ball	Alert, competent, and efficient.	چوکس اور قابل	The new assistant is really on the ball.
Pull someone's leg	To tease or joke with someone.	کسی کی ٹانگ کھینچنا، مذاق کرنا	I'm just pulling your leg; I wasn't really angry.
Speak of the devil	Said when a person you were just talking about appears.	بات کرتے شیطان حاضر	Speak of the devil! We were just talking about you.
The last straw	The final problem in a series that makes you lose patience.	آخری حد ہو جانا	When he was late for the third time, it was the last straw.
Under the weather	Feeling slightly ill.	تھوڑا بیمار محسوس کرنا	I'm feeling a bit under the weather today.
A white elephant	A possession that is useless or troublesome, especially one that is expensive to maintain.	بے کار اور مہنگی شے	That large, old villa has become a white elephant for the family.
Bite your tongue	To stop yourself from saying something you want to say.	اپنی زبان کاٹنا، خاموش رہنا	I had to bite my tongue during the argument to avoid making it worse.
Cost an arm and a leg	To be extremely expensive.	بہت مہنگا پڑنا	Getting this car repaired is going to cost an arm and a leg.
Cry over spilt milk	To complain about a loss from the past.	گزرے ہوئے وقت پر افسوس کرنا	There's no use crying over spilt milk. Let's just find a solution.
Every cloud has a silver lining	Every bad situation has some good aspect.	ہر مشکل کے بعد آسانی	I lost my job, but it led me to a better career. Every cloud has a silver lining.

Go down in flames	To fail spectacularly.	بری طرح ناکام ہونا	His ambitious new product went down in flames due to poor planning.
Hang in there	To persist despite difficulties.	ڈٹے رہنا، ہمت نہ ہارنا	I know it's tough, but just hang in there.
In a nutshell	In a few words; concisely.	مختصراً	In a nutshell, the project was a success.
Jump on the bandwagon	To join others in doing something that has become fashionable.	چلتی گاڑی میں کودنا	After the team started winning, everyone jumped on the bandwagon.
Let the cat out of the bag	To reveal a secret accidentally.	بلی تھیلی سے باہر نکالنا، راز فاش ہو جانا	He let the cat out of the bag about the vacation plans.
Miss the boat	To be too late to take advantage of an opportunity.	موقع ہاتھ سے نکل جانا	He missed the boat on investing in that company before its stock soared.
On thin ice	In a risky situation.	خطرناک صورت حال میں	After missing two deadlines, he is on thin ice with his manager.
Pull yourself together	To calm yourself and regain control of your emotions.	اپنے آپ کو سنبھالنا	After the shock, she took a minute to pull herself together.
Sit on the fence	To avoid making a decision or choice.	بیچ میں رہنا، غیر جانبدار رہنا	You can't sit on the fence forever; you have to choose a side.
Through thick and thin	Under all circumstances, good and bad.	ہر حال میں، خوشی اور غمی میں	My best friend has supported me through thick and thin.
Wrap your head around something	To understand something complicated.	کسی پیچیدہ بات کو سمجھنا	It's hard to wrap my head around the concept of infinity.

A dime a dozen	Very common and of little value.	آم کے آم گھٹیوں کے دام	Ideas like that are a dime a dozen; we need something truly unique.
Beat around the bush	(Same as "beat about the bush") To avoid the main topic.	گول مول بات کرنا	Stop beating around the bush and tell me what you want.
Cut to the chase	To get to the point without wasting time.	براہ راست اصل موضوع پر آنا	Let's cut to the chase: how much will it cost?
Get your act together	To organize yourself and act more effectively.	اپنے کام کو منظم کرنا	If he doesn't get his act together, he's going to fail the class.
Hit the nail on the head	To be exactly right about something.	بالکل درست کہنا	You hit the nail on the head when you said the problem was a lack of communication.
Once in a blue moon	Very rarely.	بہت ہی کم	He only visits his hometown once in a blue moon.
The ball is in your court	It is your turn to make a decision or take action.	فیصلہ آپ کے ہاتھ میں ہے	I've made my offer; now the ball is in your court.
When pigs fly	Something that will never happen.	کبھی نہیں ہو گا	He'll clean his room when pigs fly!
A blessing in disguise	(Repeated for emphasis) A good thing that seemed bad initially.	مصیبت میں نعمت	Getting laid off was a blessing in disguise, as it pushed me to start my own business.
Break the ice	To do or say something to relieve tension or get conversation started.	سخنی دور کرنا، بات چیت کا آغاز کرنا	He told a joke to break the ice at the start of the meeting.
Face the music	To accept the unpleasant consequences of one's actions.	اپنے عمل کا نتیجہ بھگتنا	It's time to face the music and admit you were wrong.

A red herring	Something that misleads or distracts from the important issue.	توجہ ہٹانے والی بات	The detective realized the clue was a red herring meant to mislead the investigation.
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Phrasal Verbs:

Phrasal Verb	English Meaning	Urdu Meaning	Example
Account for	To explain the reason for.	وضاحت پیش کرنا	Can you account for the missing funds?
Add up	To make sense; seem consistent.	معنی خیز ہونا	His story just doesn't add up.
Ask after	To inquire about someone's health or well-being.	کسی کے بارے میں دریافت کرنا	She asked after you when I saw her.
Back down	To withdraw a claim or demand.	اپنی بات سے پیچھے ہٹنا	He refused to back down from the argument.
Back up	To support; to make a copy of data.	سپورٹ کرنا؛ بیک اپ بنانا	I will back you up in the meeting. Always back up your files.
Bail out	To rescue from a difficult situation; to leave abruptly.	مصیبت سے نکالنا؛ اچانک چلے جانا	The government had to bail out the bank. I'm going to bail out of this party early.
Break down	To stop functioning; to lose emotional control; to analyze in detail.	خراب ہو جانا؛ رونے لگانا؛ تجزیہ کرنا	My car broke down. She broke down crying. Let's break down the costs.
Break into	To enter a place forcibly.	زبردستی گھسنا	Thieves broke into the house last night.
Break off	To end a relationship or stop suddenly.	تعلق ختم کرنا؛ اچانک روک دینا	They broke off their engagement.
Break out	To escape; for something (like war, fire) to start suddenly.	فرار ہونا؛ پھوٹ پڑنا	A fire broke out in the kitchen.
Break up	To end a relationship; to disperse.	تعلق ختم کرنا؛ منتشر کرنا	The couple broke up last month. The police broke up the fight.

Bring about	To cause to happen.	سبب بننا	The new policy brought about significant changes.
Bring forward	To move an event to an earlier time.	تاریخ آگے لانا	The meeting has been brought forward to Tuesday.
Bring up	To raise a child; to mention a topic.	پرورش کرنا؛ بات چھیڑنا	She was brought up in London. He brought up an interesting point.
Brush up on	To improve a skill by reviewing it.	مہارت کو تازہ کرنا	I need to brush up on my French before the trip.
Call off	To cancel.	منسوخ کرنا	They called off the match due to rain.
Call on	To visit someone; to ask someone to speak.	ملاقات کرنا؛ جواب دینے کے لیے کہنا	I called on my grandmother. The teacher called on me to answer.
Calm down	To become calm or make someone calm.	پرسکون ہونا یا کرانا	Please calm down and tell me what happened.
Carry on	To continue.	جاری رکھنا	Carry on with your work.
Carry out	To perform a task or experiment.	انجام دینا	The soldiers carried out their orders.
Catch up	To reach someone who is ahead.	کسی تک پہنچنا	I ran to catch up with her. Let's catch up over coffee soon.
Check in	To register at a hotel or airport.	چیک ان کرنا	We need to check in two hours before the flight.
Check out	To leave a hotel; to investigate.	چیک آؤٹ کرنا؛ دیکھنا	We checked out at 11 AM. You should check out that new cafe.
Cheer up	To become happier or make someone happier.	خوش ہونا یا خوش کرنا	I brought you flowers to cheer you up.
Clam up	To become silent or refuse to talk.	چپ ہو جانا	He clammed up when the police started questioning him.
Come across	To find or meet by chance.	اتفاقاً مل جانا	I came across this book in an old shop.
Come forward	To offer help or information.	سامنے آنا	Several witnesses came forward.

Come up with	To think of an idea or plan.	کوئی خیال یا منصوبہ بنانا	She came up with a brilliant solution.
Count on	To rely on.	بھروسہ کرنا	You can count on me.
Cross out	To draw a line through text to delete it.	کاٹنا	Cross out the wrong answers.
Cut down on	To reduce consumption.	کمی کرنا	I'm trying to cut down on sugar.
Deal with	To handle, manage, or take action on something.	ٹھنٹنا	She is good at dealing with difficult customers.
Do away with	To abolish or get rid of.	ختم کرنا	The law did away with the old tax.
Do up	To fasten; to renovate.	باندھنا؛ مرمت کرنا	Do up your seatbelt. They are doing up their old house.
Draw up	To prepare a document or plan.	تیار کرنا	The lawyer will draw up the contract.
Drop by/in	To visit informally without an appointment.	اچانک ملاقات کے لیے آجانا	Feel free to drop by anytime.
Drop off	To deliver someone or something; to fall asleep.	چھوڑنا؛ نیند آجانا	Can you drop me off at the station? He dropped off during the movie.
Drop out	To leave school or a course before finishing.	چھوڑ دینا	He had to drop out of college due to financial issues.
End up	To eventually reach a state or place.	پہنچ جانا	If you don't study, you'll end up failing.
Fall apart	To break into pieces; to become emotionally upset.	ٹکڑے ٹکڑے ہو جانا؛ ٹوٹ جانا	My old shoes are falling apart. She fell apart after the bad news.
Fall for	To be tricked; to fall in love with.	دھوکہ کھانا؛ پیار ہو جانا	Don't fall for his lies. He fell for her the moment he saw her.
Figure out	To understand or find the answer.	سمجھنا	I can't figure out how to solve this puzzle.
Fill in	To complete a form; to substitute.	فارم بھرننا؛ قائم مقامی کرنا	Please fill in this application. Can you fill in for me while I'm away?

Find out	To discover information.	پتہ چلانا	I need to find out when the train leaves.
Get across	To communicate successfully.	بات سمجھانا	It's difficult to get the message across to them.
Get along	To have a friendly relationship.	اتجھے تعلقات ہونا	I get along well with my colleagues.
Get away	To go on vacation; to escape.	چھٹی پر جانا؛ فرار ہونا	We need to get away for a few days. The thief got away.
Get by	To manage to live or survive with difficulty.	گزارا کرنا	It's hard to get by on such a low salary.
Get over	To recover from an illness or disappointment.	صحتیاب ہو جانا؛ تابو پا لینا	It took her months to get over the breakup.
Get through	To succeed in making contact (by phone); to finish.	فون ملانا؛ ختم کرنا	I tried calling, but I couldn't get through. I have to get through this book by Monday.
Give away	To give something for free; to reveal a secret.	مفت دینا؛ ہراز فاش کرنا	They are giving away free samples. Don't give away the ending!
Give in	To surrender or yield.	ہار مان لینا	The government refused to give in to the demands.
Give up	To stop trying; to quit a habit.	ہمت ہار دینا؛ چھوڑ دینا	Don't give up on your dreams. He gave up smoking.
Go after	To try to get or achieve something.	حاصل کرنے کی کوشش کرنا	You should go after that job.
Go ahead	To proceed.	آگے بڑھنا	Go ahead and start without me.
Go on	To continue; to happen.	جاری رکھنا؛ ہو رہا ہونا	Please go on with your story. What's going on here?
Go through	To experience something difficult; to examine carefully.	سے گزرنا؛ چھان بین کرنا	She went through a lot of hardship. Go through these documents carefully.
Grow up	To become an adult.	بڑا ہونا	He grew up in a small village.
Hand in	To submit something (e.g., homework).	جمع کرانا	Please hand in your assignments by Friday.

Hand out	To distribute.	تقسیم کرنا	They were handing out flyers in the street.
Hang on	To wait for a short time.	تھوڑی دیر انتظار کرنا	Hang on, I'll be right back.
Hang out	To spend time relaxing.	وقت گزارنا	We like to hang out at the cafe.
Hold on	To wait; to grip tightly.	انتظار کرنا، مضبوطی سے پکڑنا	Hold on a minute! Hold on to the railing.
Keep on	To continue doing something.	جاری رکھنا	Keep on trying, you'll succeed.
Keep up	To maintain the same pace or standard.	ساتھ چلنا؛ برقرار رکھنا	I can't keep up with all these changes. Keep up the good work!
Knock out	To make someone unconscious; to impress greatly.	بے ہوش کرنا؛ دیوانہ کر دینا	The blow knocked him out. Her performance knocked everyone out.
Lay off	To dismiss workers temporarily.	ملازموں کو عارضی طور پر برطرف کرنا	The company had to lay off 100 employees.
Leave out	To omit or not include.	چھوڑ دینا	You left out an important detail.
Let down	To disappoint.	مایوس کرنا	He promised to help, but he let me down.
Look after	To take care of.	دیکھ بھال کرنا	Can you look after my dog while I'm away?
Look down on	To regard with contempt.	تہقارت سے دیکھنا	She looks down on people who didn't go to university.
Look for	To try to find.	تلاش کرنا	I'm looking for my keys.
Look forward to	To anticipate with pleasure.	بے صبری سے انتظار کرنا	I'm looking forward to the holidays.
Look into	To investigate.	چھان بین کرنا	The police are looking into the matter.
Look out	To be careful.	ہوشیار	Look out! There's a car coming!
Look up	To search for information (e.g., in a dictionary).	ڈھونڈنا	Look up the word in the dictionary.

Look up to	To admire or respect.	تعظیم کرنا	He looks up to his father.
Make for	To head in a particular direction.	کی طرف جانا	Let's make for the exit.
Make out	To see, hear, or understand with difficulty; to kiss passionately.	سمجھنا؛ چومنا	I can't make out what he's saying. They were making out in the car.
Make up	To invent a story; to reconcile after a quarrel; to constitute.	گھڑنا؛ صلح کر لینا؛ بنانا	He made up an excuse. They made up after the fight. Women make up 50% of the workforce.
Mix up	To confuse.	الہچانا	I always mix up the twins.
Pass away	To die.	وفات پا جانا	His grandfather passed away last year.
Pass out	To faint; to distribute.	بے ہوش ہو جانا؛ تقسیم کرنا	He passed out from the heat. Please pass out these papers.
Pay back	To return owed money; to take revenge.	قرض واپس کرنا؛ بدلہ لینا	I'll pay you back next week. I'll pay him back for his treachery.
Pick out	To choose or select.	چننا	Can you help me pick out a dress?
Pick up	To lift; to collect someone; to learn.	اٹھانا؛ لینے جانا؛ سیکھ لینا	Pick up your clothes. I'll pick you up at 8. She picked up Spanish quickly.
Point out	To indicate or show.	اشارہ کرنا	He pointed out the mistake.
Pull over	To drive to the side of the road.	گاڑی روڈ سائیڈ پر روکنا	The police officer told him to pull over.
Put aside	To save money; to ignore.	بچت کرنا؛ نظر انداز کرنا	You should put aside some money for emergencies. Let's put aside our differences.
Put down	To insult; to euthanize an animal.	ذلیل کرنا؛ جانور کو موت کی نیند سلا دینا	Stop putting me down! They had to put down their old dog.
Put off	To postpone.	ملتوی کرنا	We had to put off the meeting.

Put on	To wear clothes; to organize a show.	پہننا؛ منعقد کرنا	Put on your coat. The school put on a great play.
Put out	To extinguish a fire; to inconvenience someone.	بچھانا؛ تکلیف دینا	Put out the fire. I hope I'm not putting you out.
Put up with	To tolerate.	برداشت کرنا	I can't put up with his rudeness anymore.
Run into	To meet by chance.	اتفاقاً ملاقات ہو جانا	I ran into an old friend at the mall.
Run out of	To have no more of something left.	ختم ہو جانا	We have run out of milk.
Set off	To start a journey; to cause an explosion.	سفر شروع کرنا؛ دھماکا کرنا	We set off at dawn. They set off fireworks.
Set up	To establish or arrange.	قائم کرنا	They set up a new business.
Show off	To display boastfully.	شہنی مارنا	He loves to show off his new car.
Turn down	To reject an offer; to decrease volume.	مسترد کرنا؛ آواز کم کرنا	She turned down the job offer. Turn down the TV, please.
Turn up	To arrive; to increase volume; to be found.	پہنچ جانا؛ آواز تیز کرنا؛ مل جانا	He finally turned up an hour late. Turn up the heat. My keys turned up in the drawer.
Watch out	To be careful.	ہوشیار	Watch out for the step!
Wear off	To gradually disappear.	آہستہ آہستہ ختم ہو جانا	The painkiller's effect began to wear off.
Work out	To exercise; to be successful; to calculate.	ورزش کرنا؛ کامیاب ہونا؛ حل کرنا	I work out at the gym. I hope everything works out for you. Can you work out the total cost?



(d) have supported
Answer: (b) supports

(d) were issuing
Answer: (a) has issued

11. There _____ several compelling reasons to reconsider the proposed policy.

- (a) is
- (b) are
- (c) has been
- (d) was

Answer: (b) are

16. Many a student _____ struggled with the philosophical concepts in that text.

- (a) have
- (b) has
- (c) are
- (d) were

Answer: (b) has

12. The majority of the senate _____ in favor of the bill, but a vocal minority _____ it vehemently.

- (a) is, oppose
- (b) are, opposes
- (c) is, opposes
- (d) are, oppose

Answer: (c) is, opposes

17. Not only the project manager but also the entire team _____ responsible for the failure.

- (a) is
- (b) are
- (c) were
- (d) have been

Answer: (a) is

13. Each of the employees working in the hazardous environment _____ a protective suit.

- (a) wear
- (b) wears
- (c) have worn
- (d) are wearing

Answer: (b) wears

18. Two hundred dollars _____ the estimated cost for the repairs.

- (a) are
- (b) is
- (c) were
- (d) have been

Answer: (b) is

14. Statistics _____ a branch of mathematics, but the statistics from that study _____ unreliable.

- (a) is, is
- (b) are, are
- (c) is, are
- (d) are, is

Answer: (c) is, are

19. The phenomena observed by the researchers _____ all previous theories.

- (a) contradict
- (b) contradicts
- (c) are contradicting
- (d) has contradicted

Answer: (a) contradict

20. Every one of the participants who _____ the training session _____ a certificate.

- (a) attend, receive
- (b) attends, receives
- (c) attend, receives
- (d) attends, receive

Answer: (b) attends, receives

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4. Subject - Verb Agreement



- He will **probably** arrive late.

7. Interrogative Adverbs

Used to ask questions.

- **Examples:** when, where, why, how
- **When** will you arrive?
- **Why** are you late?

8. Relative Adverbs

Introduce relative clauses and relate back to an antecedent (expressed or understood).

- **Examples:** when, where, why
- This is the house **where** I was born. (Antecedent: 'house')
- I remember the day **when** we met. (Antecedent: 'day')
- Tell me **why** you are upset. (Antecedent understood: 'the reason')

Degrees of Comparison in Adverbs

Like adjectives, many adverbs have comparative and superlative forms.

Regular Formation

- **One-syllable adverbs:** Add -er (comparative) and -est (superlative).

Positive	Comparative	Superlative
soon	sooner	soonest
hard	harder	hardest
fast	faster	fastest

- **Adverbs ending in -ly:** Use *more* (comparative) and *most* (superlative).

Positive	Comparative	Superlative
quickly	more quickly	most quickly
beautifully	more beautifully	most beautifully
efficiently	more efficiently	most efficiently

Irregular Formation

Positive	Comparative	Superlative
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- C. Incorrect preposition
- D. Missing subject

Answer: A

11. Choose the correct usage of 'few' and 'little':

- A. There are few students in the class today.
- B. There is few students in the class today.
- C. There are little students in the class today.
- D. There is little students in the class today.

Answer: A

12. Identify the possessive adjective: "Our team performed better than their team."

- A. Our
- B. team
- C. better
- D. their

Answer: A

13. Which sentence uses an absolute adjective correctly?

- A. This is the most unique opportunity.
- B. This is a very unique opportunity.
- C. This is a unique opportunity.
- D. This is the unquest opportunity.

Answer: C

14. The phrase "God Almighty" demonstrates:

- A. Proper adjective usage
- B. Adjective following the noun
- C. Superlative degree
- D. Demonstrative adjective

Answer: B

15. Choose the sentence with correct participle adjective usage:

- A. The bored lecture put everyone to sleep.

- B. The boring lecture put everyone to sleep.
- C. The lecture was bored everyone.
- D. Everyone was boring by the lecture.

Answer: B

16. Identify the interrogative adjective: "Which route should we take to avoid traffic?"

- A. Which
- B. route
- C. should
- D. take

Answer: A

17. The error in "This is more preferable than that option" is:

- A. Double comparative
- B. Wrong preposition
- C. Incorrect adjective form
- D. Missing article

Answer: A

18. Which sentence demonstrates correct use of 'elder':

- A. She is elder than her sister.
- B. She is elder to her sister.
- C. She is older than her sister.
- D. Both B and C are correct.

Answer: D

19. Identify the adjective of quality: "The magnificent palace stood against the golden sky."

- A. The
- B. magnificent
- C. stood
- D. golden

Answer: B

20. Choose the correct superlative form: "This is the _____ movie I have ever seen."

- A. most interesting
- B. interestingest



Preposition	Usage	Example
In	Enclosed spaces, countries, cities, streets, books	In the kitchen, in Pakistan, in a book, in the car
On	Surfaces, public transport, rivers, floors, attached	On the wall, on the bus, on the Thames, on the 2nd floor
At	Specific points, addresses, events, tables	At the door, at 21 Main Street, at a concert, at the table
By/Beside/Next to	Adjacency (left or right of something)	She stood by the car.
Under	Directly below (and often covered by)	The cat is under the table.
Below	Lower than something else (not directly under)	The valley is below the mountain.
Over	Covered by; above; across to the other side	Put a blanket over the bed. He jumped over the wall.
Above	Higher than something else	The picture hangs above the sofa.
Across	From one side to the other	Walk across the bridge.
Through	Movement from one end to the other in a 3D space	Drive through the tunnel.
Between	In the space separating two things	The ball is between the chair and the table.
Among	In the middle of a group (more than two)	She was among friends.

Prepositions of Direction and Movement

These prepositions indicate the direction in which someone or something is moving.

Preposition	Usage	Example
To	Movement towards a destination	Go to school, go to bed
Into	Movement from outside to inside	Walk into the room.
Out of	Movement from inside to outside	Get out of the car.



Answer: (a) She sleeps peacefully. (Intransitive verb 'sleeps' has no object)

manipulate its stock prices.

Answer: (c) Both (a) and (b) are correct.

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7. **Choose the correct passive voice for the sentence with a double object: "The committee awarded him the 'Researcher of the Year' prize."**

- (a) He was awarded the 'Researcher of the Year' prize by the committee.
- (b) The 'Researcher of the Year' prize was awarded him by the committee.
- (c) He was awarded by the committee the 'Researcher of the Year' prize.
- (d) Both (a) and (b) are correct, but (a) is more common.

Answer: (d) Both (a) and (b) are correct, but (a) is more common.

8. **"The scientists' groundbreaking research suggests that a paradigm shift is imminent." The most accurate passive construction is:**

- (a) A paradigm shift is suggested to be imminent by the scientists' groundbreaking research.
- (b) It is suggested by the scientists' groundbreaking research that a paradigm shift is imminent.
- (c) That a paradigm shift is imminent is suggested by the scientists' groundbreaking research.
- (d) Both (b) and (c) are correct.

Answer: (d) Both (b) and (c) are correct.

9. **The passive form of "People believe that the company is manipulating its stock prices" can be:**

- (a) It is believed that the company is manipulating its stock prices.
- (b) The company is believed to be manipulating its stock prices.
- (c) Both (a) and (b) are correct.
- (d) The company was believed to

10. **Identify the sentence where the passive voice is used most appropriately for formal writing.**

- (a) The experiment was conducted under controlled conditions, and the results were meticulously recorded.
- (b) I conducted the experiment under controlled conditions, and I recorded the results meticulously.
- (c) Someone conducted the experiment under controlled conditions.
- (d) They recorded the results meticulously after conducting the experiment.

Answer: (a) The experiment was conducted under controlled conditions, and the results were meticulously recorded.

11. **"What measures are you going to take to address this issue?" The correct passive form is:**

- (a) What measures are going to be taken by you to address this issue?
- (b) What measures are to be taken to address this issue by you?
- (c) By you, what measures are going to be taken to address this issue?
- (d) What measures were going to be taken to address this issue?

Answer: (a) What measures are going to be taken by you to address this issue?

12. **The active sentence "The noise of the traffic had disturbed the residents all night" becomes in the passive:**

- (a) The residents were disturbed by the noise of the traffic all night.
- (b) The residents had been disturbed by the noise of the traffic all night.

9. Active and Passive Voice



If the reporting verb (e.g., said, told) is in the past tense, the verb in the reported speech changes as follows:

Direct Speech (Tense)	Indirect Speech (Tense)
Present Indefinite	Past Indefinite
Present Continuous	Past Continuous
Present Perfect	Past Perfect
Present Perfect Continuous	Past Perfect Continuous
Past Indefinite	Past Perfect
Past Continuous	Past Perfect Continuous
Past Perfect	No Change (Past Perfect)
Future (will/shall)	Conditional (would)
Can	Could
May	Might
Must (obligation)	Had to
Must (general truth)	No Change (must)

Examples:

- Direct: He said, "I write a letter." (Present Indefinite)
- Indirect: He said that he **wrote** a letter. (Past Indefinite)
- Direct: She said, "I have finished my work." (Present Perfect)
- Indirect: She said that she **had finished** her work. (Past Perfect)
- Direct: He said, "I will go." (Future)
- Indirect: He said that he **would go**. (Conditional)

Rule 2: Exceptions to Tense Change

The tense does **not** change in the following cases:

- **Universal Truths/Habitual Facts:**
 - Direct: The teacher said, "The sun **rises** in the east."
 - Indirect: The teacher said that the sun **rises** in the east.
- **Reporting Verb in Present or Future Tense:**
 - Direct: He **says**, "I **am** tired."
 - Indirect: He **says** that he **is** tired.

Changes in Time and Place Words

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10. Direct and Indirect Narration



d) He suggested that we wait here until the rain stopped.

Answer: b) He suggested that they should wait there till the rain stopped.

7. "I must go to the bank tomorrow," she said, "as I have no cash left."

- a) She said that she must go to the bank the next day as she had no cash left.
- b) She said that she had to go to the bank the next day as she had no cash left.
- c) She said that she must go to the bank tomorrow as she has no cash left.
- d) She said that she should go to the bank the next day as she has no cash left.

Answer: b) She said that she had to go to the bank the next day as she had no cash left.

8. "Would that I were a bird!" the prisoner sighed.

- a) The prisoner sighed that he would be a bird.
- b) The prisoner wished that he were a bird.
- c) The prisoner said that he would like to be a bird.
- d) The prisoner exclaimed that he would be a bird.

Answer: b) The prisoner wished that he were a bird.

9. The notice read, "Passengers are requested to keep their luggage with them at all times."

- a) The notice read that passengers are requested to keep their luggage with them at all times.
- b) The notice said that passengers were requested to keep their luggage with them at all times.
- c) The notice stated that passengers are requested to keep their luggage with them at all times.
- d) The notice said that passengers are

requested to keep their luggage with them at all times.

Answer: c) The notice stated that passengers are requested to keep their luggage with them at all times.

10. "How dare you speak to me like that!" he roared at the junior clerk.

- a) He roared at the junior clerk how he dared to speak to him like that.
- b) He asked the junior clerk angrily how he dared to speak to him like that.
- c) He roared at the junior clerk and asked how he dared to speak to him like that.
- d) He demanded of the junior clerk how he dared to speak to him like that.

Answer: d) He demanded of the junior clerk how he dared to speak to him like that.

11. She said, "I was studying law when the war broke out."

- a) She said that she studied law when the war broke out.
- b) She said that she was studying law when the war had broken out.
- c) She said that she had been studying law when the war broke out.
- d) She said that she had been studying law when the war had broken out.

Answer: c) She said that she had been studying law when the war broke out.

12. The scientist said, "This discovery will revolutionize the field of medicine."

- a) The scientist said that that discovery would revolutionize the field of medicine.
- b) The scientist said that this discovery will revolutionize the field of medicine.
- c) The scientist said that that discovery will revolutionize the field of medicine.
- d) The scientist said that this discovery would revolutionize the field of medicine.

Answer: a) The scientist said that that

A wolf in sheep's clothing	A person who appears harmless but is actually dangerous.	بھیڑے جیسا شخص، منافق	Be careful of him; he's a wolf in sheep's clothing.
To fight tooth and nail	To fight with all one's might.	دانت کھٹے کرنا، خوب جدوجہد کرنا	The community fought tooth and nail to save the local park.
To be in a tight corner	To be in a difficult situation.	مشکل میں پھنس جانا، مصیبت میں گھر جانا	The sudden market crash put many investors in a tight corner.
To burn the candle at both ends	To overwork oneself by doing too much.	دونوں سروں سے موم جلی جانا، حد سے زیادہ محنت کرنا	You'll get sick if you keep burning the candle at both ends.
To bell the cat	To face a risk or perform a dangerous task.	خطرہ مول لینا، مشکل کام کرنے کا عہد کرنا	Everyone agreed to complain, but no one was ready to bell the cat.
To have an axe to grind	To have a private reason for being involved in something.	ذاتی غرض ہونا	His criticism isn't impartial; he has an axe to grind.
A storm in a teacup	A lot of fuss about something trivial.	رائی کا پہاڑ بنانا	Their argument about who should make the coffee was a storm in a teacup.
A bolt from the blue	A complete surprise.	اچانک اور بے انتہا حیرت انگیز واقعہ	The news of the merger was a bolt from the blue for the employees.
To bite off more than one can chew	To take on a task that is too big or difficult.	اپنی استطاعت سے زیادہ کام لے لینا	By accepting three major projects, he bit off more than he could chew.
To strain every nerve	To make the utmost effort.	پوری کوشش کرنا، از حد جدوجہد کرنا	The doctors strained every nerve to save the patient.
To go the extra mile	To make a special effort.	ضرورت سے زیادہ محنت کرنا	She always goes the extra mile for her clients.

Practice MCQs – Idioms and Phrasal Verbs

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1. He decided to *bite the bullet* and finally confront his boss about the promotion.

- A. Avoid the issue
- B. Prepare carefully
- C. Face a painful situation bravely
- D. Resign from the job

Answer: C

2. Her extravagant plans to build a castle *went up in smoke* when the investors backed out.

- A. Were highly praised
- B. Were partially successful
- C. Ended in complete failure
- D. Were postponed indefinitely

Answer: C

3. The detective *smelled a rat* when the witness changed his story for the third time.

- A. Became angry
- B. Suspected deception
- C. Found evidence
- D. Felt nauseous

Answer: B

4. After the scandal, the company had to *face the music* from regulatory authorities.

- A. Enjoy success
- B. Accept consequences
- C. Avoid punishment
- D. Celebrate victory

Answer: B

5. The new manager *brought about* significant changes in the organizational structure.

- A. Prevented
- B. Delayed
- C. Caused to happen
- D. Criticized

Answer: C

6. His explanation for the missing funds *doesn't add up*.

- A. Make sense
- B. Seem honest
- C. Appear complete
- D. Sound convincing

Answer: A

7. She's always *blowing her own trumpet* about her academic achievements.

- A. Being modest
- B. Boasting
- C. Criticizing others
- D. Working hard

Answer: B

8. The negotiations *broke down* when neither side would compromise.

- A. Succeeded
- B. Concluded
- C. Failed
- D. Accelerated

Answer: C

9. His sudden resignation came as *a bolt from the blue* for everyone in the office.

- A. Expected event
- B. Complete surprise
- C. Regular occurrence
- D. Minor incident

Answer: B

10. We need to *cut corners* to complete the project within the limited budget.

- A. Increase quality
- B. Reduce costs
- C. Extend deadlines
- D. Hire more staff

Answer: B

11. The CEO *called off* the merger at the last moment.

11. Idioms and Phrasal Verbs

Chapter 12

Synonyms and Antonyms

- **Synonyms** are words or phrases that have the same or nearly the same meaning as another word or phrase in the same language. For example, "happy" and "joyful" are synonyms. Knowing synonyms helps in understanding nuanced meanings and improves writing style.
- **Antonyms** are words that have the exact opposite meaning of another word. For example, "hot" is the antonym of "cold." A strong grasp of antonyms is crucial for understanding contrast and constructing balanced arguments.

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12. Synonyms and Antonyms

Word	Urdu Meaning	Synonyms	Antonyms	Sentence
Abate	کم ہونا، گھٹنا	Subside, Diminish, Decrease, Lessen	Intensity, Increase, Augment, Escalate	The storm finally began to abate after raging for hours.
Aberration	خلل، انحراف	Anomaly, Deviation, Irregularity, Oddity	Normality, Regularity, Standard, Conformity	His poor performance was an aberration from his usual excellence.
Abhor	نفرت کرنا، کراہت کرنا	Despise, Detest, Loathe, Hate	Admire, Adore, Cherish, Love	She abhors any form of cruelty towards animals.
Abridge	مختصر کرنا، خلاصہ کرنا	Shorten, Condense, Abbreviate, Curtail	Elongate, Expand, Amplify, Extend	The publisher released an abridged version of the classic novel for students.
Acrimonious	تلخ، کڑواہٹ بھرا	Bitter, Caustic, Hostile, Sarcastic	Harmonious, Kind, Gentle, Amicable	The divorce proceedings were acrimonious and lengthy.
Admonish	ڈانٹنا، تنبیہ کرنا	Reprimand, Rebuke, Chide, Warn	Praise, Commend, Applaud, Encourage	The teacher had to admonish the student for talking in class.



Practice MCQs

1. What is the synonym of "NOVEL" (as an adjective)?

- A) Traditional
- B) Hazardous
- C) New
- D) Complicated

Answer: C) New

2. What is the synonym of "IMPERVIOUS"?

- A) Vulnerable
- B) Resistant
- C) Sensitive
- D) Susceptible

Answer: B) Resistant

3. What is the synonym of "SCRUTINIZE"?

- A) Ignore
- B) Skim
- C) Examine
- D) Overlook

Answer: C) Examine

4. What is the synonym of "INGENIOUS"?

- A) Uninspired
- B) Dull
- C) Clever
- D) Simple

Answer: C) Clever

5. What is the synonym of "SAGACIOUS"?

- A) Foolish
- B) Redundant
- C) Wise
- D) Obtuse

Answer: C) Wise

6. What is the synonym of "MAGNANIMOUS"?

- A) Petty

- B) Spiteful
- C) Vindictive
- D) Generous

Answer: D) Generous

7. What is the synonym of "INNATE"?

- A) Acquired
- B) Extrinsic
- C) Learned
- D) Inborn

Answer: D) Inborn

8. What is the synonym of "OBFUSCATE"?

- A) Elucidate
- B) Clarify
- C) Confuse
- D) Explain

Answer: C) Confuse

9. What is the synonym of "FASTIDIOUS"?

- A) Negligent
- B) Sloppy
- C) Meticulous
- D) Careless

Answer: C) Meticulous

10. What is the synonym of "TRANSIENT"?

- A) Permanent
- B) Enduring
- C) Temporary
- D) Perpetual

Answer: C) Temporary

11. She was the victim of a MALICIOUS rumor.

- A) Benevolent
- B) Compassionate
- C) Spiteful
- D) Kind

Answer: C) Spiteful

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12. Synonyms and Antonyms



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- A. Postponed
- B. Cancelled
- C. Accelerated
- D. Approved

Answer: B

12. Despite initial difficulties, their startup eventually *bore fruit*.

- A. Failed miserably
- B. Produced results
- C. Lost money
- D. Changed direction

Answer: B

13. The politician was accused of *throwing dust in the public's eyes* with false promises.

- A. Being transparent
- B. Deceiving people
- C. Helping citizens
- D. Speaking truth

Answer: B

14. After the argument, they decided to *bury the hatchet* and work together.

- A. To dig for treasure
- B. To forget their disagreement and make peace
- C. To hide their weapons
- D. To start a new project

Answer: B

15. The investigation *brought to light* several corruption cases.

- A. Hid
- B. Revealed
- C. Ignored
- D. Complicated

Answer: B

16. His elaborate excuses were nothing *but a storm in a teacup*.

- A. Serious matter
- B. Fuss about nothing
- C. Well-reasoned argument
- D. Important issue

Answer: B

17. The team *pulled off* a remarkable victory against all odds.

- A. Achieved unexpectedly
- B. Failed to achieve
- C. Postponed
- D. Abandoned

Answer: A

18. She *came across* the old letters while cleaning the attic.

- A. Destroyed
- B. Purchased
- C. Found by chance
- D. Wrote

Answer: C

19. The company's outdated policies are *on their last legs*.

- A. Highly successful
- B. About to collapse
- C. Being updated
- D. Widely popular

Answer: B

20. He always *stands up for* the rights of marginalized communities.

- A. Opposes
- B. Ignores
- C. Supports
- D. Criticizes

Answer: C

Chapter 12

Synonyms and Antonyms

- **Synonyms** are words or phrases that have the same or nearly the same meaning as another word or phrase in the same language. For example, "happy" and "joyful" are synonyms. Knowing synonyms helps in understanding nuanced meanings and improves writing style.
- **Antonyms** are words that have the exact opposite meaning of another word. For example, "hot" is the antonym of "cold." A strong grasp of antonyms is crucial for understanding contrast and constructing balanced arguments.

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12. Synonyms and Antonyms

Word	Urdu Meaning	Synonyms	Antonyms	Sentence
Abate	کم ہونا، گھٹنا	Subside, Diminish, Decrease, Lessen	Intensity, Increase, Augment, Escalate	The storm finally began to abate after raging for hours.
Aberration	خلل، انحراف	Anomaly, Deviation, Irregularity, Oddity	Normality, Regularity, Standard, Conformity	His poor performance was an aberration from his usual excellence.
Abhor	نفرت کرنا، کراہت کرنا	Despise, Detest, Loathe, Hate	Admire, Adore, Cherish, Love	She abhors any form of cruelty towards animals.
Abridge	مختصر کرنا، خلاصہ کرنا	Shorten, Condense, Abbreviate, Curtail	Elongate, Expand, Amplify, Extend	The publisher released an abridged version of the classic novel for students.
Acrimonious	تلخ، کڑواہٹ بھرا	Bitter, Caustic, Hostile, Sarcastic	Harmonious, Kind, Gentle, Amicable	The divorce proceedings were acrimonious and lengthy.
Admonish	ڈانٹنا، تنبیہ کرنا	Reprimand, Rebuke, Chide, Warn	Praise, Commend, Applaud, Encourage	The teacher had to admonish the student for talking in class.



Practice MCQs

1. What is the synonym of "NOVEL" (as an adjective)?

- A) Traditional
- B) Hazardous
- C) New
- D) Complicated

Answer: C) New

2. What is the synonym of "IMPERVIOUS"?

- A) Vulnerable
- B) Resistant
- C) Sensitive
- D) Susceptible

Answer: B) Resistant

3. What is the synonym of "SCRUTINIZE"?

- A) Ignore
- B) Skim
- C) Examine
- D) Overlook

Answer: C) Examine

4. What is the synonym of "INGENIOUS"?

- A) Uninspired
- B) Dull
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- D) Simple

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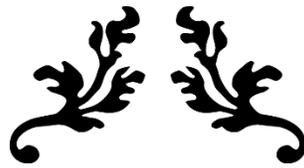
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12. Synonyms and Antonyms



PART 3: PEDAGOGY



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Chapter 1

Teaching Techniques and Methodologies

1. Introduction to Teaching: Concept, Nature, and Evolution

Definition of Teaching:

Teaching is a deliberate, interactive, and planned process implemented by an educator to facilitate learning. It involves the systematic transmission and facilitation of knowledge (cognitive skills), practical abilities (psychomotor skills), and values or attitudes (affective skills) within a structured educational context. A refined definition characterizes teaching as the process of preparing students for learning by providing an initial structure, clarifying intended outcomes, indicating effective learning strategies, creating opportunities for practice and application, and delivering improvement-oriented feedback.

The Nature and Evolution of Teaching:

- **Teaching as a Mutual Exchange:** It is not a one-way transmission but a dynamic interaction involving the mutual exchange of experiences and information between the teacher and the students.
- **Teaching as a Provocative Activity:** Its purpose is to stimulate and provoke academic, mental, and personal development in learners.
- **Shift from Traditional to Modern Role:**
 - **Traditional (Teacher-Centered) Role:** The teacher was viewed as the primary source or "fountainhead" of knowledge. The focus was on the dissemination of information through methods like lecturing ("chalk-and-talk"), and students were passive recipients.
 - **Modern (Student-Centered) Role:** The teacher acts as a facilitator, guide, and co-learner. The focus shifts to creating environments where students can discover, construct, and collaborate on knowledge. This approach caters to individual differences and uses methods like group work, experiments, and research-based learning.

The Process of Learning and Teaching:

- Students possess unique ways of understanding, processing, and demonstrating knowledge, and they learn at their own pace.

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- Teachers must be diagnosticians of learning, considering students' background knowledge, the learning environment, and educational goals when selecting appropriate teaching methods.
- A wide spectrum of methods exists, ranging from traditional (explaining, questioning) to modern (role-play, seminars, case studies, technology-integrated learning).

2. The Roles and Characteristics of an Effective Teacher

M An effective teacher seamlessly transitions between multiple roles, embodying a blend of personal and professional qualities.

K **The Five Major Roles of a Teacher:**

1. **Subject Matter Expert:** Possesses deep, extensive, and current knowledge of the subject, going beyond textbooks to develop original thoughts and a genuine passion for the discipline.
2. **Pedagogical Expert:** Sets clear, achievable learning goals; demonstrates a positive attitude; helps students overcome learning difficulties; guides critical thinking and problem-solving; and provides fair and constructive evaluation.
3. **Excellent Communicator:** Demonstrates effective oral and written communication, strong organizational abilities, and planning skills. Actively helps students develop their own communication competencies.
4. **Student-Centered Mentor:** Encourages each student to learn through varied methods, promotes active participation, and challenges students to reach higher intellectual and personal levels.
5. **Systematic and Continual Assessor:** Develops and implements procedures for assessing student learning outcomes; systematically evaluates their own teaching effectiveness; and refreshes instructional materials and styles to improve student learning.

O **Characteristics of an Effective Teacher:**

N **A. Personal Qualities:**

- **Fairness:** Avoids any form of favoritism; treats all students justly and equitably.
- **Positive Attitude:** Believes in student success, uses meaningful verbal praise, and proactively "catches students doing things right."
- **Preparedness:** Is competent in the subject matter and thoroughly prepared for lessons, which allows for better management of behavioral matters.

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- **Personal Touch:** Connects with students personally by using their names, sharing relevant stories, and showing genuine interest in their lives.
- **Sense of Humor:** Uses wit and humor to break the ice, reduce anxiety, and make learning an enjoyable experience.
- **Creativity:** Employs unusual, engaging, and innovative methods to motivate students and present content.
- **Willingness to Admit Mistakes:** Apologizes for errors, modeling humility, integrity, and a growth mindset for students.
- **Forgiving:** Shows a willingness to forgive student misbehavior and move forward without holding grudges.
- **Respect:** Gives respect to students to earn it in return; handles situations with sensitivity and dignity.
- **High Expectations:** Sets challenging yet realistic academic and behavioral standards, motivating students to consistently do their best.
- **Compassion:** Cares for students' emotional well-being and works to reduce the impact of hurt feelings on learning.
- **Sense of Belonging:** Actively builds a classroom community and unity to create an emotionally safe space where every student feels valued and included.

B. Professional Qualities:

- **Collaboration:** Works constructively and cooperatively with colleagues, parents, and the community to achieve common educational goals.
- **Honesty and Integrity:** Demonstrates truthfulness, maintains confidentiality, and is trustworthy in all professional dealings.
- **Respect (Professional):** Values diversity, establishes rapport with students and colleagues, and addresses varied learning and cultural needs.
- **Commitment to Learning:** Values lifelong learning for both self and students; uses research-based strategies; and continuously reflects on and improves their own practice.
- **Emotional Maturity:** Is self-confident, enthusiastic, punctual, reliable, and handles all situations with appropriate professionalism and composure.



3. Theoretical Foundations of Learning and Teaching

Vygotsky's Zone of Proximal Development (ZPD)

- **Theory:** Lev Vygotsky theorized that a child's cognitive development is defined by two levels:
 1. **The Actual Developmental Level:** What a child can do independently without any assistance.
 2. **The Zone of Proximal Development (ZPD):** The difference between what a learner can do without help and what they can achieve with guidance and encouragement from a skilled partner (e.g., a teacher or more capable peer).
- **Implication for Teaching:** Effective teaching occurs within the ZPD. It consists of "assisting performance" to "awaken" and nurture mental functions that are in a stage of maturing. Teaching is only effective when it precedes development.
- **Scaffolding (Means of Assistance):** This is the supportive framework provided by the teacher to help students bridge the gap in their ZPD. Techniques include:
 - **Modeling:** Demonstrating a behavior or skill for imitation.
 - **Feeding Back:** Providing constructive information on performance, allowing learners to compare against a standard and self-correct.
 - **Contingency Managing:** Using principles of reinforcement and punishment to shape and encourage desirable behavior.
 - **Directing:** Requesting specific actions from the student to clarify the correct response.
 - **Questioning:** Prompting mental operations that the learner cannot produce alone.
 - **Explaining:** Providing rationale and logical connections to help learners organize new information.
 - **Task Structuring:** Breaking down a complex task into smaller, manageable parts by chunking, segregating, and sequencing.

The Constructivist Approach

- **Core Idea:** Learners **construct** their own knowledge and meaning through active interaction between their existing experiences and new ideas. Knowledge is not passively received but is actively built.



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- **Key Principles:**

- Learning is an active, interpretive, and iterative process.
- New knowledge is built upon and connected to prior knowledge (through Assimilation and Accommodation).
- Learning is inherently social and culturally influenced.
- The teacher's role shifts from instructor to **facilitator** of learning.

- **Implications for Teaching:**

- Use active learning techniques (problem-solving, experiments, inquiry).
- Pose problems that are relevant to students' lives.
- Encourage dialogue, collaboration, and peer learning.
- Assess learning continuously within the context of teaching.

4. The Concept of Effective Teaching and a Conducive Learning Environment

Defining Effective Teaching

Effective teaching is the professional practice that demonstrably leads to improved student learning, achievement, and holistic development. It involves talking to learners about their learning and, crucially, listening to them.

Aspects of Effective Teaching:

- Effectively managing the classroom.
- Starting each class with a clear objective.
- Engaging students with strategic questioning.
- Consolidating the lesson at the end for retention.
- Diagnosing and correcting common student errors.

Approaches to Teaching Effectiveness:

- **The 'Style' View:** Effectiveness is determined by the teacher's actions and behaviors (e.g., displaying warmth and enthusiasm, minimizing direct instruction, facilitating knowledge construction through dialogue, using research-based techniques).
- **The 'Outcomes' Approach:** Effectiveness is determined by student results, measured by achievement and the *added value* a teacher contributes to student growth.



- **The 'Inquiry' Approach:** Effectiveness is determined by the quality of a teacher's inquiry into the relationship between their teaching style and student outcomes. It involves a continuous cycle of reflection, action, and evaluation.

Key Factors for Effective Teaching (Gurney, 2007):

1. **Teacher Knowledge, Enthusiasm, and Responsibility:** Creating an environment where knowledge is shared and enjoyed, and the teacher takes responsibility for fostering a love for learning.
2. **Classroom Activities That Encourage Learning:** Designing activities that allow students to explore, experiment, and feel a sense of mastery and ownership over their learning.

Creating a Conducive Learning Environment

A conducive learning environment is positive, safe, respectful, and well-managed, enabling efficient learning and fostering self-directed students.

Teacher's Responsibilities in Fostering this Environment:

- **Instructor of Knowledge:** Imparting curriculum knowledge through diverse methods.
- **Creator of Classroom Environment:** Setting a positive, warm, and happy tone that influences student behavior and social interactions.
- **Role Model:** Serving as an exemplar whom students imitate, reflecting positive values, behavior, and a love for learning.
- **Mentor:** Encouraging students to do their best, enjoy learning, and building their confidence through active listening and support.
- **Protector:** Being vigilant for signs of trouble (e.g., behavioral changes, abuse) and taking appropriate, timely action.

Strategies for a Conducive Environment:

- **Keep Students Motivated:** Prevent discipline problems by intrinsically engaging students in learning.
- **Meet Basic Needs:** Ensure students feel physically and emotionally safe, accepted, and valued.
- **Exercise Moderate Control:** Balance between authoritarian and laissez-faire approaches; too much control harms critical and creative thinking.

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1. Teaching Techniques & Methodologies



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- **Empower Students:** Make them responsible for their own learning to develop independence.
- **Differentiate Instruction:** Tailor instruction to students' developmental levels, readiness, and learning styles.
- **Build Relationships:** Learn names and positive information about each student.
- **Show Interest:** Use eye contact, gestures, and proximity to communicate care and attention.
- **Use Positive Language:** When addressing misbehavior, describe the act, don't characterize the student (e.g., "That comment was rude," not "You are rude").
- **Maximize Engaged Time:** Use wit, smooth transitions, and group focus strategies to keep students on task.
- **Establish Rules and Routines:** Teach procedures explicitly and display a few general, positive, and applicable rules.
- **Be Assertive in Discipline:** Enforce rules fairly, consistently, and calmly.
- **Handle Misbehavior Effectively:**
 - Deal with the present problem immediately.
 - Talk to the student directly and privately.
 - Stay calm and avoid anger, empty threats, or physical handling.

5. Core Teaching Methodologies and Strategies

Classroom Management

Classroom management encompasses the techniques and actions teachers use to create an environment that supports both academic and social-emotional learning, including preventing and responding to disruptive behavior.

Principles of Classroom Management and Setup:

- Teachers should have a clear view of all students at all times.
- Teaching materials should be readily accessible.
- High-traffic areas should be free of congestion.
- All students should be able to see instructional presentations.



- Procedures and routines must be explicitly taught and reinforced.

Time Management in the Classroom:

- **Allocated Time:** The total time scheduled for a subject (e.g., 30 minutes for mathematics).
- **Engaged Time:** The portion of allocated time during which students are actively involved in the academic subject.
- **Academic Learning Time:** The subset of engaged time during which students are working with a high success rate (70-80% correct). This is the most critical factor directly linked to student achievement.

Teaching Methods & Strategies:

- **Lecture Method:**
 - **Pros:** Efficient for delivering large amounts of information to large groups; instructor-controlled.
 - **Cons:** Minimizes student feedback and interaction; can be passive; information retention is often low.
 - **Improving Lectures:** Fit the lecture to the audience, focus the topic, prepare a clear outline, use relevant examples, be aware of and responsive to audience feedback, and deliver with enthusiasm.
- **Direct Instruction:**
 - A highly structured, teacher-centered, and explicit strategy for the efficient transmission of knowledge and skills.
 - **Common Steps:** Review previous learning, state goals, present new material in small steps, provide guided and independent practice, ask many questions, and provide immediate feedback and corrections.
- **Indirect Instruction:**
 - A student-centered strategy where the teacher is a facilitator, leveraging student curiosity and encouraging observation, investigation, and hypothesis formation.
 - **Main Strategies:** Problem-solving, case studies, and reading for meaning.
- **Case Method:** Engages students in active discussion about real-world issues and problems, applying theoretical classroom learning to practical scenarios.

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1. Teaching Techniques & Methodologies



- **Discussion Method:** Engages students in active dialogue about issues, initiated by a probing question from the teacher. Requires careful planning and student preparation.
- **Active Learning:** Creates environments where students talk, listen, read, write, and reflect through problem-solving, group work, simulations, etc. It enhances critical thinking and retention.
- **Cooperative Learning:** A systematic pedagogical strategy where small, mixed-ability teams work toward a common goal.
 - **Key Elements:** Positive interdependence, face-to-face interaction, individual accountability, teaching of social skills, and group processing.
 - **Advantages:** Improves academic achievement, retention, social skills, self-esteem, and promotes positive race relations.
- **Collaborative Teaching (Team Teaching):** Two or more teachers share responsibility for planning, instructing, and assessing the same group of students.
 - **Models:** Traditional Team Teaching, Linked Courses, Connected Courses.
 - **Co-teaching Strategies:** One Teach/One Observe, One Teach/One Assist, Parallel Teaching, Station Teaching, Alternative Teaching.
- **Integrating Technology:** Using tools like educational software, online resources, and interactive platforms to extend and enhance learning. Requires addressing varying levels of student digital literacy.
- **Distance Learning:** Any form of teaching where the teacher and learner are not in the same place at the same time (e.g., online courses, virtual classrooms).

6. Essential Teaching Techniques

- **Questioning:** Used to assess prior learning, stimulate critical thinking, clarify doubts, and encourage an inquisitive mindset. It helps teachers gauge what students have learned and decide the direction of further teaching.
- **Explaining:** Involves presenting information in a direct, logical, and structured way, often through mini-lectures, supported by examples and summaries. Its purpose is to provide explanations that help learners organize new learning.
- **Modeling:** A visual aid where learning occurs through observation, retention, and replication of demonstrated behavior. It works on the three criteria of observing, retaining, and replicating and is crucial for reinforced learning.



- **Demonstrating:** A step-by-step explanation that includes the reasons and significance behind each step, often involving practical experimentation. It enhances understanding and skill application through practical demonstration.
- **Collaborating (Group Work):** Teaching students to work effectively in teams, promoting mutual responsibility, research skills, critical analysis, and problem-solving through discussion.
- **Brainstorming:** A group creativity technique designed to generate a large number of ideas for creative problem-solving.
 - **Rules:** Withhold criticism, welcome free-wheeling and unconventional ideas, aim for quantity, and combine and improve upon ideas.
- **Problem-Solving Method:** A process that involves choosing effective tools and behaviors to reach a target using scientific and critical thinking.
 - **Steps:** Identify and delimit the problem, plan an approach, prepare a guide, provide resources, examine the problem, conclude, and discuss findings.
 - **Advantages:** Promotes active participation, scientific thinking, and a sense of responsibility.
 - **Disadvantages:** Can be time-consuming, not suitable for all subjects, and may be resource-intensive.
- **Drama Technique:** Uses theatrical methods to enhance learning.
 - **Types:** Informal Drama (unrehearsed, improvisational), Role-Playing (preparing for a role before acting), Formal Drama (scripted performances).
 - **Advantages:** Makes learning fun, improves language and communication skills, and allows for the exploration of solutions to problems.
 - **Disadvantages:** Time-consuming, can be costly, and some students may feel self-conscious or threatened.



Teaching Techniques & Methodologies: One - Liners

1. Introduction to Teaching

1. **Teaching** is a deliberate, interactive, and planned process to facilitate learning.
2. It involves the systematic transmission of **knowledge (cognitive), practical abilities (psychomotor), and values (affective)**.
3. Teaching prepares students for learning by providing an **initial structure and clarifying intended outcomes**.
4. The nature of teaching is a **mutual exchange** of experiences between teacher and students.
5. Teaching is a **provocative activity** aimed at stimulating academic, mental, and personal development.
6. The **traditional role** of a teacher is as the primary source or "**fountainhead**" of **knowledge**.
7. The **modern role** of a teacher is as a **facilitator, guide, and co-learner**.
8. The traditional method focuses on "**chalk-and-talk**" lecturing with students as passive recipients.
9. The modern method focuses on creating environments for students to **discover, construct, and collaborate** on knowledge.
10. Teachers must be **diagnosticians of learning**, considering students' background knowledge and the learning environment.

2. Roles and Characteristics of an Effective Teacher

11. The five major roles of a teacher are **Subject Matter Expert, Pedagogical Expert, Excellent Communicator, Student-Centered Mentor, and Systematic Assessor**.
12. A **Subject Matter Expert** possesses deep, current knowledge and a genuine passion for the discipline.
13. A **Pedagogical Expert** sets clear learning goals and guides critical thinking and problem-solving.
14. An **Excellent Communicator** helps students develop their own communication competencies.
15. A **Student-Centered Mentor** encourages learning through varied methods and promotes active participation.

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1. Teaching Techniques & Methodologies



16. A **Systematic and Continual Assessor** evaluates student outcomes and their own teaching effectiveness.
17. **Personal qualities** of an effective teacher include **fairness, positive attitude, and preparedness**.
18. **Fairness** means treating all students justly and equitably without favoritism.
19. A **positive attitude** involves believing in student success and using meaningful verbal praise.
20. **Preparedness** in subject matter and lessons allows for better management of behavioral matters.
21. **Personal touch** involves connecting with students by using their names and showing genuine interest.
22. A **sense of humor** is used to break the ice, reduce anxiety, and make learning enjoyable.
23. **Creativity** involves using unusual and innovative methods to motivate students.
24. **Willingness to admit mistakes** models humility, integrity, and a growth mindset for students.
25. A **forgiving** nature means moving forward from student misbehavior without holding grudges.
26. **Respect** is given to students to earn it in return, handling situations with sensitivity.
27. **High expectations** involve setting challenging yet realistic academic and behavioral standards.
28. **Compassion** involves caring for students' emotional well-being and reducing the impact of hurt feelings.
29. A **sense of belonging** is created by building a classroom community where every student feels valued.
30. **Professional qualities** include **collaboration, honesty, integrity, and respect**.
31. **Collaboration** means working constructively with colleagues, parents, and the community.
32. **Commitment to learning** involves valuing lifelong learning for both self and students.
33. **Emotional maturity** involves being self-confident, reliable, and handling situations with composure.



3. Theoretical Foundations of Learning and Teaching

- 34. **Vygotsky's Zone of Proximal Development (ZPD)** defines two levels of cognitive development.
- 35. The **Actual Developmental Level** is what a child can do independently without assistance.
- 36. The **Zone of Proximal Development (ZPD)** is what a learner can achieve with guidance from a skilled partner.
- 37. Effective teaching occurs within the learner's **ZPD**.
- 38. **Scaffolding** is the supportive framework provided by the teacher to help students bridge their ZPD.
- 39. Scaffolding techniques include **modeling, feeding back, contingency managing, and directing**.
- 40. Other scaffolding techniques are **questioning, explaining, and task structuring**.
- 41. **Task structuring** involves breaking down a complex task into smaller, manageable parts.
- 42. The **Constructivist Approach** posits that learners **construct** their own knowledge through active interaction.
- 43. In constructivism, knowledge is not passively received but is **actively built**.
- 44. Learning is an **active, interpretive, and iterative process**.
- 45. New knowledge is built upon and connected to **prior knowledge**.
- 46. Learning is inherently **social and culturally influenced**.
- 47. In constructivism, the teacher's role shifts from instructor to **facilitator** of learning.

4. Effective Teaching and Conducive Learning Environment

- 48. **Effective teaching** demonstrably leads to improved student learning and holistic development.
- 49. Effective teaching involves **talking to learners** about their learning and **listening to them**.
- 50. Aspects of effective teaching include managing the classroom and starting with a **clear objective**.
- 51. The **'Style' View** of teaching effectiveness is determined by the teacher's actions and behaviors.



- 52. The '**Outcomes' Approach** measures effectiveness by student results and the **added value** from the teacher.
- 53. The '**Inquiry' Approach** focuses on the teacher's reflection on the relationship between their style and student outcomes.
- 54. A **conducive learning environment** is positive, safe, respectful, and well-managed.
- 55. The teacher's role includes being an **instructor of knowledge** and a **creator of the classroom environment**.
- 56. The teacher is a **role model** whom students imitate, reflecting positive values.
- 57. The teacher acts as a **mentor** to encourage students and build their confidence.
- 58. The teacher is a **protector**, vigilant for signs of trouble like behavioral changes or abuse.
- 59. A key strategy is to **keep students motivated** to prevent discipline problems.
- 60. A conducive environment requires meeting students' **basic needs** for physical and emotional safety.
- 61. Teachers should exercise **moderate control**, balancing authoritarian and laissez-faire approaches.
- 62. **Empowering students** makes them responsible for their own learning, developing independence.
- 63. **Differentiating instruction** means tailoring it to students' developmental levels and learning styles.
- 64. Using **positive language** when addressing misbehavior means describing the act, not characterizing the student.

5. Core Teaching Methodologies and Strategies

- 65. **Classroom management** involves techniques to create an environment that supports academic and social-emotional learning.
- 66. A principle of classroom setup is that teachers should have a **clear view of all students** at all times.
- 67. **Allocated Time** is the total time scheduled for a subject.
- 68. **Engaged Time** is the portion of allocated time students are actively involved in the subject.



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- 69. **Academic Learning Time** is when students work with a high success rate (70-80% correct).
- 70. **Academic Learning Time** is the most critical factor directly linked to student achievement.
- 71. The **Lecture Method** is efficient for delivering large amounts of information to large groups.
- 72. A disadvantage of the **Lecture Method** is low information retention and minimal student interaction.
- 73. **Direct Instruction** is a highly structured, teacher-centered strategy for efficient knowledge transmission.
- 74. Steps in **Direct Instruction** include reviewing previous learning, stating goals, and providing immediate feedback.
- 75. **Indirect Instruction** is a student-centered strategy where the teacher is a facilitator.
- 76. Main strategies of **Indirect Instruction** are problem-solving, case studies, and reading for meaning.
- 77. The **Case Method** engages students in active discussion about real-world issues.
- 78. The **Discussion Method** engages students in active dialogue initiated by a probing question.
- 79. **Active Learning** creates environments where students talk, listen, read, write, and reflect.
- 80. **Cooperative Learning** involves small, mixed-ability teams working toward a common goal.
- 81. A key element of **Cooperative Learning** is **positive interdependence**.
- 82. Other key elements are **face-to-face interaction, individual accountability, and teaching of social skills**.
- 83. **Collaborative Teaching (Team Teaching)** involves two or more teachers sharing responsibility.
- 84. Co-teaching strategies include **One Teach/One Observe, Parallel Teaching, and Station Teaching**.

6. Essential Teaching Techniques

- 85. **Questioning** is used to assess prior learning, stimulate critical thinking, and clarify doubts.



86. **Explaining** involves presenting information in a direct, logical, and structured way.
87. **Modeling** is a visual aid where learning occurs through observation, retention, and replication.
88. **Demonstrating** is a step-by-step explanation that includes the reasons behind each step.
89. **Collaborating (Group Work)** teaches students to work effectively in teams, promoting mutual responsibility.
90. **Brainstorming** is a group creativity technique to generate a large number of ideas.
91. Rules for **Brainstorming** include withholding criticism and welcoming unconventional ideas.
92. The **Problem-Solving Method** involves choosing effective tools and behaviors using scientific thinking.
93. Steps in the **Problem-Solving Method** include identifying the problem, planning an approach, and examining the problem.
94. An advantage of the **Problem-Solving Method** is that it promotes active participation and scientific thinking.
95. A disadvantage is that it can be **time-consuming and resource-intensive**.
96. The **Drama Technique** uses theatrical methods like role-playing to enhance learning.
97. **Informal Drama** is unrehearsed and improvisational.
98. **Role-Playing** involves preparing for a role before acting it out.
99. An advantage of the **Drama Technique** is that it makes learning fun and improves communication skills.
100. A disadvantage is that some students may feel **self-conscious or threatened**.



Practice MCQ

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1. What is the primary focus of the modern, student-centered role of a teacher?

- A) Disseminating information through lectures
- B) Acting as the fountainhead of knowledge
- C) Facilitating knowledge discovery and collaboration
- D) Ensuring passive reception of knowledge

Answer: Facilitating knowledge discovery and collaboration

2. Which of the following is NOT a key role of a teacher?

- A) Subject Matter Expert
- B) Financial Advisor
- C) Pedagogical Expert
- D) Systematic Assessor

Answer: Financial Advisor

3. Vygotsky's Zone of Proximal Development (ZPD) is defined as the difference between what a learner can do:

- A) With and without technology
- B) In a group and individually
- C) Without help and with guidance from a skilled partner
- D) At home and at school

Answer: Without help and with guidance from a skilled partner

4. Which teaching technique involves learning through observation, retention, and replication of demonstrated behavior?

- A) Brainstorming
- B) Modeling
- C) Lecturing

D) Collaborating

Answer: Modeling

5. The constructivist approach to learning emphasizes that knowledge is:

- A) Passively received from the teacher
- B) Actively constructed by the learner
- C) Only acquired through memorization
- D) Solely dependent on textbook content

Answer: Actively constructed by the learner

6. Which of the following is a personal quality of an effective teacher?

- A) Collaboration with colleagues
- B) High expectations for students
- C) Commitment to lifelong learning
- D) Emotional maturity

Answer: High expectations for students

7. What is the most critical factor in time management that is directly linked to student achievement?

- A) Allocated Time
- B) Engaged Time
- C) Academic Learning Time
- D) Break Time

Answer: Academic Learning Time

8. The 'Inquiry' approach to teaching effectiveness is determined by:

- A) The teacher's display of warmth and enthusiasm
- B) Student results on standardized tests
- C) The quality of the teacher's reflection on their style and student outcomes
- D) The number of research-based techniques used

Answer: The quality of the teacher's



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reflection on their style and student outcomes

9. Which co-teaching strategy involves two teachers teaching the same content to two equal groups of students simultaneously?

- A) One Teach/One Assist
- B) Station Teaching
- C) Parallel Teaching
- D) Alternative Teaching

Answer: Parallel Teaching

10. A key element of Cooperative Learning that ensures no one "hitches a free ride" is:

- A) Positive Interdependence
- B) Face-to-Face Interaction
- C) Individual Accountability
- D) Group Processing

Answer: Individual Accountability

11. What is the main purpose of using the brainstorming technique in the classroom?

- A) To critically evaluate every idea as it is presented
- B) To generate a large number of ideas for creative problem-solving
- C) To teach formal debate skills
- D) To assess individual student knowledge

Answer: To generate a large number of ideas for creative problem-solving

12. Which characteristic involves a teacher using wit to break the ice and reduce anxiety?

- A) Preparedness
- B) Sense of Humor
- C) Personal Touch

D) Creativity

Answer: Sense of Humor

13. The process of breaking down a complex task into smaller, manageable parts is known as:

- A) Modeling
- B) Task Structuring
- C) Directing
- D) Explaining

Answer: Task Structuring

14. Which teaching method is described as a highly structured, teacher-centered strategy for efficient knowledge transmission?

- A) Indirect Instruction
- B) Case Method
- C) Direct Instruction
- D) Discussion Method

Answer: Direct Instruction

15. When addressing student misbehavior, a teacher should use positive language by:

- A) Characterizing the student as rude
- B) Describing the specific act that was inappropriate
- C) Ignoring the behavior to avoid confrontation
- D) Using sarcasm to correct the behavior

Answer: Describing the specific act that was inappropriate

16. What is the defining feature of a conducive learning environment?

- A) It is competitive and high-pressure
- B) It is positive, safe, respectful, and well-managed
- C) It is completely student-led with no



teacher intervention

D) It focuses solely on academic achievement

Answer: It is positive, safe, respectful, and well-managed

17. Which of the following is a disadvantage of the Problem-Solving Method?

- A) It does not promote scientific thinking
- B) It is always suitable for all subjects
- C) It can be time-consuming and resource-intensive
- D) It discourages active participation

Answer: It can be time-consuming and resource-intensive

18. In the context of teaching, what does "scaffolding" refer to?

- A) The physical structure of the classroom
- B) A supportive framework provided by the teacher to bridge the ZPD
- C) The final assessment given to students
- D) The curriculum designed by the school board

Answer: A supportive framework provided by the teacher to bridge the ZPD

19. Which type of drama involves unrehearsed, improvisational activities?

- A) Formal Drama
- B) Role-Playing
- C) Informal Drama
- D) Scripted Drama

Answer: Informal Drama

20. The teacher's role as a "protector" primarily involves:

- A) Imparting curriculum knowledge

B) Being vigilant for signs of trouble like abuse or behavioral changes

C) Setting a positive tone in the classroom

D) Serving as an exemplar for students

Answer: Being vigilant for signs of trouble like abuse or behavioral changes

21. Which professional quality of a teacher involves working constructively with colleagues and parents?

- A) Honesty and Integrity
- B) Emotional Maturity
- C) Collaboration
- D) Respect

Answer: Collaboration

22. What is the core idea behind the 'Outcomes' Approach to teaching effectiveness?

- A) The teacher's enthusiastic delivery
- B) The student results and the added value from the teacher
- C) The teacher's use of dialogue and discussion
- D) The teacher's inquiry into their own practice

Answer: The student results and the added value from the teacher

23. Differentiating instruction means tailoring it to students':

- A) Parental expectations only
- B) Developmental levels, readiness, and learning styles
- C) Performance on the final exam only
- D) Preferences for easy work

Answer: Developmental levels, readiness, and learning styles

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24. Which of the following is a principle of effective classroom management and setup?

- A) High-traffic areas should be free of congestion
- B) Students should not be able to see all instructional presentations
- C) Teaching materials should be kept locked away
- D) Procedures should be assumed and not taught

Answer: High-traffic areas should be free of congestion

25. The technique of "feeding back" in scaffolding involves:

- A) Demonstrating a skill for imitation
- B) Providing constructive information on performance for self-correction
- C) Using reinforcement to shape behavior
- D) Requesting specific actions from the student

Answer: Providing constructive information on performance for self-correction

26. What is a major advantage of the Cooperative Learning method?

- A) It requires no planning from the teacher
- B) It improves academic achievement, retention, and social skills
- C) It ensures that only the brightest students do the work
- D) It is the fastest way to cover the curriculum

Answer: It improves academic achievement, retention, and social skills

27. According to the document, teaching is defined as a process that is:

- A) Accidental and unplanned
- B) Deliberate, interactive, and planned
- C) Solely focused on psychomotor skills
- D) A one-way transmission of information

Answer: Deliberate, interactive, and planned

28. Which teaching strategy leverages student curiosity and encourages observation and investigation?

- A) Direct Instruction
- B) Lecture Method
- C) Indirect Instruction
- D) Demonstrating

Answer: Indirect Instruction

29. The characteristic of "willingness to admit mistakes" in a teacher primarily models what for students?

- A) Inflexibility
- B) Humility, integrity, and a growth mindset
- C) That the teacher is not an expert
- D) A lack of preparedness

Answer: Humility, integrity, and a growth mindset

30. In the Lecture Method, information retention is often:

- A) Very high
- B) Low
- C) Guaranteed
- D) Not a concern

Answer: Low

31. What is the primary goal of using the questioning technique in teaching?

- A) To fill up class time
- B) To intimidate students who are not paying attention
- C) To assess prior learning and stimulate



critical thinking

D) To avoid explaining concepts

Answer: To assess prior learning and stimulate critical thinking

32. Which of the following best describes "Academic Learning Time"?

A) The total time scheduled for a subject

B) The time when students are passively listening

C) The engaged time when students are working with a high success rate

D) The time spent on disciplinary actions

Answer: The engaged time when students are working with a high success rate

33. The "Style View" of teaching effectiveness is determined by:

A) Student test scores

B) The teacher's actions and behaviors, like displaying enthusiasm

C) The teacher's annual self-evaluation report

D) The number of degrees a teacher holds

Answer: The teacher's actions and behaviors, like displaying enthusiasm

34. What does the "Personal Touch" characteristic of a teacher involve?

A) Using students' names and showing genuine interest in their lives

B) Giving personal gifts to students

C) Sharing personal problems with the class

D) Allowing students to do whatever they want

Answer: Using students' names and showing genuine interest in their lives

35. Which of the following is a key principle of the Constructivist Approach?

A) Learning is a passive process of receiving information

B) New knowledge is built upon and connected to prior knowledge

C) The teacher is the sole source of knowledge

D) Learning is independent of social and cultural context

Answer: New knowledge is built upon and connected to prior knowledge

36. The teacher's role as a "facilitator" is most closely associated with which teaching approach?

A) Traditional Teacher-Centered Role

B) Modern Student-Centered Role

C) Chalk-and-Talk Method

D) Fountainhead of Knowledge Role

Answer: Modern Student-Centered Role

37. Which technique involves a step-by-step explanation that includes the reasons behind each step?

A) Modeling

B) Demonstrating

C) Brainstorming

D) Questioning

Answer: Demonstrating

38. What is a recommended way to improve the effectiveness of a lecture?

A) Read directly from the textbook for accuracy

B) Fit the lecture to the audience and deliver it with enthusiasm

C) Avoid using any examples to save time

D) Ignore audience feedback to stay on track

Answer: Fit the lecture to the audience and deliver it with enthusiasm

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39. According to Gurney (2007), one key factor for effective teaching is:

- A) Strict authoritarian control
- B) Teacher knowledge, enthusiasm, and responsibility
- C) Focusing only on high-achieving students
- D) Using only traditional teaching methods

Answer: Teacher knowledge, enthusiasm, and responsibility

40. What is the main purpose of establishing rules and routines in the classroom?

- A) To punish students frequently
- B) To create a structured and predictable environment for efficient learning
- C) To show the teacher's authority
- D) To eliminate the need for student interaction

Answer: To create a structured and predictable environment for efficient learning

41. In Vygotsky's theory, the "Actual Developmental Level" refers to what a child can do:

- A) With guidance from a peer
- B) Independently without any assistance
- C) In the distant future
- D) Under stress

Answer: Independently without any assistance

42. Which of the following is a strategy for creating a conducive learning environment?

- A) Meeting students' basic needs for physical and emotional safety
- B) Exercising maximum control over all student actions

C) Avoiding building relationships to maintain objectivity

D) Using negative language to correct behavior effectively

Answer: Meeting students' basic needs for physical and emotional safety

43. The Discussion Method of teaching requires:

- A) No preparation from students
- B) Careful planning and student preparation
- C) The teacher to do all the talking
- D) Avoiding any probing questions

Answer: Careful planning and student preparation

44. What is the primary focus of the "Case Method" in teaching?

- A) Rote memorization of facts
- B) Applying theoretical learning to practical, real-world scenarios
- C) Silent individual study
- D) Practicing handwriting skills

Answer: Applying theoretical learning to practical, real-world scenarios

45. Which characteristic involves a teacher proactively "catching students doing things right"?

- A) Fairness
- B) Positive Attitude
- C) Forgiving
- D) Sense of Belonging

Answer: Positive Attitude

46. The technique of "contingency managing" in scaffolding involves:

- A) Providing logical connections for new information
- B) Using reinforcement and punishment to



shape behavior

- C) Breaking tasks into smaller parts
- D) Demonstrating a skill for imitation

Answer: Using reinforcement and punishment to shape behavior

47. What is a significant disadvantage of the Drama Technique?

- A) It never improves communication skills
- B) It makes learning boring
- C) It can be time-consuming and may make some students self-conscious
- D) It is the cheapest method to implement

Answer: It can be time-consuming and may make some students self-conscious

48. Empowering students in a conducive learning environment primarily aims to:

- A) Make the teacher's job easier
- B) Develop student independence and responsibility for their own learning
- C) Reduce the amount of homework
- D) Entertain students with fun activities

Answer: Develop student independence and responsibility for their own learning

49. Which of the following is a professional quality of an effective teacher?

- A) Sense of Humor
- B) Compassion
- C) Commitment to Learning
- D) Creativity

Answer: Commitment to Learning

50. The process of "assisting performance" to awaken mental functions is central to teaching within the:

- A) Actual Developmental Level
- B) Zone of Proximal Development (ZPD)

- C) Lecture Hall
- D) Traditional Curriculum

Answer: Zone of Proximal Development (ZPD)

51. What does the "Systematic and Continual Assessor" role of a teacher involve?

- A) Only assessing students at the end of the year
- B) Evaluating student learning outcomes and their own teaching effectiveness
- C) Focusing solely on subject matter expertise
- D) Avoiding feedback to students

Answer: Evaluating student learning outcomes and their own teaching effectiveness

52. Which co-teaching strategy involves one teacher leading the lesson while the other circulates to provide assistance?

- A) One Teach/One Observe
- B) Parallel Teaching
- C) One Teach/One Assist
- D) Station Teaching

Answer: One Teach/One Assist

53. A teacher who serves as an exemplar for students, reflecting positive values, is fulfilling the role of a:

- A) Protector
- B) Role Model
- C) Mentor
- D) Subject Matter Expert

Answer: Role Model

54. In brainstorming, one of the key rules is to:

- A) Criticize ideas as they are generated

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- B) Welcome free-wheeling and unconventional ideas
- C) Aim for a small number of perfect ideas
- D) Allow only the teacher to generate ideas

Answer: Welcome free-wheeling and unconventional ideas

55. What is the main advantage of using Active Learning strategies?

- A) They require minimal effort from the teacher
- B) They enhance critical thinking and retention of knowledge
- C) They ensure complete silence in the classroom
- D) They are the same as the traditional lecture method

Answer: They enhance critical thinking and retention of knowledge

56. The nature of teaching as a "mutual exchange" emphasizes that it is:

- A) A one-way transmission from teacher to student
- B) A dynamic interaction between teacher and students
- C) Only about the teacher's experiences
- D) Independent of student input

Answer: A dynamic interaction between teacher and students

57. Which of the following is a component of Direct Instruction?

- A) Presenting new material in large, complex chunks
- B) Providing immediate feedback and corrections
- C) Relying solely on student discovery
- D) Avoiding the review of previous learning

Answer: Providing immediate feedback and corrections

58. The characteristic of "fairness" in a teacher requires:

- A) Treating all students justly and equitably, avoiding favoritism
- B) Giving everyone the same grade regardless of performance
- C) Focusing only on the most talented students
- D) Punishing all students for one student's mistake

Answer: Treating all students justly and equitably, avoiding favoritism

59. What is the purpose of the "explaining" technique in teaching?

- A) To confuse students with complex language
- B) To provide rationale and help learners organize new information
- C) To avoid answering student questions
- D) To fill time when unprepared

Answer: To provide rationale and help learners organize new information

60. According to the document, a teacher acting as a "diagnostician of learning" must consider:

- A) Only the final exam results
- B) Students' background knowledge and the learning environment
- C) Their own salary
- D) The opinions of other teachers only

Answer: Students' background knowledge and the learning environment

61. Which teaching method is characterized by small, mixed-ability

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1. Teaching Techniques & Methodologies



teams working toward a common goal?

- A) Lecture Method
- B) Direct Instruction
- C) Cooperative Learning
- D) Distance Learning

Answer: Cooperative Learning

62. The term "scaffolding" in educational theory is most closely associated with the work of:

- A) Piaget
- B) Vygotsky
- C) Gurney
- D) Skinner

Answer: Vygotsky

63. What is a key element of a conducive learning environment regarding control?

- A) Exercising moderate control, balancing authoritarian and laissez-faire approaches
- B) Exercising maximum control at all times
- C) Having no control and letting students do whatever they want
- D) Letting the parents control the classroom

Answer: Exercising moderate control, balancing authoritarian and laissez-faire approaches

64. Which of the following is a type of Formal Drama?

- A) Improvisational activities
- B) Role-Playing with preparation
- C) Scripted performances
- D) Unrehearsed plays

Answer: Scripted performances

65. The "Added Value" a teacher contributes is a concept central to which approach to teaching effectiveness?

- A) The Style View

B) The Outcomes Approach

C) The Inquiry Approach

D) The Traditional Approach

Answer: The Outcomes Approach

66. In the context of teaching, "Assimilation and Accommodation" are processes related to:

- A) Building new knowledge upon prior knowledge in constructivism
- B) The lecture method
- C) Classroom seating arrangements
- D) Salary negotiations for teachers

Answer: Building new knowledge upon prior knowledge in constructivism

67. Which of the following is a responsibility of a teacher as a "creator of the classroom environment"?

- A) Setting a positive, warm, and happy tone
- B) Only delivering the curriculum
- C) Focusing solely on administrative tasks
- D) Ignoring student behavior

Answer: Setting a positive, warm, and happy tone

68. What is the primary focus when a teacher uses the "One Teach/One Observe" co-teaching strategy?

- A) Both teachers teaching the same content simultaneously
- B) One teacher teaching while the other gathers data on student learning
- C) Dividing the class into two groups based on ability
- D) Having one teacher manage discipline while the other teaches

Answer: One teacher teaching while the other gathers data on student learning

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69. The technique of "directing" in scaffolding involves:

- A) Providing constructive feedback
- B) Requesting specific actions from the student to clarify the correct response
- C) Demonstrating a skill for imitation
- D) Using reinforcement to shape behavior

Answer: Requesting specific actions from the student to clarify the correct response

70. Which of the following is a recommended strategy for handling student misbehavior?

- A) Deal with the present problem immediately and talk to the student privately
- B) Ignore all misbehavior to avoid attention
- C) Use empty threats to scare students
- D) Handle the student with anger to show authority

Answer: Deal with the present problem immediately and talk to the student privately

71. What does "Differentiating Instruction" primarily involve?

- A) Teaching the same way to every student
- B) Tailoring instruction to students' individual needs, readiness, and learning styles
- C) Making the curriculum easier for everyone
- D) Focusing only on gifted students

Answer: Tailoring instruction to students' individual needs, readiness, and learning styles

72. The "Pedagogical Expert" role of a teacher includes:

- A) Only knowing the subject matter deeply
- B) Setting clear learning goals and guiding

critical thinking

- C) Handling the school's finances
- D) Communicating only with parents

Answer: Setting clear learning goals and guiding critical thinking

73. Which of the following is an advantage of using the Role-Playing technique?

- A) It requires no preparation
- B) It allows for the exploration of solutions to problems in a safe environment
- C) It is the least time-consuming method
- D) It ensures all students will be extroverted

Answer: It allows for the exploration of solutions to problems in a safe environment

74. In the Problem-Solving Method, what is the first step?

- A) Conclude and discuss findings
- B) Provide resources
- C) Identify and delimit the problem
- D) Plan an approach

Answer: Identify and delimit the problem

75. What is the main goal of "maximizing engaged time" in the classroom?

- A) To have the longest school day possible
- B) To keep students on task and actively involved in learning
- C) To give students more free time
- D) To reduce the amount of curriculum covered

Answer: To keep students on task and actively involved in learning

76. Which personal quality involves a teacher showing a willingness to move forward after student misbehavior?



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- A) Fairness
- B) Forgiving
- C) Respect
- D) High Expectations

Answer: Forgiving

77. The concept that "teaching is only effective when it precedes development" is associated with:

- A) The Lecture Method
- B) Vygotsky's ZPD
- C) Direct Instruction
- D) The Outcomes Approach

Answer: Vygotsky's ZPD

78. What is a key function of the "questioning" technique in scaffolding?

- A) To punish students for not knowing the answer
- B) To prompt mental operations the learner cannot produce alone
- C) To fill silence in the classroom
- D) To avoid giving explanations

Answer: To prompt mental operations the learner cannot produce alone

79. Which of the following describes the "Linked Courses" model of Collaborative Teaching?

- A) Two teachers plan and teach the same course content together.
- B) Two separate courses are linked by a common theme and sometimes shared assignments.
- C) Teachers teach in rotating stations.
- D) One teacher teaches while the other assists.

Answer: Two separate courses are linked by a common theme and sometimes shared assignments.

80. A teacher who actively builds a classroom community to make every student feel valued is promoting:

- A) High Expectations
- B) Sense of Belonging
- C) Compassion
- D) Preparedness

Answer: Sense of Belonging

81. According to the document, effective teaching demonstrably leads to improved student:

- A) Learning, achievement, and holistic development
- B) Only rote memorization skills
- C) Performance in sports
- D) Obedience without question

Answer: Learning, achievement, and holistic development

82. Which of the following is a component of "task structuring" as a scaffolding technique?

- A) Using reinforcement
- B) Providing immediate feedback
- C) Chunking, segregating, and sequencing a complex task
- D) Demonstrating a skill

Answer: Chunking, segregating, and sequencing a complex task

83. The "Station Teaching" co-teaching strategy involves:

- A) Both teachers teaching the same content to the whole class
- B) Dividing the class and content into multiple stations, with teachers at separate stations
- C) One teacher teaching while the other observes



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D) Teaching different courses in the same room

Answer: Dividing the class and content into multiple stations, with teachers at separate stations

84. What is the primary purpose of consolidating the lesson at the end of a class?

- A) To introduce new topics for the next day
- B) To give students a break
- C) To aid in retention of the material covered
- D) To assign homework quickly

Answer: To aid in retention of the material covered

85. Which characteristic involves a teacher caring for students' emotional well-being?

- A) Respect
- B) Compassion
- C) Fairness
- D) Positive Attitude

Answer: Compassion

86. In the context of learning, what does "ZPD" stand for?

- A) Zero Problem Domain
- B) Zone of Proximal Development
- C) Zealous Pupil Development
- D) Zonal Performance Data

Answer: Zone of Proximal Development

87. Which teaching method is most associated with the "chalk-and-talk" approach?

- A) Cooperative Learning
- B) Traditional Teacher-Centered Role
- C) Modern Student-Centered Role

D) Constructivist Approach

Answer: Traditional Teacher-Centered Role

88. What is a key principle for establishing classroom rules?

- A) They should be numerous and highly specific
- B) They should be few, general, positive, and applicable
- C) They should be created by the principal only
- D) They should never be displayed for students to see

Answer: They should be few, general, positive, and applicable

89. The professional quality of "Respect" in a teacher involves:

- A) Valuing diversity and establishing rapport with students
- B) Demanding respect from students without giving any
- C) Only respecting other teachers
- D) Ignoring cultural differences in the classroom

Answer: Valuing diversity and establishing rapport with students

90. Which technique is described as a group creativity technique for generating ideas?

- A) Demonstrating
- B) Explaining
- C) Brainstorming
- D) Modeling

Answer: Brainstorming

91. What is the main implication of the Constructivist Approach for teaching?



- A) The teacher should lecture for the entire class period
- B) The teacher's role shifts from instructor to facilitator of learning
- C) Students should work in complete silence
- D) Knowledge is solely transmitted from the teacher

Answer: The teacher's role shifts from instructor to facilitator of learning

- A) Being self-confident, reliable, and handling situations with composure
- B) Sharing all personal emotions with the class
- C) Reacting emotionally to student misbehavior
- D) Being overly friendly with students

Answer: Being self-confident, reliable, and handling situations with composure

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92. Which of the following is a strategy to build relationships in a conducive learning environment?

- A) Learn names and positive information about each student
- B) Avoid any personal connection with students
- C) Remember only the names of the top performers
- D) Use students' names only when they misbehave

Answer: Learn names and positive information about each student

93. The "Alternative Teaching" co-teaching strategy typically involves:

- A) Both teachers leading the whole class together
- B) One teacher teaching a large group while the other teaches a small group for remediation or enrichment
- C) Teachers teaching in parallel groups
- D) Students rotating through stations independently

Answer: One teacher teaching a large group while the other teaches a small group for remediation or enrichment

94. What does "Emotional Maturity" as a professional quality entail?

95. According to the document, teaching involves the transmission of three types of skills: Cognitive, Psychomotor, and what else?

- A) Digital
- B) Affective (values or attitudes)
- C) Linguistic
- D) Musical

Answer: Affective (values or attitudes)

96. What is a primary advantage of the Indirect Instruction method?

- A) It is the fastest way to deliver facts
- B) It leverages student curiosity and encourages investigation
- C) It requires no preparation from the teacher
- D) It ensures all students think identically

Answer: It leverages student curiosity and encourages investigation

97. The characteristic of "creativity" in a teacher is demonstrated by using:

- A) Only the textbook
- B) Unusual, engaging, and innovative methods
- C) The same lesson plan every year
- D) Methods that require no effort

Answer: Unusual, engaging, and innovative methods



98. In which teaching method does the teacher initiate dialogue with a probing question?

- A) Lecture Method
- B) Discussion Method
- C) Direct Instruction
- D) Demonstrating

Answer: Discussion Method

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99. What is the core idea behind "Positive Interdependence" in Cooperative Learning?

- A) Students work completely alone
- B) Students believe they sink or swim together
- C) The teacher does all the work for the group
- D) Success is based on individual performance only

Answer: Students believe they sink or swim together

100. Which of the following is a key responsibility of a teacher as a "mentor"?

- A) Encouraging students to do their best and enjoy learning
- B) Only delivering curriculum content
- C) Focusing solely on administrative reports
- D) Protecting the school's physical property

Answer: Encouraging students to do their best and enjoy learning



Chapter 2

Classroom Management and Discipline

1. Definition, Concept, and Importance of Classroom Management

Definition:

Classroom Management is a broad, multi-dimensional process encompassing all the strategies, methods, and practices a teacher employs to establish and maintain a supportive, orderly, predictable, and productive learning environment. It is not merely about controlling student behavior but about systematically creating conditions where both teaching and learning can flourish efficiently.

Key Definitions from Theorists:

- **Wong (2004):** Defines it as the practices and processes a teacher uses to uphold an environment where instruction and learning can occur smoothly.
- **Mallory (2008):** Describes it as a multifaceted process that depends on an engaging curriculum, student responsibility, effective instruction, and management skills for conflict resolution.
- **Brophy & Good:** Emphasize that it is broader than student discipline, including all things teachers do to foster student involvement, cooperation, and a productive working environment.

Importance of Classroom Management:

Effective classroom management is a critical indicator of student success and teacher efficacy. Its importance is multifaceted:

- **Maximizes Learning Time:** A well-managed classroom minimizes disruptions and time spent on disciplining, allowing maximum time to be allocated to instructional activities.
- **Creates a Positive and Safe Atmosphere:** It fosters an environment where students feel physically and emotionally safe, respected, and comfortable to take intellectual risks, ask questions, and participate actively.
- **Enhances Student Engagement:** Through structured routines and engaging activities, it helps keep students on-task, focused, and involved in the learning process.
- **Improves Academic Achievement:** Consistent routines, clear expectations, and a focused environment directly contribute to higher student test scores and overall academic performance.

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Classroom Management and Discipline: One-Liners

1. Definition, Concept, and Importance of Classroom Management

1. **Classroom Management** is a multi-dimensional process to establish a supportive, orderly, and productive learning environment.
2. According to **Wong (2004)**, it is the practices to uphold an environment where instruction and learning occur smoothly.
3. **Mallory (2008)** describes it as a multifaceted process dependent on an engaging curriculum and effective instruction.
4. **Brophy & Good** emphasize that it is broader than discipline, fostering student involvement and cooperation.
5. Effective classroom management **maximizes learning time** by minimizing disruptions.
6. It creates a **positive and safe atmosphere** for students to take intellectual risks.
7. It **enhances student engagement** through structured routines and engaging activities.
8. It directly **improves academic achievement** and student test scores.
9. A key aim is to promote **student self-control and responsibility**.
10. It **reduces teacher stress** and prevents burnout.

2. Goals, Components, and Dimensions of Classroom Management

11. A goal of classroom management is **better teaching** through careful lesson planning.
12. Clear goals provide **student focus** by clarifying expectations.
13. Teacher goal-setting acts as a **model for students** to set their own objectives.
14. Well-defined goals **motivate students** toward higher academic achievement.
15. A key operational component is **classroom design**, the intentional physical arrangement.
16. **Establishing rules and procedures** is crucial for a functional classroom.
17. **Discipline with consistency** involves implementing fair and firm consequences.
18. Effective **scheduling and time management** keeps the class on task.
19. Teacher **organizational skills** set a good example and prevent wasted time.
20. **Effective instructional techniques** are tailored to the grade level and subject.

Practice MCQs

1. According to Harry Wong (2004), classroom management is defined as:

- A) The process of controlling student behavior through rules and consequences.
- B) The practices and processes a teacher uses to uphold an environment where instruction and learning can occur smoothly.
- C) A system for fostering student creativity and independent thought.
- D) The administrative duties a teacher performs to maintain classroom order.

Answer: The practices and processes a teacher uses to uphold an environment where instruction and learning can occur smoothly.

2. Which of the following is NOT cited as a key importance of effective classroom management?

- A) Maximizes learning time
- B) Creates a positive and safe atmosphere
- C) Guarantees all students will achieve high grades
- D) Reduces teacher stress

Answer: Guarantees all students will achieve high grades

3. According to Froyen and Iverson (1999), which component involves managing the instructional process?

- A) Conduct Management
- B) Content Management
- C) Covenant Management
- D) Curriculum Management

Answer: Content Management

4. The A-C-T-S model of classroom management dimensions includes all

EXCEPT:

- A) Activity
- B) Climate
- C) Time
- D) Strategy

Answer: Strategy

5. What is the standard space requirement per student in an Elementary school classroom?

- A) 0.6 m²
- B) 1.0 m²
- C) 1.2 m²
- D) 1.5 m²

Answer: 0.6 m²

6. A seating arrangement that is ideal for whole-group discussions but may lead to disturbances due to students being close together is the:

- A) Rows
- B) Clusters
- C) U-Shape
- D) Pair Pods

Answer: U-Shape

7. A student who withdraws from new persons or events is displaying which type of temperament?

- A) Active
- B) Passive
- C) Irritable
- D) Reflective

Answer: Passive

8. Which of the following is a characteristic of Attention-Deficit/Hyperactivity Disorder (ADHD)?

- A) Exceptional musical ability

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Chapter 3

Testing, Measurement, Assessment and Evaluation

1. Introduction to the Core Concepts

The process of understanding and judging student learning is built upon four fundamental, sequential concepts: Test, Measurement, Assessment, and Evaluation. These terms are often used interchangeably but have distinct, hierarchical meanings and scopes.

- **Scope:** Test (Least in scope) → Measurement → Assessment → Evaluation (Broadest in scope).

A. Test

- **Definition:** A test is a formal and systematic instrument or procedure used to measure a sample of an individual's behavior, knowledge, skills, or abilities. It consists of a set of questions or tasks that require an answer orally, in writing, or through performance.
- **Purpose:** To elicit a response that can be quantified and interpreted.
- **Example:** A final exam in mathematics, a driving test, a personality inventory.
- **It answers the question:** "How well?" does the individual perform on this specific set of tasks.

B. Measurement

- **Definition:** Measurement is the process of obtaining a **numerical description** of the degree to which an individual possesses a particular characteristic. It is the quantification or scoring of the test.
- **Purpose:** To assign a number (a score) to the performance observed in the test.
- **Nature:** It is quantitative and objective but does not, by itself, include qualitative judgments.
- **Example:** "Rafaih solved 23 arithmetic problems out of 40." or "Sara scored 85 marks out of 100."
- **It answers the question:** "How much?"
- **Final Product:** The final product of measurement is a **Score**.

C. Assessment

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- **Formula: $D = (NH - NL) / N$**
 - NH = Number of high achievers (top 27%) who answered correctly
 - NL = Number of low achievers (bottom 27%) who answered correctly
 - N = Number of students in *each* group (high or low)
- **Interpretation:**
 - **Acceptable Range: 0.30 to 1.0**
 - **Value of 1:** Indicates 100% discrimination (all high achievers correct, all low achievers incorrect).
 - **Value < 0.30:** Indicates the item is poor at discriminating.
- **Effectiveness of Distracters**
 - **Definition:** Analysis of incorrect options (distracters) in MCQs.
 - **Interpretation:**
 - A **distracter is effective** if it attracts *more low achievers* than high achievers.
 - A **distracter is ineffective** if it attracts *more high achievers* than low achievers, or if it attracts no one.

6. Principles of Effective Classroom Assessment

For assessment to be truly effective and support learning, it should adhere to the following principles:

1. **Formative in Nature:** Used regularly to inform ongoing teaching and learning.
2. **Driven by Educational Goals:** Based on and reflects the most valued learning outcomes.
3. **Clear and Explicit Purposes:** Both teachers and students understand why the assessment is being conducted.
4. **Comprehensive Understanding of Learning:** Recognizes learning as multidimensional, integrated, and revealed over time.
5. **An Ongoing Process:** Assessment power is cumulative, not episodic.
6. **Involves the Educational Community:** Teachers, students, administrators, and parents should be involved.
7. **Student-Centered:** Focuses on learner needs and involves them actively in the process (e.g., self-assessment).
8. **Diagnostic:** Identifies students' strengths and weaknesses to guide instruction.



Practice MCQs

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1. What is the correct hierarchical sequence of the core concepts from least to broadest scope?

- A) Assessment, Measurement, Test, Evaluation
- B) Test, Measurement, Assessment, Evaluation
- C) Evaluation, Assessment, Measurement, Test
- D) Measurement, Test, Evaluation, Assessment

Answer: Test, Measurement, Assessment, Evaluation

2. A final exam in mathematics is a direct example of which core concept?

- A) Measurement
- B) Assessment
- C) Evaluation
- D) Test

Answer: Test

3. The process of assigning a numerical score to a student's performance is known as?

- A) Assessment
- B) Evaluation
- C) Measurement
- D) Testing

Answer: Measurement

4. Which concept answers the question, "What does the performance mean?"

- A) Test
- B) Measurement
- C) Assessment
- D) Evaluation

Answer: Assessment

5. Making a value judgment about the quality of a student's work is the essence of?

- A) Assessment
- B) Measurement
- C) Evaluation
- D) Testing

Answer: Evaluation

6. Assessment FOR Learning is synonymous with?

- A) Summative Assessment
- B) Diagnostic Assessment
- C) Formative Assessment
- D) Placement Assessment

Answer: Formative Assessment

7. The primary purpose of summative assessment is to?

- A) Provide ongoing feedback
- B) Monitor learning during instruction
- C) Develop metacognitive skills
- D) Measure and certify learning at the end

Answer: Measure and certify learning at the end

8. Assessment AS Learning primarily focuses on developing?

- A) Social skills
- B) Metacognitive skills
- C) Psychomotor skills
- D) Linguistic skills

Answer: Metacognitive skills

9. In which type of assessment is feedback typically detailed, descriptive, and immediate?

- A) Summative Assessment
- B) Norm-Referenced Assessment

3. Testing, Measurement, Assessment & Evaluation



Chapter 4

Educational Taxonomies

4. Educational Taxonomies

Introduction to Educational Taxonomies

Definition:

Educational taxonomies are systematic frameworks or models used to classify educational goals, learning objectives, and standards into hierarchical levels of complexity and specificity.

M Purpose and Uses:

- To help educators design, implement, and assess instructional strategies and student learning outcomes effectively.
- To provide a common language for discussing educational objectives.
- To ensure that instruction, curriculum, and assessments are aligned with the intended learning goals.
- To guide the creation of questions, lesson plans, and curriculum mapping (e.g., Table of Specification).
- To differentiate instruction and provide targeted learning feedback.

A Bloom's Taxonomy

Bloom's Taxonomy is the most famous and widely used taxonomy in education. It is a three-dimensional hierarchical model that classifies learning objectives into levels of complexity and specificity.

T The Three Domains of Bloom's Taxonomy:

1. **Cognitive Domain:** Related to mental skills and knowledge (**Head**).
2. **Affective Domain:** Related to attitudes, emotions, and values (**Heart**).
3. **Psychomotor Domain:** Related to manual and physical skills (**Hand**).

A. The Cognitive Domain (Benjamin Bloom, 1956)

This domain is concerned with knowledge outcomes, intellectual abilities, and mental skills. The original taxonomy has six levels, progressing from the simplest to the most complex.

Original Levels (1956):

1. **Knowledge (Lowest Level)**



Educational Taxonomies: One-Liners

Introduction to Educational Taxonomies

1. **Educational taxonomies** are systematic frameworks for classifying educational goals and learning objectives.
2. They classify goals into hierarchical levels of **complexity and specificity**.
3. Their purpose is to help educators design, implement, and assess **instructional strategies** and **student learning outcomes**.
4. They provide a **common language** for discussing educational objectives.
5. They ensure alignment between **instruction, curriculum, and assessments** with learning goals.
6. They guide the creation of questions, lesson plans, and **curriculum mapping** (e.g., Table of Specification).
7. They are used to **differentiate instruction** and provide targeted learning feedback.

Bloom's Taxonomy

8. **Bloom's Taxonomy** is the most famous and widely used taxonomy in education.
9. It is a **three-dimensional hierarchical model** classifying learning objectives.
10. The three domains are **Cognitive (Head), Affective (Heart), and Psychomotor (Hand)**.

A. The Cognitive Domain (Original - Bloom, 1956)

11. The **Cognitive Domain** is related to mental skills, knowledge, and intellectual abilities.
12. The original taxonomy has six levels, from simplest to most complex.
13. **Knowledge** is the lowest level, involving recall of facts and basic concepts.
14. **Comprehension** is the ability to understand, interpret, and summarize material.
15. **Application** is the ability to use learned material in new and concrete situations.
16. **Analysis** is the ability to break down material into its constituent parts and understand its structure.
17. **Synthesis** is the ability to integrate elements to form a new, coherent whole.
18. **Evaluation** was the highest level in the original taxonomy, involving judgment based on criteria.

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Practice MCQs

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1. **What is the primary purpose of educational taxonomies?**
 - A) To replace traditional teaching methods
 - B) To classify educational goals into hierarchical levels
 - C) To focus solely on student assessment
 - D) To standardize curriculum across countries

Answer: To classify educational goals into hierarchical levels

2. **Bloom's Taxonomy is primarily a framework for classifying what?**
 - A) Student personalities
 - B) Educational resources
 - C) Learning objectives
 - D) School administrative levels

Answer: Learning objectives

3. **Which of the following is NOT one of the three domains of Bloom's Taxonomy?**
 - A) Cognitive
 - B) Affective
 - C) Psychomotor
 - D) Sociological

Answer: Sociological

4. **The Cognitive Domain in Bloom's Taxonomy is primarily associated with which part of the human faculties?**
 - A) Heart
 - B) Hands
 - C) Head

D) Health
Answer: Head

5. **In the original Bloom's Taxonomy, which level was considered the highest?**
 - A) Synthesis
 - B) Analysis
 - C) Evaluation
 - D) Application

Answer: Evaluation

6. **The ability to break down material into its constituent parts is defined as which level in the cognitive domain?**
 - A) Comprehension
 - B) Application
 - C) Analysis
 - D) Synthesis

Answer: Analysis

7. **Which verb is most associated with the 'Knowledge' level of the original cognitive domain?**
 - A) Explain
 - B) Summarize
 - C) Define
 - D) Compare

Answer: Define

8. **The revised version of Bloom's Cognitive Domain was developed by whom?**
 - A) Benjamin Bloom and Elizabeth Simpson
 - B) Lorin Anderson and David Krathwohl
 - C) John Biggs and Kevin Collis

4. Educational Taxonomies



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