

GENERAL ANATOMY

Describe the anatomical position: The anatomical position is a standard reference position for the human body. It is the body in fully extended position with arms by the side, palms up and feet facing forward.

Describe the directional terms used in anatomy:

Prone Position: Flat on stomach

Supine Position: Laying on back with face up

Anterior (ventral): towards front

Posterior (dorsal): towards back

Superior (cranial): upper/top

Inferior (caudal): lower/below

Medial: Towards the midline

Lateral: Away from the midline

- Ipsilateral: same side
- Contralateral: opposite side

Superficial: Close to the surface of the body

Deep: Away from the surface of the body

Proximal: Closer to the attachment

Distal: Further away from the attachment

Intermediate: In-between

Use correct anatomical terminology for the various regions of the body and be able to describe several components of each region.

BODY PLANES	DESCRIPTION
Sagittal planes	Divides into left and right parts
Midsagittal planes	Split in 2 halves through the centre of the body
Parasagittal planes	Split into unequal parts off centre
Frontal (coronal) planes	Divides body into anterior and posterior halves
Horizontal (cross sectional or transverse) plane	Divides body into superior and inferior parts
Oblique planes	Divides at an angle

AXIAL REGION	DESCRIPTION
Head (Cephalic)	Skull and face (cranium and mandible)
Cervical Region	Region between the head and the trunk includes: 7 cervical vertebrae, oesophagus, trachea and larynx
Trunk	Includes thorax (chest), abdomen and pelvis
Thoracic Region	Region between the neck and the abdomen. Bounded by ribs (12 pairs), thoracic vertebrae and sternum. Separated from abdomen by diaphragm, contains heart, lungs, oesophagus and trachea.

Abdominal Region	Between thorax and pelvis. Posteriorly are lumbar vertebrae. Bounded by abdominal muscles and diaphragm and contains organs such as liver, stomach and small intestine.
Lumbar Region	Area around lumbar vertebrae. Kidneys sit on each side of the lumbar vertebrae.
Pelvic Region	Bounded by the bones of the pelvis (ilium, ischium, pubis, sacrum bones) and the muscles which close the outlet of the pelvis.
Inguinal Region	Anterior surface of body where trunk attaches to thighs; marked by a crease on each side.

APPENDICULAR REGION	DESCRIPTION
Upper Limb	Appendage attached at the shoulder; consists of arm, forearm, wrist, hand and fingers
Brachium	Between shoulder joint and elbow, contains the humerus
Axillary Region	Armpit
Forearm	Between the wrist and elbow, contains the radius and ulna
Wrist	Joint between distal ends of radius and ulna and carpal bones
Hand	Includes carpals, metacarpals and phalanges
Palm	Anterior surface of hand when in anatomical position
Dorsum of hand	Back of hand. Nails are on the surface
Lower Limb	Appendage attached to pelvis, includes buttock, thigh, leg, ankle and foot
Thigh	Portion of lower limb from hip to knee, contains femur
Leg	Portion of lower limb from knee to ankle, contains tibia and fibula
Ankle	Joint between tibia, fibula and talus
Foot	Tarsals, metatarsals and phalanges
Plantar Surface	Sole; surface of foot on the ground in anatomical position
Dorsum of Foot	Superior surface of the foot in anatomical position, toenails are on the surface.

BODY CAVITY	DESCRIPTION
Cranial Cavity	Formed by the cranial bones, contains the brain
Vertebral Cavity	Formed by the vertebral column, contains spinal cord and beginnings of spinal nerves
Thoracic Cavity	Chest cavity, contains pericardial and pleural cavities and the mediastinum
Mediastinum	Central portion of thoracic cavity between the lungs; extends anterior-posteriorly from sternum to vertebral column and super-inferiorly from first rib to diaphragm, contains heart, great vessels (aorta, vena cava), oesophagus, trachea and thymus
Pericardial Cavity	Potential space between the layers of the pericardium surrounding the heart
Pleural Cavity	Potential space between the layers of the pleura surrounding the lungs

Abdominopelvic Cavity	Extends from the diaphragm to groin, encircled by abdominal musculature and muscles and bones of the pelvis; subdivided into abdominal and pelvic cavities
Abdominal Cavity	Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine
Pelvic Cavity	Contains urinary bladder, part of large intestine and internal reproductive organs

Use correct anatomical terminology to describe movements at joints.

MOVEMENT	PLANE	DESCRIPTION	EXAMPLE
Flexion	Sagittal	Decrease joint angle	Clenching hand into fist
Extension	Sagittal	Returns body part to zero, straightness	Triceps extensions
Hyperextension	Sagittal	Extension beyond point zero	
Abduction	Frontal	Away from the midline	
Adduction	Frontal	Towards the midline	
Rotation	Transverse	Any circular movement of an object around a centre	
Circumduction	NA	One end is stationary and other end moves in circular motion	Serving a base ball
Pronation	Transverse	Palms downwards and radius to cross ulna like an X	
Supination	Transverse	Palms face anterior and radius is parallel to the ulna	
Dorsiflexion	Sagittal	Action of raising the foot upwards towards the shin	Flexing toes
Plantar flexion	Sagittal	Movement which the top of your foot points away from your leg	Pointing toes
Elevation	Frontal	Raises the body part vertically	Eyebrows up
Depression	Frontal	Lowers the body part	Eyebrows down
Eversion	Frontal	Sole of foot laterally	
Inversion	Frontal	Sole of foot medially	
Protraction	Transverse	Anterior movement	Jaw line
Retraction	Transverse	Posterior movement	Double chins

Know the major bones of the body, their bone type and whether they belong to the axial or appendicular skeleton.

CRANIAL BONES	DESCRIPTION
Frontal	Forms the forehead, roof of the orbits and most of anterior part of the cranial floor
Parietal	Forms the largest portion of the sides and roof of the cranium
Temporal	Inferior lateral aspect of cranium and part of the cranial floor

Occipital	Forms the posterior part of the cranium and most of the base of the cranium
Sphenoid	Butterfly shaped bone in mid-part of base of skull; articulates with all other cranial bones and forms part of the orbits
Ethmoid	Located in anterior cranial floor, medial to orbits; sponge-like in appearance

FACIAL BONES	DESCRIPTION
Maxilla	Unite to form the upper jaw, articulate with every facial bone except mandible
Zygomatic	Cheekbones, articulate with the frontal, maxilla, sphenoid and temporal bones
Mandible	Lower jawbone, the only movable skull bone (other than auditory ossicles)

VERTEBRAE (NUMBER)	DESCRIPTION	OCCURS IN WHICH AXIAL REGION
Cervical (7)	Neck region: smaller than all other vertebrae except coccygeal vertebrae. Has transverse foramen to allow the passage of blood vessels	Cranial region
Thoracic (12)	Chest region: Larger than cervical vertebrae, articulate with ribs	Thoracic and abdominal region
Lumbar (5)	Lower back: largest of the unfused vertebrae	Lumbar region
Sacrum (5)	Triangular bone formed by fusion of sacral vertebrae	Pelvic region
Coccyx (4)	Triangular: formed by fusion of coccygeal vertebrae, articulates with apex of sacrum	Pelvic region

Functions of the vertebral column:

1. Protection of spinal cord
2. Support and structure of skull
3. Shock and stress absorption
4. Attachment points for muscles
5. Allows movement

EVOLUTION

Define biological evolution: Biological genetic change in a population (a group within a species of interbreeding individuals and their offspring in the same geographical location) over generations.

Describe Darwin and Wallace's theory of evolution by natural selection – occurs when selection pressures in the environment confer a selective advantage on a specific phenotype to enhance its survival and reproduction; this results in changes in allele frequency in the gene pool of a population over time.

Variation + Differential + Heredity = Evolution

The principles of natural selection leading to evolutionary change rests on a few propositions:

- 1 Individuals in population show variation
- 2 Many of these variations are caused by mutations in alleles and are inheritable
- 3 In general, more offspring are born that can survive to maturity and reproduce. Because of this, there is a struggle for existence and only some organisms can reproduce
- 4 Some individuals have traits that make them more suited to their environment than others, making them better able to reproduce and pass on their alleles to the next generation

Understand that there are four evolutionary forces: mutation, natural selection, gene flow and random genetic drift

Mutation: in genes and chromosomes produce new alleles into a population which are passed onto subsequent generation.

Natural Selection: The process by which a population or species become better adapted to its environment.

- Individuals with favourable characteristics are able to compete successfully in a particular environment- they are more likely to survive and produce a greater number of offspring than those with less favourable characteristics
- After many generations, the whole population will have the desirable characteristics

Gene Flow:

- Few populations are completely isolated from each other and generally migration occurs in and out of the population
- **Gene flow** may occur if migrants breed with one another