

**GRADE 10**

**LIFE SCIENCE**

**WORKBOOK**

**2021**

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**TOPIC 4 PLANT AND ANIMAL TISSUE**

**TOPIC 5 PLANT ORGANS: LEAF**

**TOPIC 6 SUPPORT AND TRANSPORT SYSTEMS IN  
PLANTS**

**TOPIC 7 SUPPORT SYSTEMS IN ANIMALS**

# Topic 4

## PLANT AND ANIMAL TISSUE

### Content

- Introduce concept of a tissue as a group of similar cells adapted for a particular function: Cell differentiation
- **Animal tissues:** epithelial, connective, muscle and nerve tissue and some examples of each. Relationship between structure and function [no detail required – some tissue, e.g. blood and nerves in the reflex-arc, will be covered in more detail in relevant sections]
- **Plant tissues:** Emphasis on the relationship between basic structure and function  
Plant tissues: Xylem, Phloem, parenchyma, collenchyma, sclerenchyma, epidermis and meristematic tissue! **Anatomy of dicotyledonous plants:** Root and Stem: distribution of different tissue, structure of cells in different tissues

**Day 1, 2 and 3**

**Date:**

### **ANIMAL TISSUE**

**Embryonic tissue:** Found in growing embryos

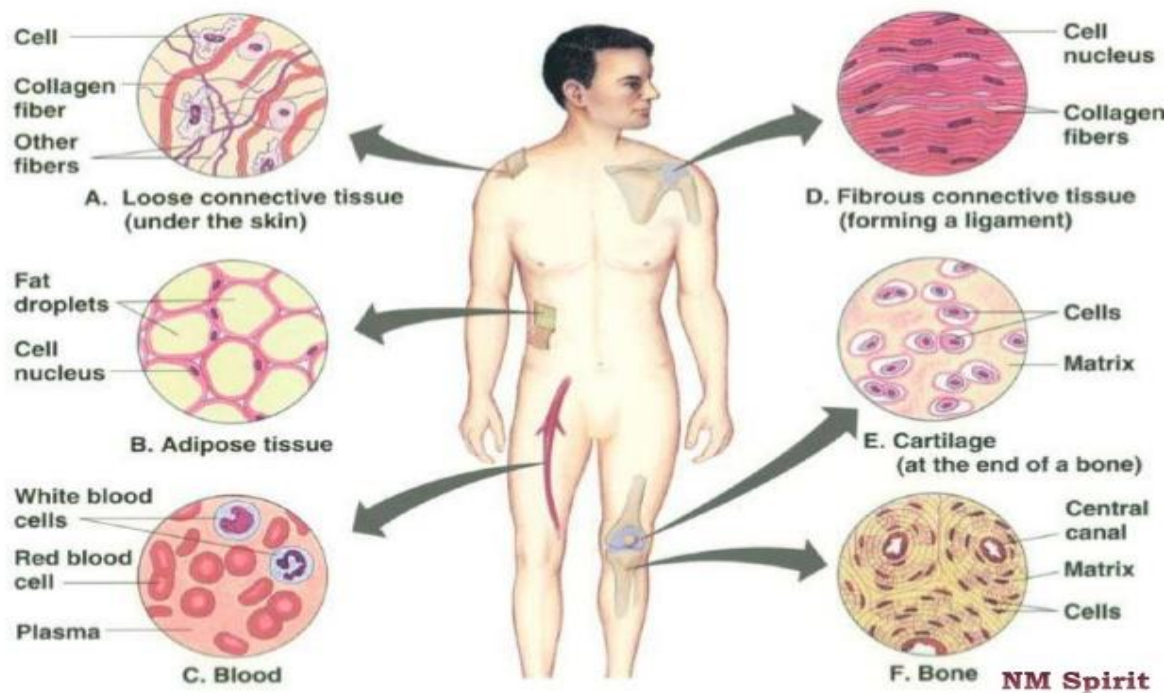
### **Permanent tissue:**

-Epithelium: Tissue that covers, lines, secretes

-Muscle: Tissue that moves different body parts

-Connective: Tissue that binds and supports other tissue

-Nerve: Tissue that transmits chemical and electrical control signal



## EMBRYONIC TISSUE

Two kinds of stem cells:

**Embryonic stem cells:** Tissue in an embryo that produces all other tissue during growth.

**Adult stem cells:** Tissue in an adult organism that produces new tissue cells to replace old and damaged ones.

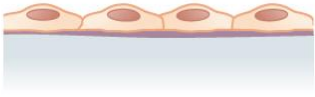
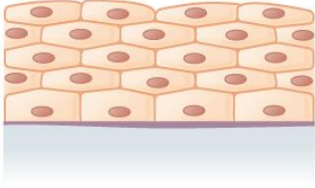

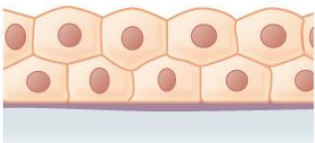
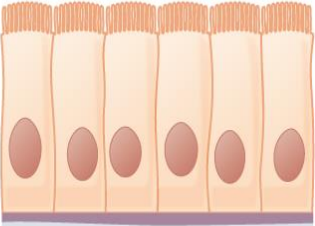
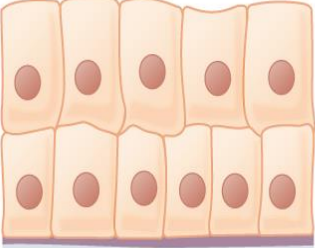
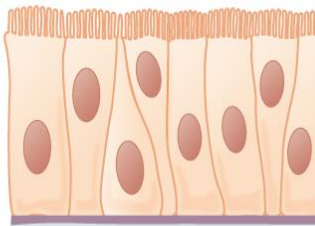
**Draw table with structure and function in books.**

## PERMANENT TISSUE

**Epithelial tissue:** Some are flat shaped (squamous), and some are tall (columnar). Cuboidal means “like a cube shape”

Stratified means “in layers” and pseudostratified means it seems to be “in layers” but is not.

Ciliated means the cell has tiny hairs.

|          | Simple   | Stratified  |  |
|----------|--|---|--|
| Squamous |  <p>Simple squamous epithelium</p>  |  <p>Stratified squamous epithelium</p>  |  |
| Cuboidal |  <p>Simple cuboidal epithelium</p>  |  <p>Stratified cuboidal epithelium</p>  |  |
| Columnar |  <p>Simple columnar epithelium</p> |  <p>Stratified columnar epithelium</p> | <b>Pseudostratified</b>  |
|          |  |   |  <p>Pseudostratified columnar epithelium</p> |

**Draw table with structure and function in books.**

**Day 4 and 5**

**Date:**

**Muscle tissue:**

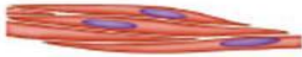
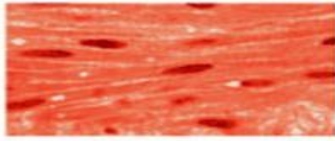
Three types of muscle tissue:

Skeletal: Found connected to skeleton (bones), voluntary movement.

Cardiac: Found in the heart, involuntary movement.

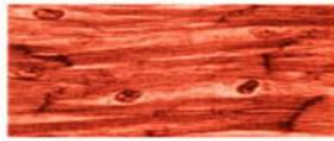
Smooth: Found in other organs, involuntary movement.

**SMOOTH MUSCLE**



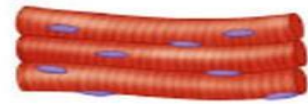
**INTERNAL ORGANS**

**CARDIAC MUSCLE**



**HEART**

**SKELETAL MUSCLE**



**LEG**

**Draw table with structure and function in books.**

**Connective tissue:**

Six types:

Adipose tissue

Areolar

Fibrous

Cartilage

Bone

Blood

**Draw table with structure and function in books.**

**Day 6 and 7**

**Date:**

**Nerve tissue:**

**Receptors:** Sense, receive signals

**Effectors:** Transmit or transfer messages to carry out tasks

Made of cells called neurons

**Sensory neurons:** Carry impulses from receptor to central nervous system.

**Motor neuron:** Carry impulses from central nervous system to muscles and glands which are effectors.

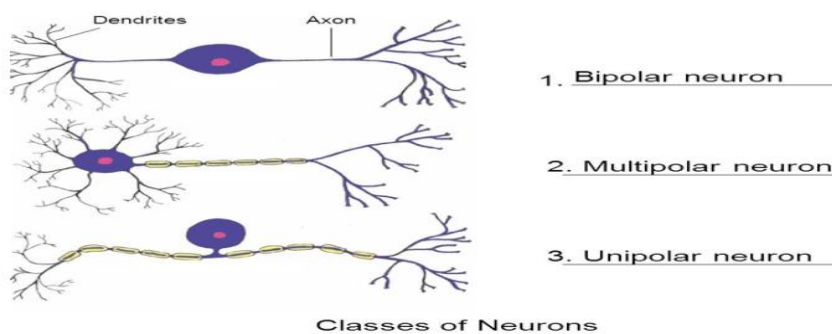
Axons, covered by Schwann cells with spaces between them called “nodes of Ranvier”, ends of axon have fine extensions called terminal fibers or branches.

**Three types of cells:**

Unipolar

Bipolar

Multipolar



18

**Draw table with structure and function in books.**

**Test yourself:**

Complete **EXERCISE 2** on page 93 in your Life Science, Via Afrika textbook.

**Day 8 and 9**

**Date:**

## **PLANT TISSUE**

### **MERISTEMATIC TISSUE**

**Meristematic tissue:** Tissue with undifferentiated, unspecialized cells undergoing cell division. Cells that are formed do not differentiate as they divide, and make the plant grow, once they are formed they turn into specialized permanent tissue.

**Permanent tissue:** Tissues that do not divide and grow further, they develop special structures for specific functions.

Can be found in:

-**Apical meristems:** Tissue that makes a plant grow longer from its tips

-**Lateral meristems:** Tissue that makes a plant grow thicker and wider

**Draw table with structure and function in books.**

### **PERMANENT TISSUE**

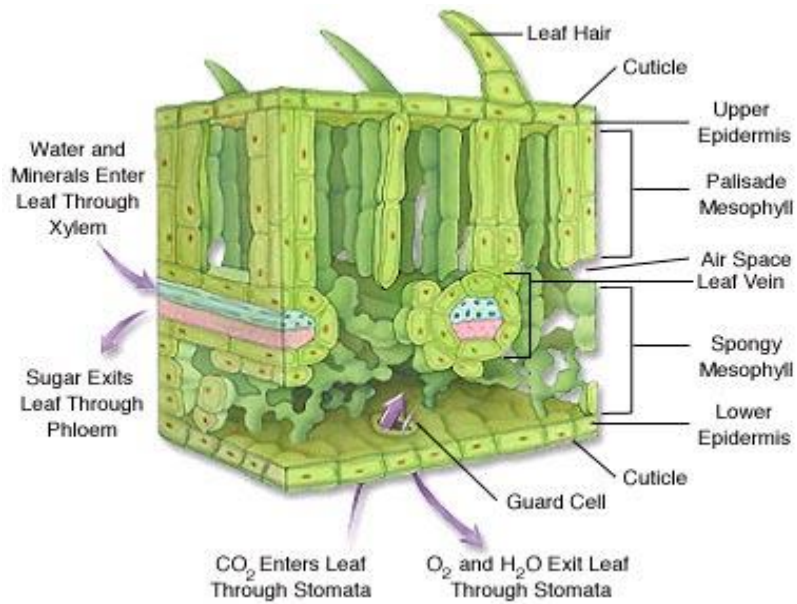
**Three groups:**

- Dermal tissue: Covers the plant
- Vascular tissue: Transports water and nutrients
- Ground tissue: Fills the space between the epidermal and vascular tissue and performs other functions

**Day 10 and 11**

**Date:**

Dermal or epidermal tissue is on the outside of the plant.

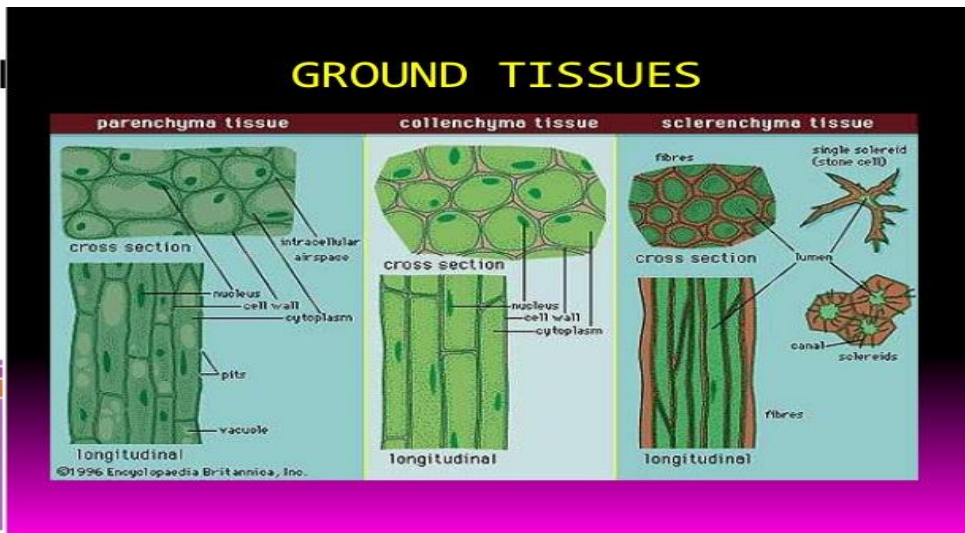


**Draw table with structure and function in books.**

**Ground tissue includes:**

- Parenchyma
- Chlorenchyma
- Collenchyma
- Sclerenchyma





**Draw table with structure and function in books.**

**Day 12 and 13**

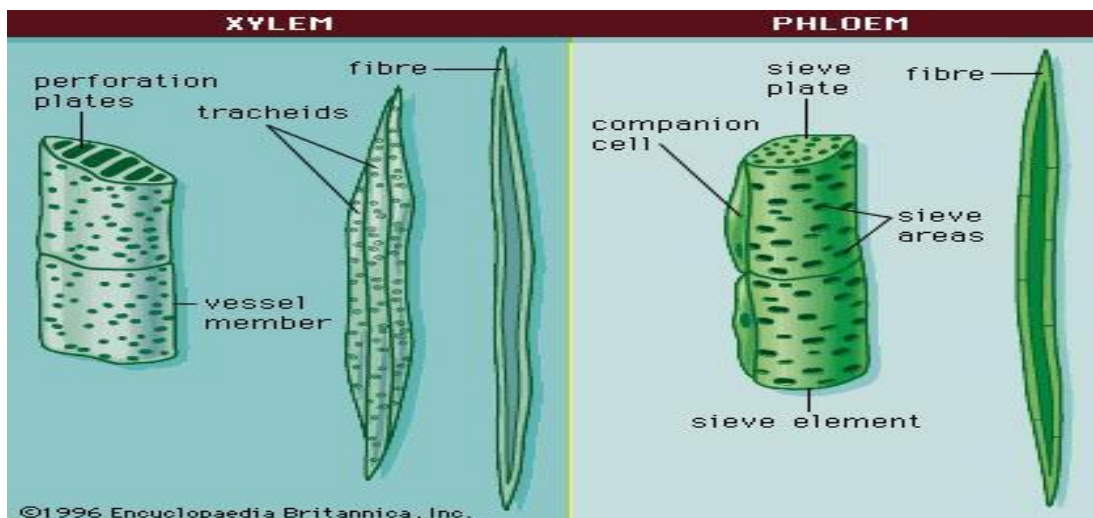
**Date:**

Vascular tissue is vein-like tubes that can easily transport substances.

**Two types:**

-Xylem

-Phloem



**Draw table with structure and function in books.**

**Test yourself:**

Complete **EXERCISE 1** on page 85 in your Life Science, Via Afrika textbook.

**Day 14: Revise Topic 4. Additional revision activities will be provided and class discussions and debates (if possible) will be held to lay down knowledge.**

Complete **TOPIC QUESTION** on page 105 in your Life Science, Via Afrika textbook.

**END TOPIC 4**

# Topic 5

## PLANT ORGANS: LEAF

### Content

- Organs: **Leaf structure** Cross section of a dicotyledonous leaf to demonstrate and explain its structure in terms of its functions i.e. Photosynthesis, Gas exchange and Transport. Link with plant tissues, appropriate cell organelles, movement across membranes and movement of molecules into through and out of the leaf.

Day 15

Date:

### PLANT ORGANS

**Roots:** Anchor plants and absorb water and mineral salts

**Stems:** Support leaves for photosynthesis, flowers for pollination, and fruit for dispersal

**Leaves:** Photosynthesis, transpiration and gaseous exchange

**Flowers:** Reproduction through pollination

**Fruit:** Reproduction through dispersal

**Draw figure 82 in workbooks.**

**PLANT LEAVES**

- **Isobilateral leaves:** Both surfaces look the same
- **Dorsiventral leaves:** Both surfaces are different

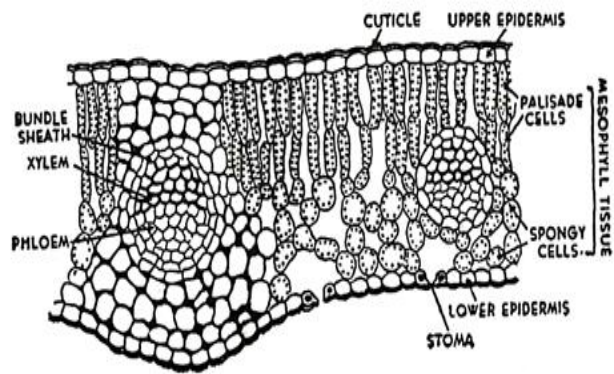
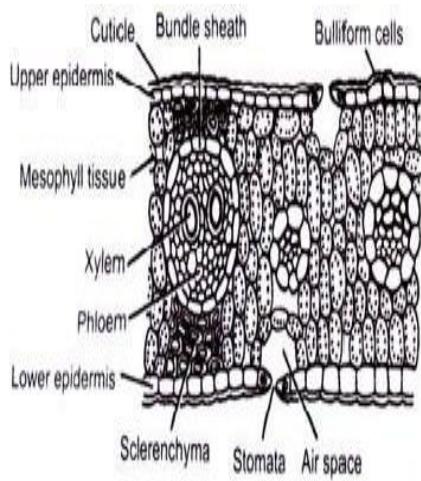


Fig. 156. Section of a dorsiventral leaf showing the plan of arrangement of tissues.

ISOBILATERAL

DORSIVENTRAL

**Draw figure 85 in workbooks.**

**Day 18**

**Date:**

Leaf structure for gaseous exchange:

**Draw figure 86 in workbooks**

**Day 19**

**Date:**

Leaf structure for photosynthesis:

**Draw figure 87 in workbooks**

**Day 20**

**Date:**

Leaf structure for water regulation:

**Draw figure 89 in workbooks.**

**Day 21 and 22**

**Date:**

**Mesophyll structure for photosynthesis:**

- Palisade parenchyma: On dorsal surface, column-shaped cells, tightly packed, no intercellular spaces, many chloroplasts in small space for maximum photosynthesis.
- Spongy parenchyma: On ventral surface, irregular-shaped cells, loosely packed, different sized intercellular spaces for easy gaseous exchange, chloroplasts for increased photosynthesis.

### **Movement of carbon dioxide:**

- Carbon dioxide for photosynthesis, made during cell respiration.
- Leaves plant during day through stomata
- Enters during day from atmosphere through stomata into intercellular spaces, and also diffuses through epidermal layer
- Leaves plant at night through diffusion
- Inside leaf: Moves via diffusion through intercellular spaces, into cell across cell wall.
- Movement into leaf through epidermis=slow, movement through stomata=quick

### **Movement of water:**

- Movement of water into leaf, through diffusion from water carried by xylem tissue within stem, and from vascular bundles in leaf.
- Once it has left the vascular bundles it moves:
  - **between the cells**, through diffusion in the cell walls and intercellular spaces
  - **into cells**, through osmosis across cell membrane
  - **out of the leaf**, by diffusion through the stomata as water vapour, through process called transpiration

**Day 23 and 24**

**Date:**

### **Movement of sugars:**

- Glucose is made in chloroplasts of the palisade and spongy parenchyma, through photosynthesis during day.

- Glucose dissolves in water and moves in a solution out of cell and into the phloem tissue of the vascular bundle, and is then transported to other parts of plant.
- Starch that is made from excess glucose is stored in the chloroplast of the leaf and exposed parts of stem and root system, and is then used up as needed.

### **Movement of oxygen:**

- Oxygen moves into leaf through epidermis.
- Movement out of leaf, through diffusion from intercellular spaces, through stomata into atmosphere.
- Also diffuses across cell membrane into intercellular spaces, and out the epidermal layer.
- Diffusion=Slow
- Movement through open stomata=Quick

### **Regulation of gas movement by stomata:**

- Gaseous exchange of oxygen and carbon dioxide in leaf occurs through pores called stomata
- Stomata also controls loss of water vapor through transpiration.
- Normally stomata open when light strikes the leaf in the morning and close during night.
- If it is hot at midday the stomata close when plants uptake of soil water cannot keep up with transpiration.
- Made of two guard cells that surround an opening in the epidermis of leaves, and some green herbaceous stems of plants.
- The inner cell wall of each guard cell is thick and elastic.

**Revise Topic 5. Additional revision activities will be provided and class discussions and debates (if possible) will be held to lay down knowledge.**

Complete **TOPIC QUESTION** on page 113 in your Life Science, Via Afrika textbook.

**END TOPIC 5**



# Topic 6

## SUPPORT AND TRANSPORT SYSTEMS IN PLANTS

### Content

- **Transpiration** : Relationship between water loss and leaf structure.
- Factors that affect the rate of transpiration: temperature, light intensity, wind, humidity.
- Uptake of water and minerals into xylem in roots in xylem. Transport of water and minerals to leaves.
- **Translocation** of manufactured food from leaves to other parts of plant.

Day 25 and 26

Date:

### PLANT TISSUE

Gymnosperms: Non-flowering plants

Angiosperms: Flowering plants

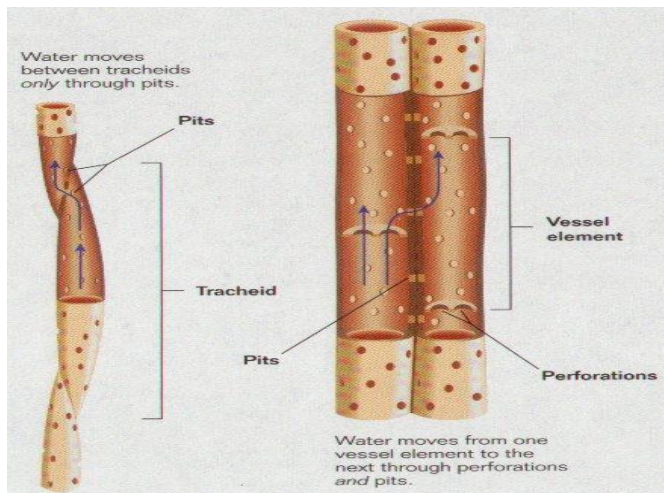
- Angiosperms: - Dicotyledonous  
- Monocotyledons

**Collenchyma** is found underneath epidermis in young stems.

**Sclerenchyma** is made of fibers and sclereids. Commonly found in the pericycle to give it strength and to protect the phloem. Can also be found in the xylem tissue.

## Xylem tissue

- Used to transport water and minerals from roots to leaves
- Consists of tubes for water, fibres for support and living parenchyma cells
- Made of **xylem vessels**, **tracheids**, **sclerenchyma fibres** and **parenchyma**

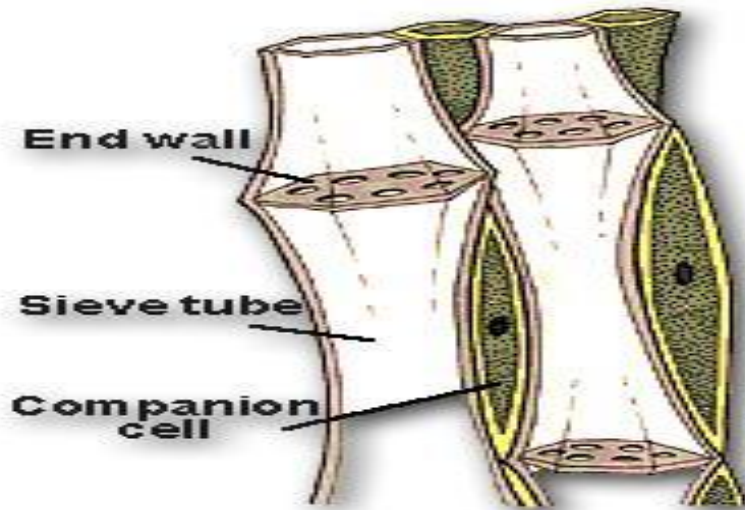


## Adaptions of xylem to function

- Xylem can carry water and minerals from roots to shoot tips because:
- Made of dead cells forming continuous column
- Tubes are narrow so capillary action is effective
- Pits allow water to move sideways
- Lignin is strong and allows for stretching
- Flow of water is not impeded as: there are no end walls, no cell contents, no nucleus, lignin prevents tubes collapsing

## Phloem tissue

- Function to transport sugars from one part to another
- Made of sieve tube elements and companion cells

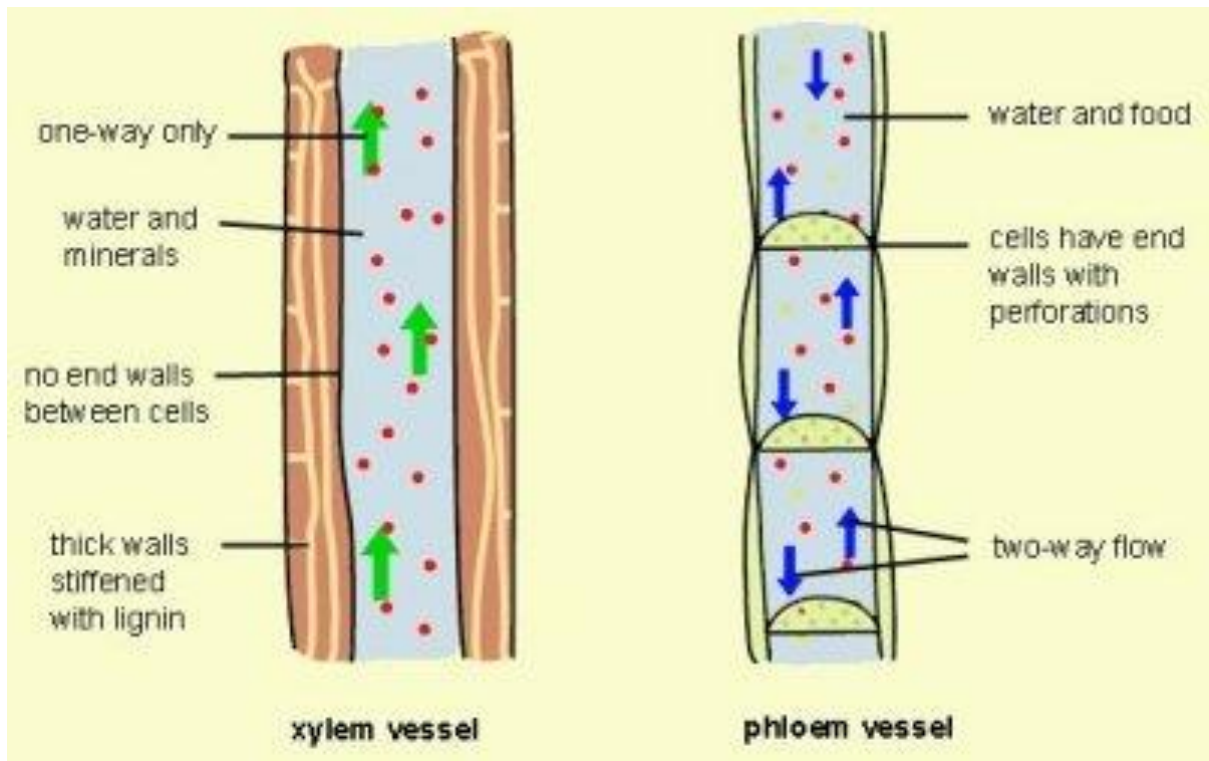


## Sieve Tubes

- Sieve tube elements are not true cells as they have little cytoplasm
- Lined up end to end to form a tube
- Sucrose is dissolved in water to form a sap
- Tubes (known as sieve tubes) have a few walls across the lumen of the tube with pores (sieve plates)

## Companion cells

- In between sieve tubes
- Large nucleus, dense cytoplasm
- Many mitochondria to load sucrose into sieve tubes
- Many gaps in cell walls between companion cells and sieve tubes for flow of minerals



**Test yourself:**

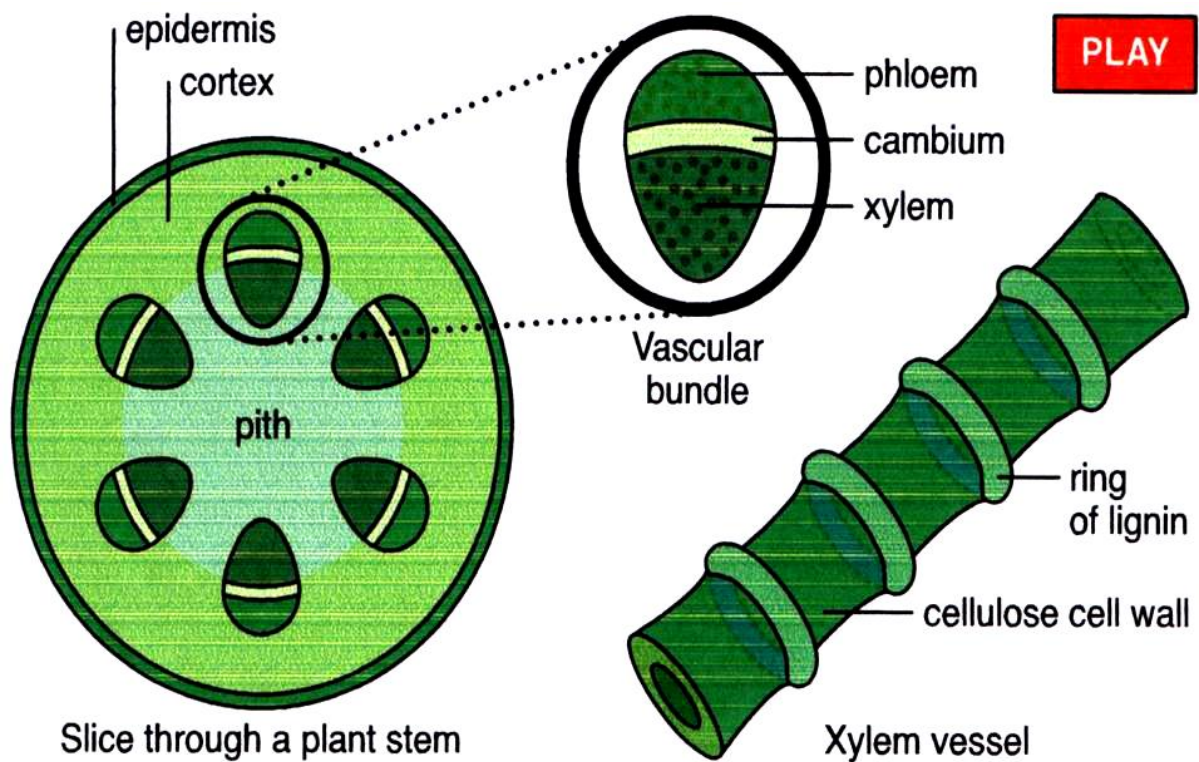
Complete **EXERCISE 1** on page 122 in your Life Science, Via Afrika textbook.

**Day 27 and 28**

**Date:**

**THE STEM**

- The vascular bundles are found near the outer edge of the stem
- The xylem is found towards the inside of each vascular bundle, the phloem is found towards the outside
- In between the xylem and phloem is a layer of cambium
- Cambium is a layer of meristem cells that divide to make new xylem and phloem



### Functions of stem

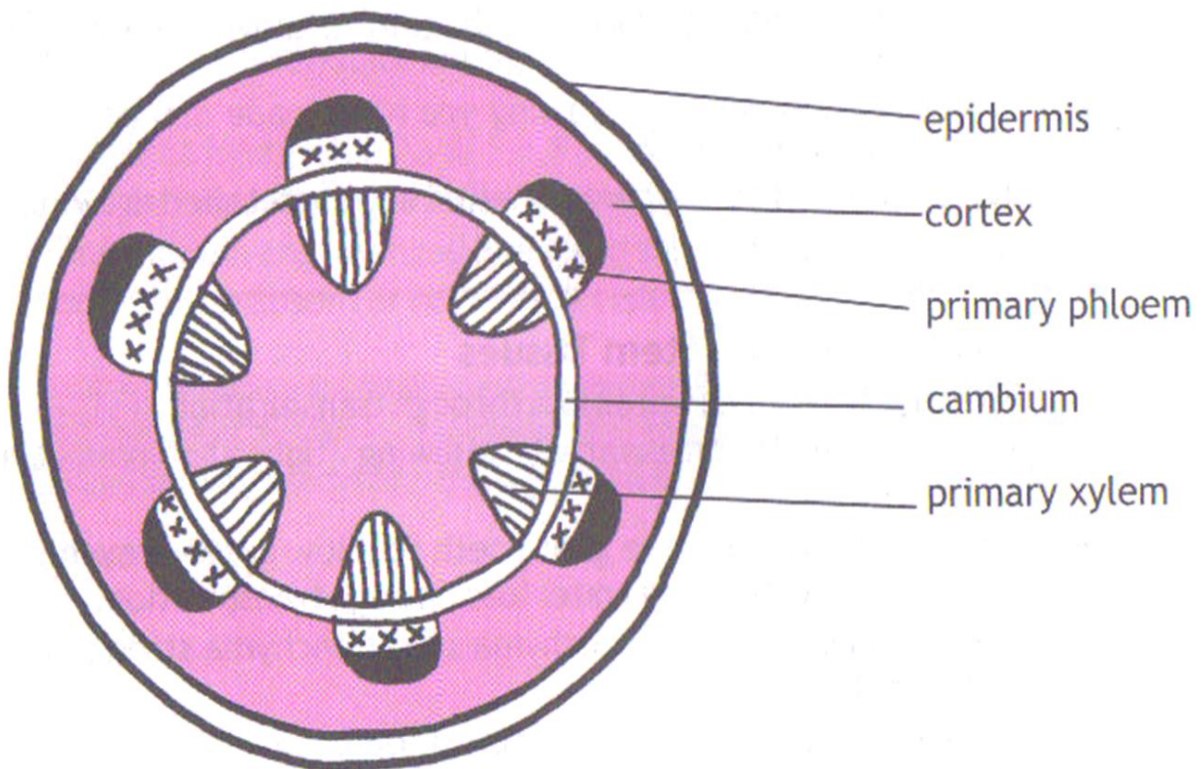
- They hold the leaves in a favourable position to receive light for photosynthesis.
- They hold the flowers in a favourable position for pollination.
- Most stems contain chlorophyll and they therefore manufacture food by the process of photosynthesis.
- They store food and water
- They transport water and mineral salts from roots to leaves
- They transport food from the leaves to the roots

## SECONDARY GROWTH

- Increase in thickness of the stem is called secondary growth or secondary thickness.

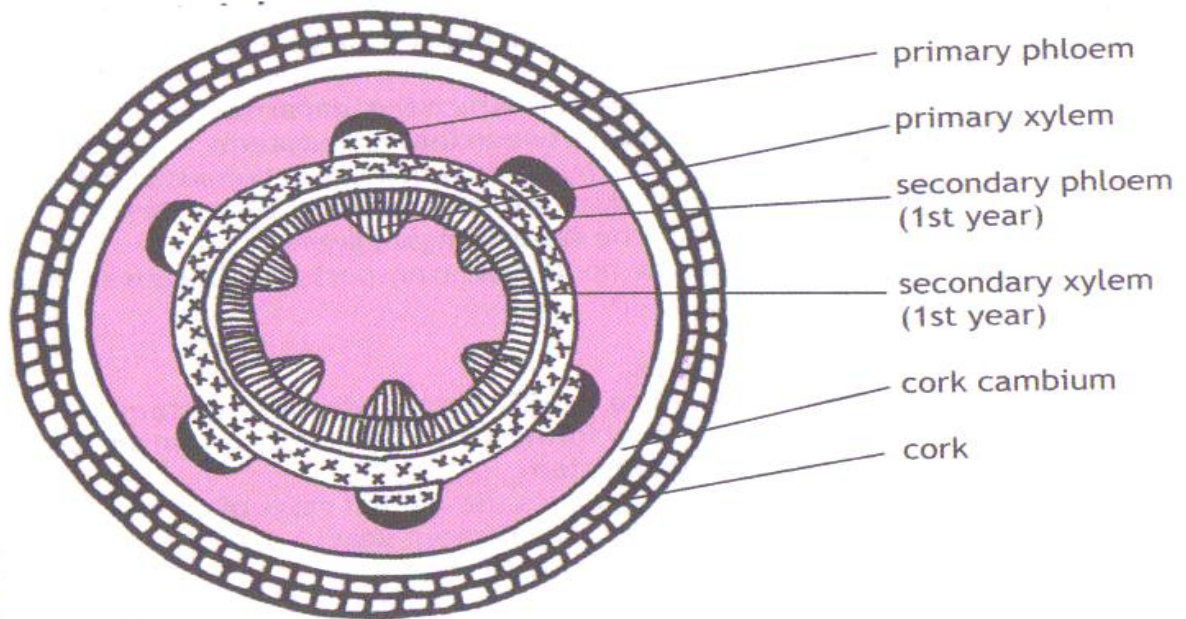
### Secondary thickness takes place in 3 steps:

- Formation of secondary xylem and secondary phloem
- Formation of cork
- Formation of lenticels



## CORK

- Certain parenchyma cells in the cortex begin to divide and form cork cambium
- The cork cambium divides to form cork cells on its outside.
- The cork cells have suberin laid down on their cell walls.



T/S of a stem after secondary thickening has taken place

### ANNUAL RINGS

- Alternating dark and light rings of woody stem or wood, seen in cross section.



## **LENTICLES**

- In woody stems the stomata are blocked by the presence of cork cells
- The epidermis of woody stems breaks up to form tiny pores called lenticles which allow gaseous exchange.



**Day 29 and 30**

**Date:**

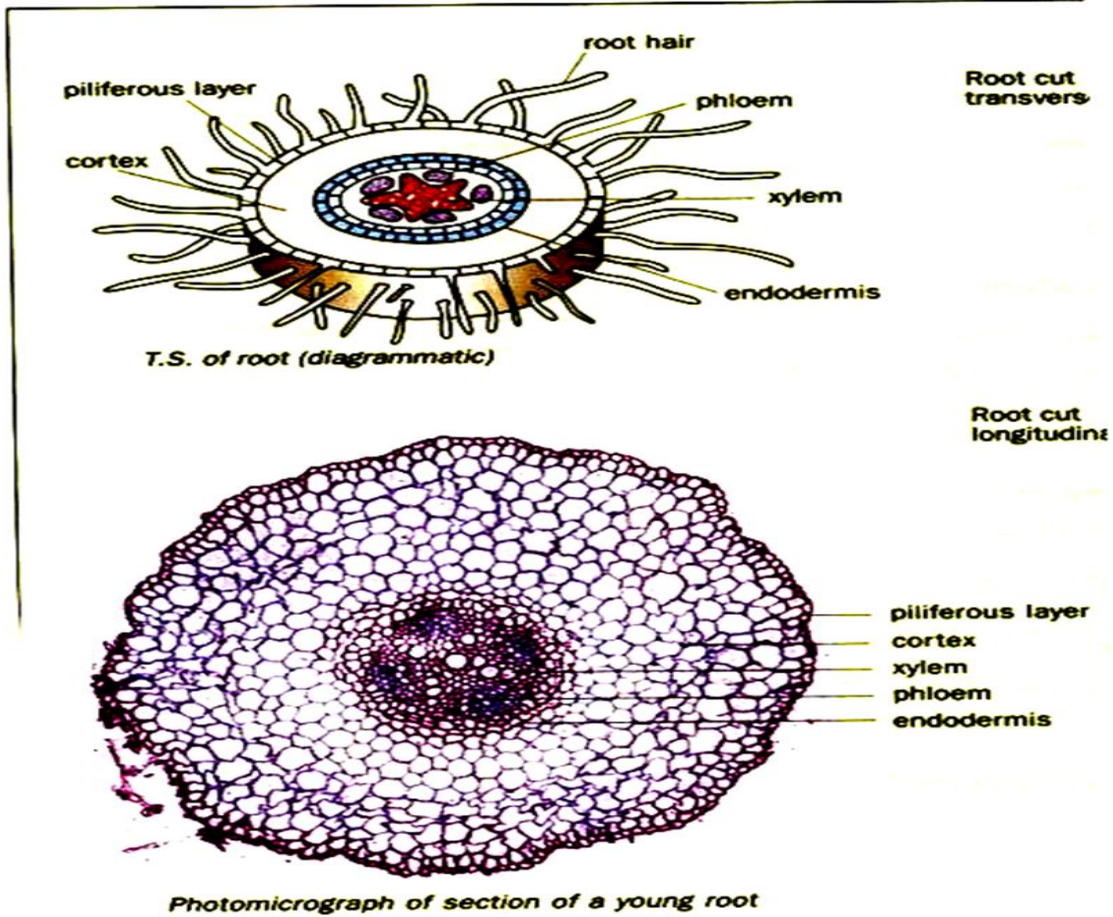
## **THE ROOT**

- The vascular bundle is found in the centre
- There is a large central core of xylem- often in an x-shape
- This arrangement provides strength to withstand the pulling forces to which roots are exposed
- Around the vascular bundle are cells called the endodermis which help to get water into the xylem vessels



- Just inside the endodermis is the pericycle which contains meristem cells that can divide (for growth)

**Figure 9.5** A young dicotyledonous root



### **Functions of root system:**

**Anchorage:** Stop plants from falling over when there is wind or rain

**Support:** For stems and leaves

**Storage:** Site of food storage, so plant can grow and survive

**Nutrient uptake:** Absorb water and elements

**Transport:** Move water and nutrients to stem and leaves

**Reproduction:** Modified roots like carrots can produce new plants

**Day 31**

**Date:**

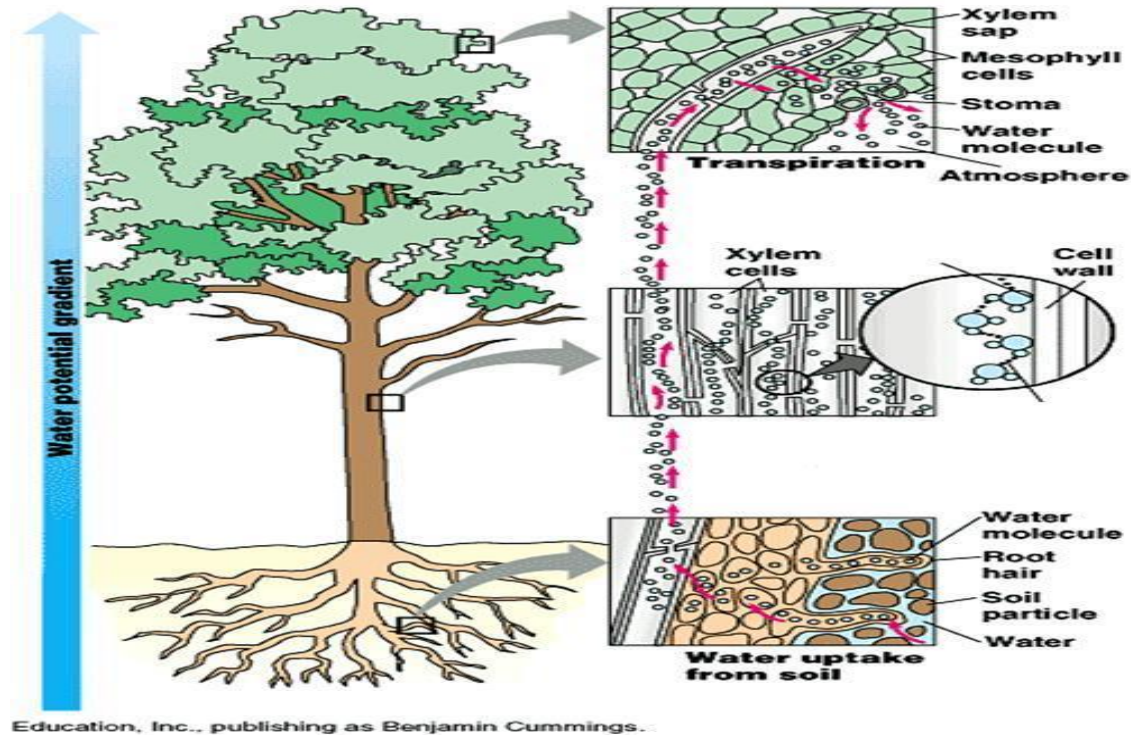
### **FUNCTIONS OF ROOT TISSUE**

- The **root hairs** of the epidermis absorb water and mineral salts.
- The **parenchyma** of the cortex stores starch and the intercellular spaces allow water and mineral salts to pass through
- The **passage cells** of the endodermis direct water into the xylem of the stele.
- The **pericycle** gives rise to side roots
- The **xylem** transports water and mineral salts from the roots to the stem and leaves. It also provides strength to the plant.
- The **phloem** transports manufactured food from the leaves to the roots.
- The **vascular cambium** gives rise to additional xylem and phloem as the root grows in thickness.

### **Test yourself:**

Complete **EXERCISE 2** on page 127 in your Life Science, Via Afrika textbook.

TRANSPORT OF WATER



- Water enters the root hairs of the epidermis of roots by osmosis

POINTS TO REMEMBER

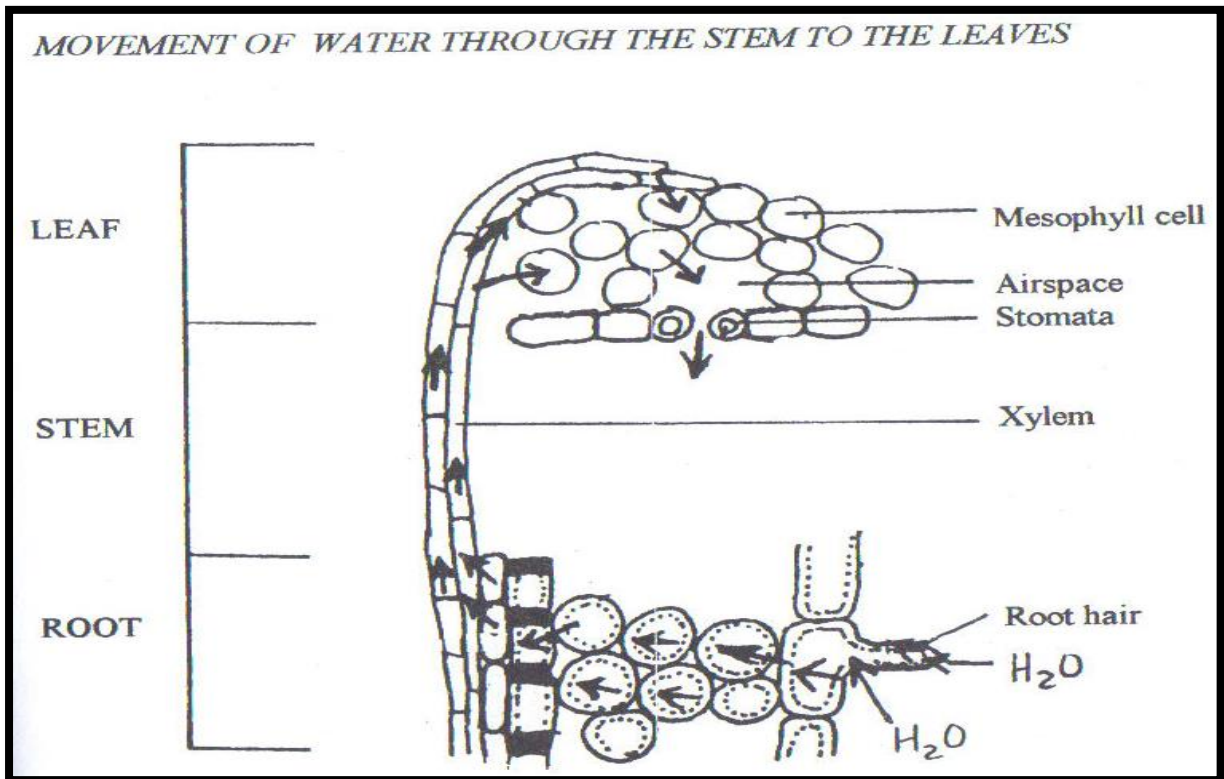
- THE SOIL WATER IS THE DILUTE SOLUTION
- THE CELL SAP HAS CONCENTRATION SOLUTION BECAUSE OF HIGH CONCENTRATION OF SALTS.
- THE CELL MEMBRANE AND TONOPLAST IS A SEMI-PERMEABLE MEMBRANE

OSMOSIS: MOVEMENT OF WATER MOLECULES FROM HIGH WATER POTENTIAL TO LOW WATER POTENTIAL THROUGH SEMI PERMEABLE MEMBRANE.

Test yourself:

Complete **EXERCISE 3** on page 139 in your Life Science, Via Afrika textbook.

## MOVEMENT OF WATER FROM ROOT TO LEAVES



Day 34 and 35

Date:

### **FORCES RESPONSIBLE FOR UPWARD MOVEMENT OF WATER:**

- Transpirational pull
- Root pressure
- Capillarity

### **Transpirational Pull:**

- Water evaporates from leaves
- Creates diffusion pressure gradient between outside air and xylem
- Tension exists in the water column extending from the roots to the leaves
- Adhesive and cohesive forces keep the column continuous
- Thus water is continually being pulled upward as water evaporates from the leaves

Upward pull = Transpirational pull

### **Root pressure**

- Cell sap of root hair always has low water potential when compared to soil water
- Water enters root hair by osmosis
- Continuous osmosis causes pressure forcing water a short distance up the stem

### **Capillarity**

- Spontaneous movement of water up narrow tubes because of adhesion and cohesion is called capillarity
- Lumen of xylem vessels and tracheid are very narrow therefore capillarity takes place
- Upward distance is very short

**TRANSPORT OF FOOD IN PLANT**

- **Absorption of water and mineral salts from soil into root:**

Moves from soil through root hair, and moves via osmosis.

Water passes through permeable membrane and tonoplast.

Active transport via plant cells can also occur.

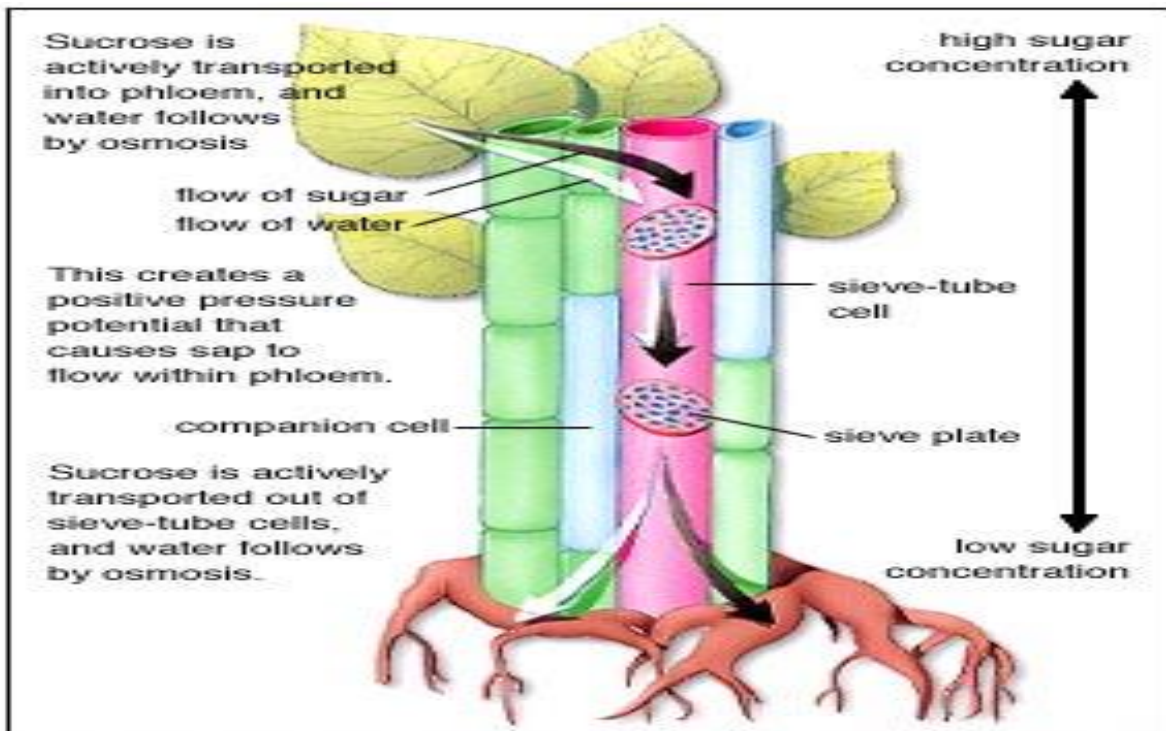
- **Movement of water through root into stele:**

**Apoplast pathway:** Movement along cell wall and intercellular membranes.

**Symplast pathway:** Movement through interconnected cytoplasm of adjacent cells.

**Transmembrane pathway:** Moves through cell membrane one side and leaves cell membrane on other side.

- Food substances (sugar & amino acids) are manufactured in the green leaves through the process called photosynthesis
- **Translocation** is the process of transporting food substances from the source (root hairs) to the sink (leaves).
- **Capillarity** is movement of water through the tracheid, fibers and vessels of xylem tissue. It happens due to interaction between the forces of **adhesion** and **cohesion**.



**Day 38, 39 and 40: Revise Topic 6. Additional revision activities will be provided and class discussions and debates (if possible) will be held to lay down knowledge.**

Complete **TOPIC QUESTION** on page 147 in your Life Science, Via Afrika textbook.

**END TOPIC 6**

# Topic 7

## SUPPORT SYSTEMS IN ANIMALS

### Content

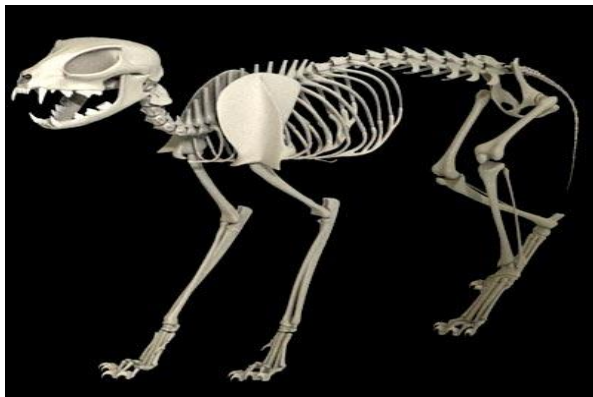
- **Human skeleton:** The axial skeleton: Mention of facial bones, cranium, foramen magnum, palate and jaws. Appendicular skeleton
- **Functions of skeleton:** Movement, protection, support, storage of minerals, hearing

Day 41 and 42

Date:

### THREE TYPES OF SKELETONS

- Endoskeleton (Internal skeleton)





- Exoskeleton (External hard skeleton)



- Hydrostatic skeleton (No skeleton)



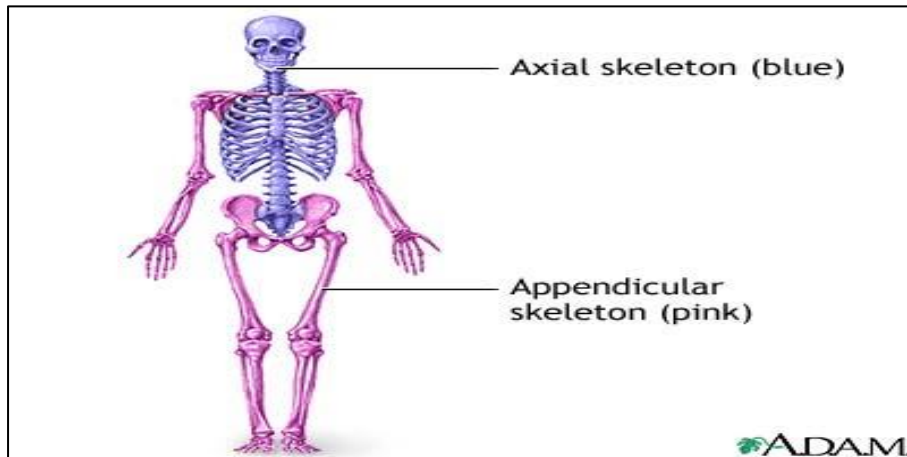
## **STRUCTURE OF ENDOSKELETON**

### **TWO SECTIONS**

**AXIAL SKELETON:** Cranium, Vertebrae, Ribs.

**APPENDICULAR SKELETON:** Limbs (Arms and Legs).

- Axial skeleton supports and protects organs of head, neck and trunk.
- Appendicular skeleton- bones of limbs and bones that anchor them to the axial skeleton.



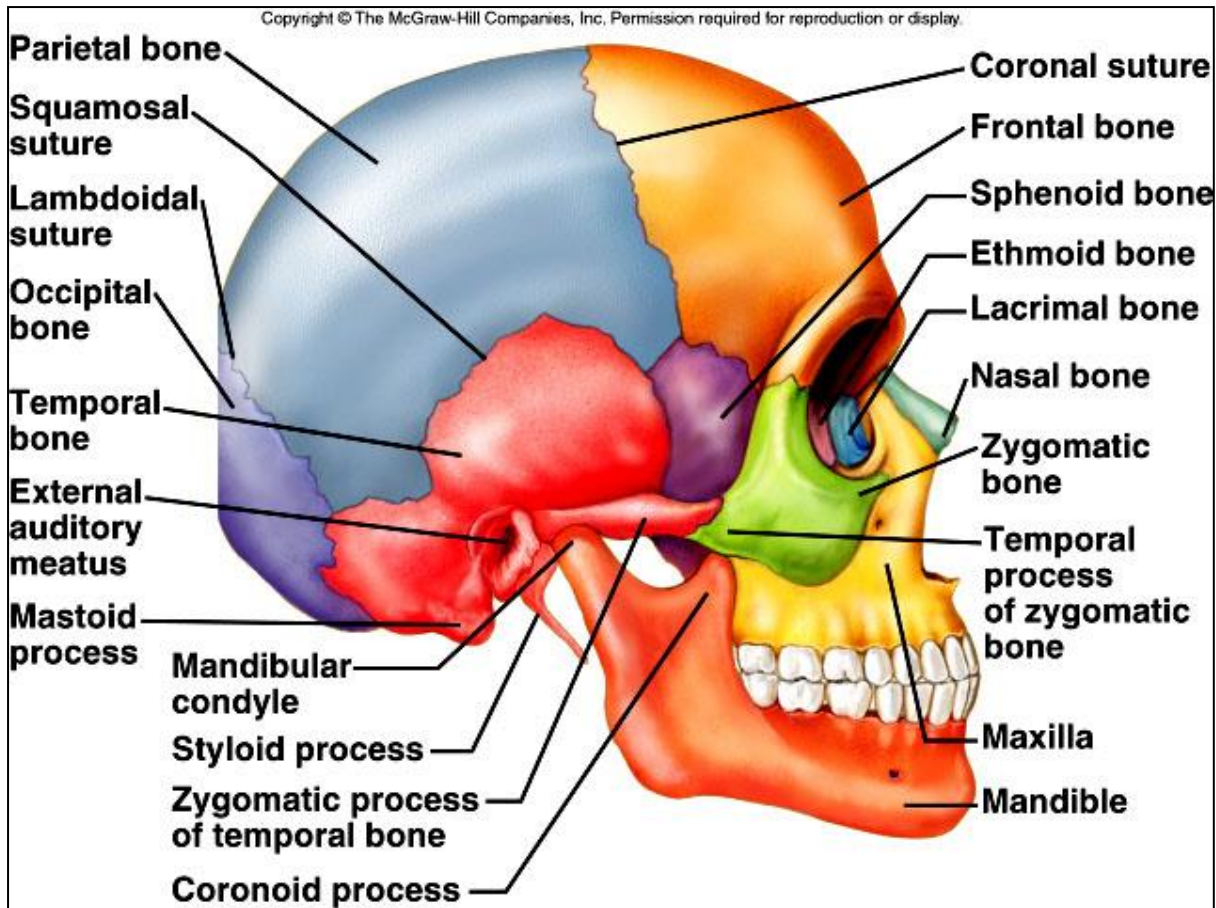
**Day 43 and 44**

**Date:**

## **AXIAL SKELETON**

### **THE SKULL:**

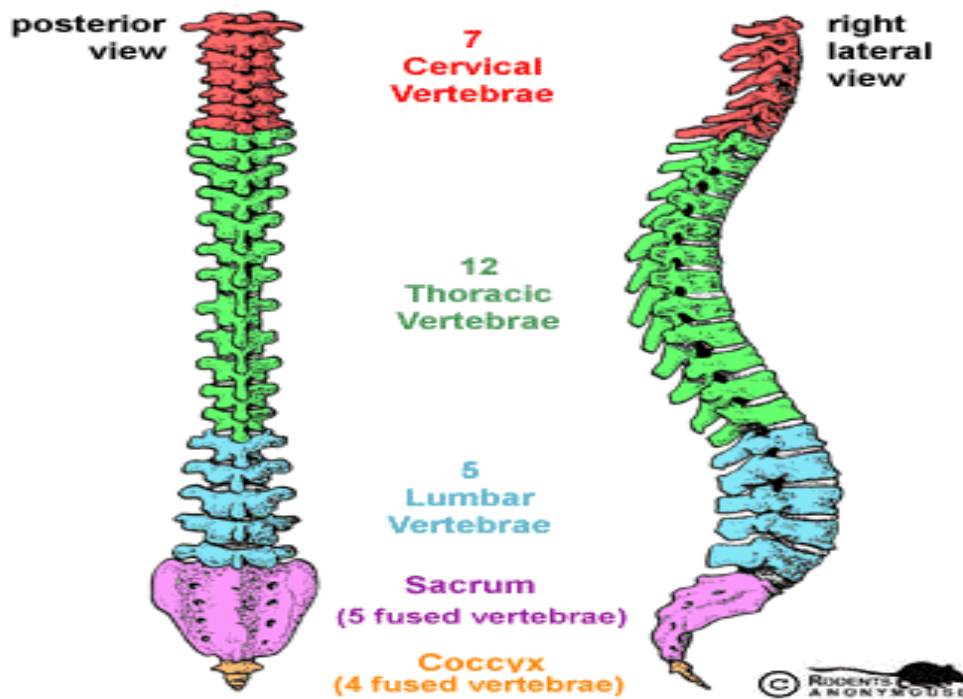
- 8 interlocking sutured bones in cranium.
- Facial bones: 13 sutured bones, 1 mandible (The lower jaw-bone or mandible is hinged to the cranium, so you can chew).
- Cranium- encases brain, attachments for muscles, sinuses.



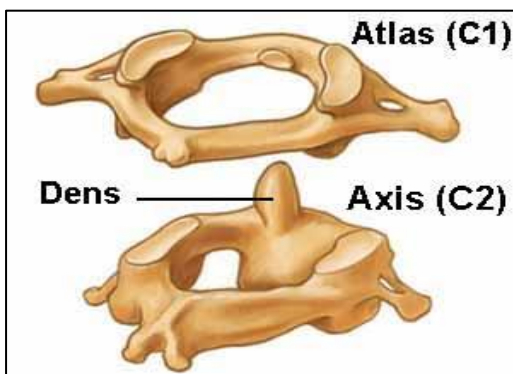
#### THE VERTEBRAL COLOUM:

- 12 thoracic vertebrae are part of thoracic cage, which helps to protect organs.
- Intermediate in size.
- Vertebrae get larger as they progress down the spine.
- Lumbar vertebrae are the largest.
- Due to amount of movement occurring here- often site of back pain.
- Sacral vertebrae are fused: joins two halves of pelvis together.
- Coccyx attached to bottom of sacrum.

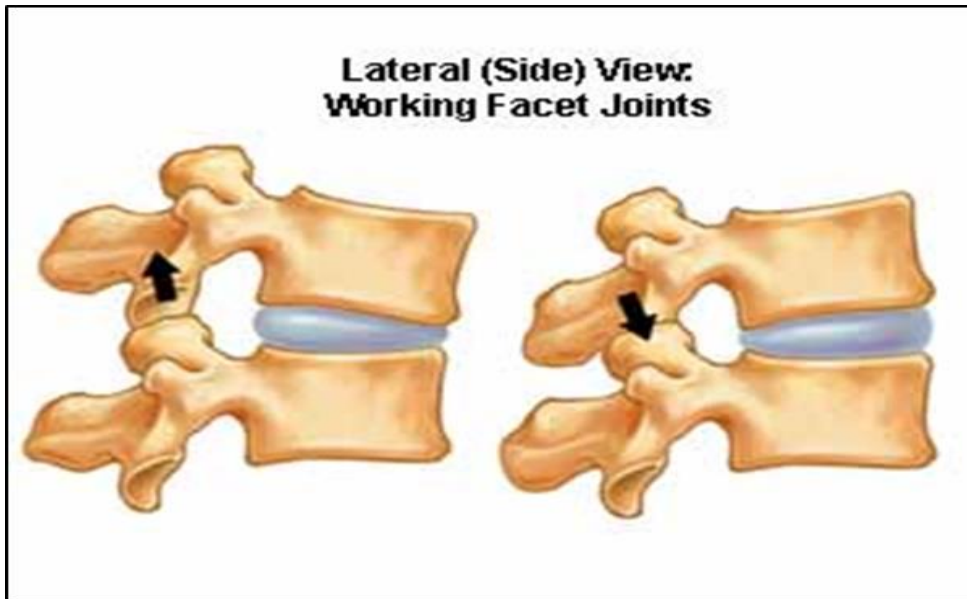
- 7 **cervical** vertebrae
- 12 **thoracic** vertebrae
- 5 **lumbar** vertebrae
- 1 **sacrum** (5 fused vertebrae)
- 1 **coccyx** (4 fused vertebrae)



- The **first** vertebra is called the atlas- supports the skull.
- The **second** vertebra is called the axis and forms a pivot joint with the atlas.

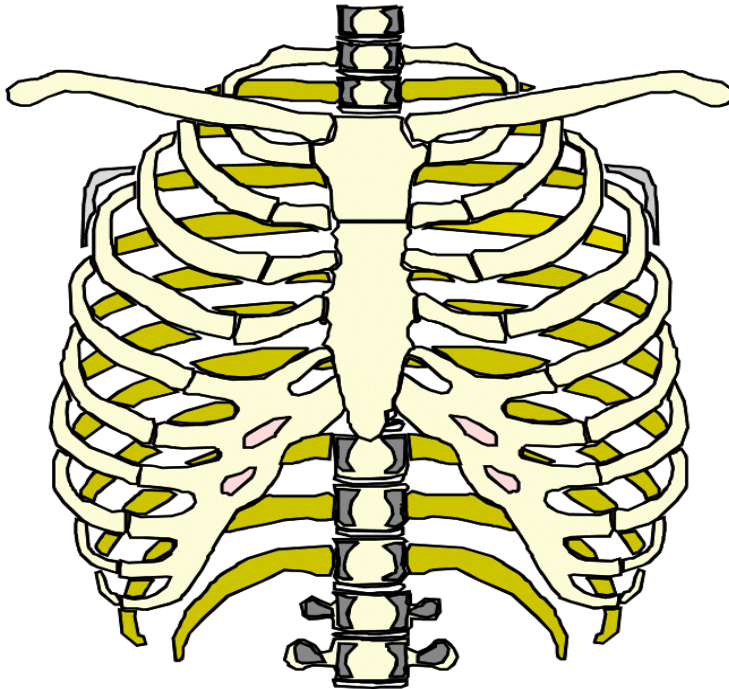


- Each vertebra has a hole in to allow spinal cord to pass down through it.
- Protects spinal cord.
- In between each vertebra is a disc: prevents friction and acts as shock absorber.



## THE THORACIC CAGE:

- Consists of Ribs, Thoracic vertebra, Sternum and Costal cartilages.
- You have 12 pairs of ribs.
- All are joined to the thoracic vertebrae.



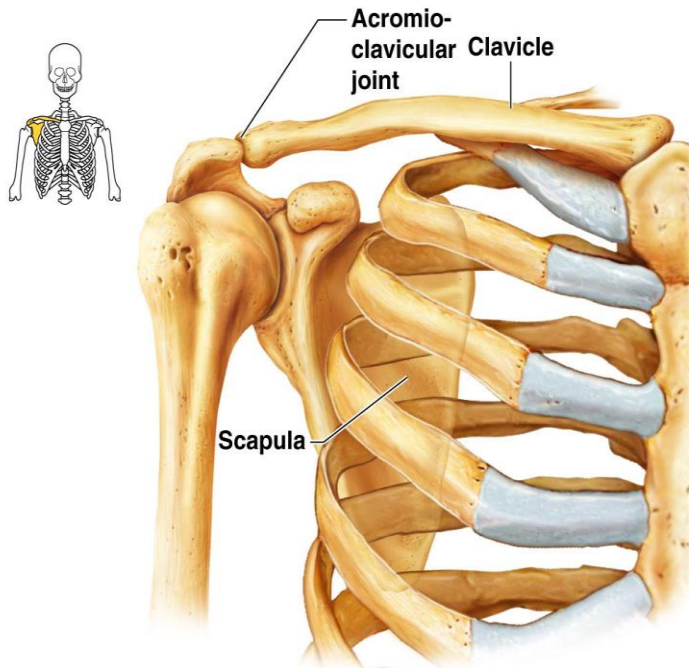
**APENDICULAR SKELETON**

**BONES OF THE APENDICULAR SKELETON:**

- Clavicles
- Scapulae
- Humerus
- Radius
- Ulna
- Carpals
- Metacarpals
- Phalanges
- Ilium
- Pubis
- Ischium
- Femur
- Patella
- Tibia
- Fibula
- Tarsals
- Metatarsals

## THE SHOULDER GIRDLE:

- Each clavicle articulates, at the top of the shoulder, with the scapula (acromioclavicular joint) and
- At the opposite end, at the front with the sternum (sterno-clavicular joint)



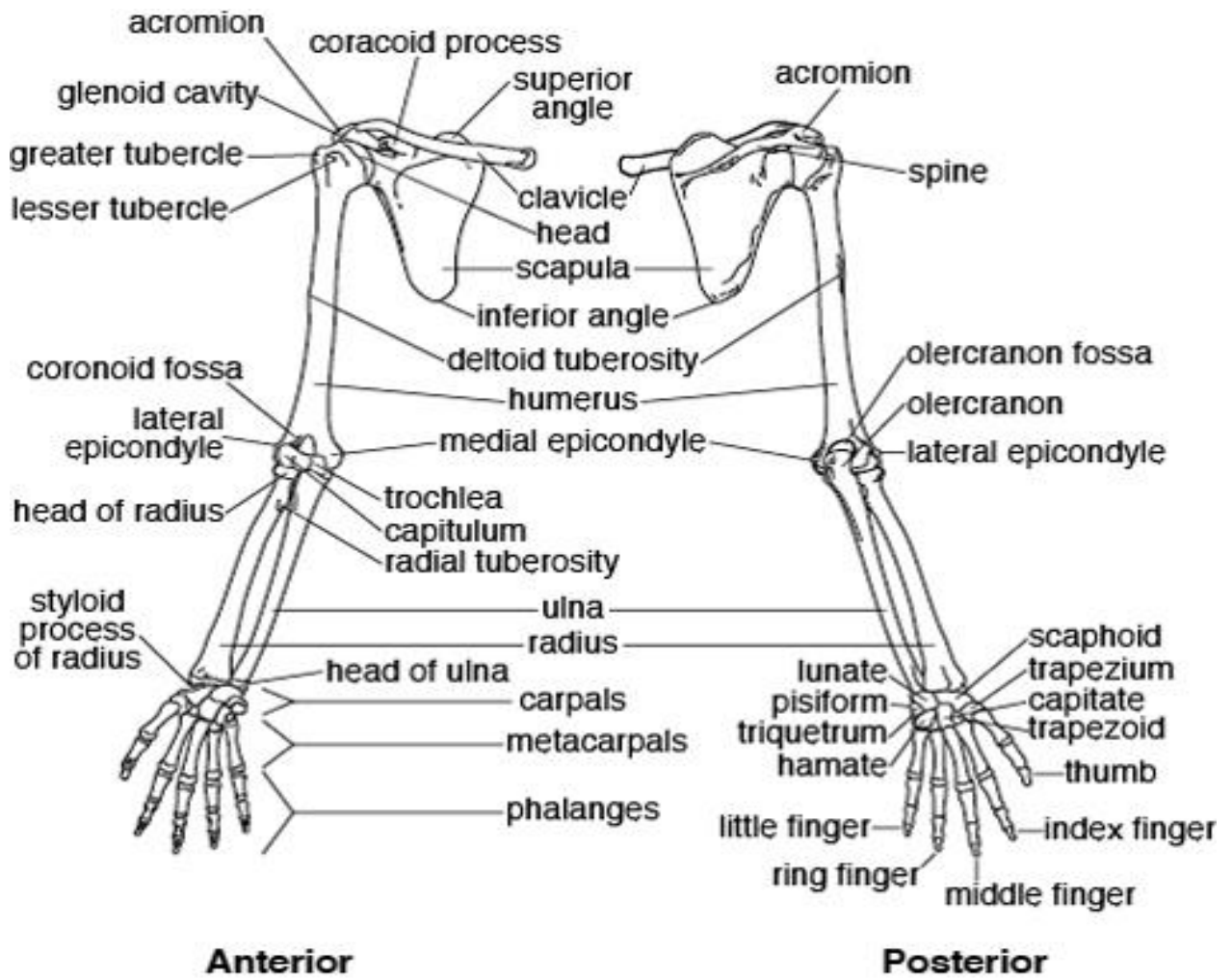
**(a) Articulated right shoulder (pectoral) girdle showing the relationship to bones of the thorax and sternum**

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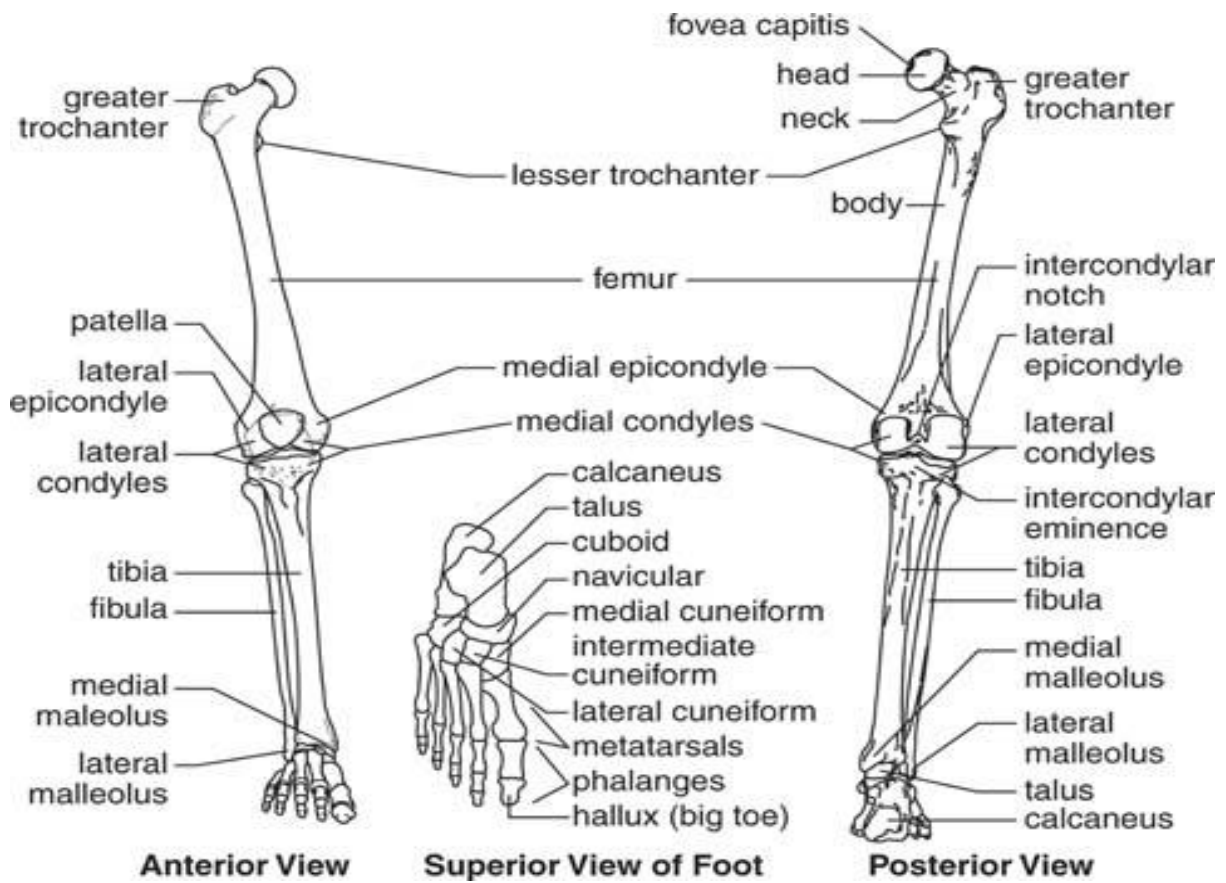
THE UPPER LIMB:

- Humerus (upper arm).
- Radius and ulna (forearm).
- Carpals, metacarpals, phalanges (wrist, hand and fingers).



**THE LOWER LIMB:**

- Femur (thigh).
- Patella (knee cap).
- Tibia, fibula (lower leg).
- Tarsals, metatarsals, phalanges (ankle, foot and toes).



## STRUCTURE OF A BONE:

### **Compact bone (Cortical)**

- Hard and dense bone.
- Makes up main shaft of bones and outer layer.
- Cells in this bone are located in rings of bone tissue around a central **haversian canal**, containing nerves and blood vessels.
- The bone cells (**osteocytes**) live in spaces (**lacunae**) between the rings.
- Each ringed unit makes up a **Haversian system**.
- Arranged in concentric circles called lamellae.
- Canaliculi connect osteocytes to central canal and to each other.

### **Spongy bone (Cancellous)**

- Less dense- more spaces (crunchie bar).
- Mesh of small bony plates filled with red marrow.
- Found in epiphyses of long bones and centre of other bones.

### **Bone Marrow**

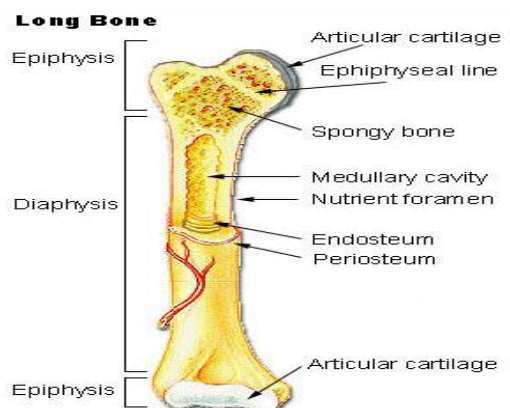
- Red marrow:
  - found in the ends of long bones and centre of other bones
  - Manufactures blood cells
- Yellow marrow:
  - In central cavities of long bones
  - Composed mainly of fat

## Periosteum

- Membrane covering bone (not joints).
- Inner layer of membrane contains osteoblasts- helps to repair injuries.
- Blood vessels help to nourish.

## Endosteum

- Membrane lines bone marrow cavity.
- Bone enclosed in periosteum a continuous sheath, with tendons and ligaments, blood vessels in periosteum.
- **Epiphysis**- proximal and distal ends of bone.
  - Inner- Spongy bone contains red marrow.
  - Outer- compact bone, articular cartilage.
- **Diaphysis**- middle
  - Outer- compact bone.
  - Inner- medullary cavity- contains yellow marrow (fat) and lined with endosteum (squamous epithelium).
- Nutrient foramen- allows for passage of blood vessels into medullary cavity.
- Epiphyseal line/ plate- where growth occurs within the bone.



**FUNCTIONS OF THE SKELETON:**

- **Movement-** The skeleton is jointed to allow us to move when the muscles attached to them contract.
- **Support-** Without the skeleton, the body would be flabby and shapeless.
- **Protection-** The hard nature of bone means that the skeleton can protect the more delicate parts of the body.
- **Storage-** Minerals are stored within the bones which helps bone growth
- **Production-** Red and white blood cells are made in red bone marrow which is found at the ends of the femur and humerus and in the ribs, sternum, pelvis and vertebrae.

**VERY IMPORTANT FUNCTION:**

- Bones are living tissue that grows and hardens.
- Bone is carried out from within the bone and growth involves 3 factors;
- **Osteoblasts-** these are bone forming cells that create new bone tissue.
- **Osteoclasts-** these are specialized cells that remodel bone by destroying bone cells and reabsorbing calcium.
- **Epiphyseal plate-** the growth plate is the only region of a long bone which can generate new cells.

## **JOINTS**

### **FIBROUS JOINTS**

- Immoveable
- Connect bones without allowing any movement.
- The bones of your skull and pelvis are held together by fibrous joints.
- Fibrous joints supply protects – e.g. for the brain.

### **CARTILAGINOUS JOINTS**

- Semi-moveable, thus allows only limited movement.
- Joints in which the bones are attached to each other by cartilage.
- These joints allow for only a little movement, such as in the spine or ribs.

### **SYNOVIAL JOINTS**

- Freely moveable, as much as the shape of the articulating surface will allow.
- Cavities between bones in joints are filled with synovial fluid (from a synovial membrane) helps lubricate and protect the bones.
- Joint enclosed by fibrous capsule (ligaments).
- Surfaces lined with cartilage to absorb shocks and reduce friction.

## TYPES OF SYNOVIAL JOINTS:

- Ball and Socket
- Hinge
- Pivot
- Saddle
- Gliding
- Condyloid

**Day 55 and 56**

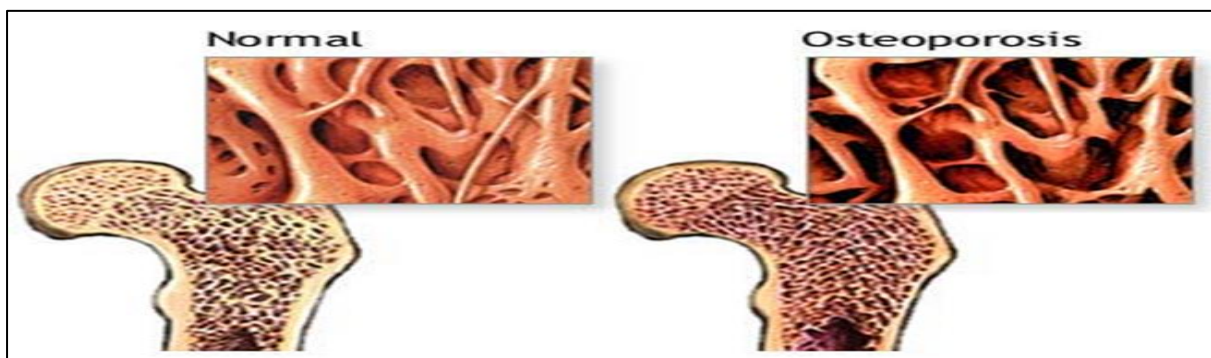
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## **DISEASE THAT AFFECT THE SKELETON**

### OSTEOPOROSIS

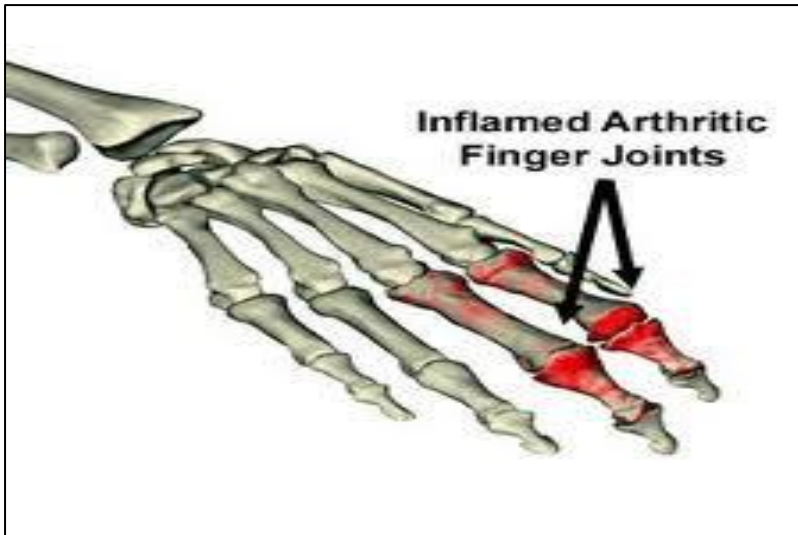
After the age of 35, bone loss increases very gradually as part of the natural ageing process. This bone loss becomes more rapid in women for several years following the menopause and can lead to osteoporosis and an increased risk of broken bones, especially in later life.

Having osteoporosis does not automatically mean that your bones will break; it just means that you have a 'greater risk of fracture'



## TYPES OF ARTHRITIS

- Osteoarthritis - common 'wear and tear' arthritis.
- Rheumatoid - an inflammatory condition caused by the immune system.
- Juvenile arthritis - three common types of arthritis that can affect children.



**Revise Topic 7. Additional revision activities will be provided and class discussions and debates (if possible) will be held to lay down knowledge.**

Complete **TOPIC QUESTION** on page 165 in your Life Science, Via Afrika textbook.

**END TOPIC 7**



