



3055 BA SANGAM COLLEGE

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Week 11

School: Ba Sangam College

Year: 12

Subject: Biology

Name: _____

Strand	1 – Structure and Life Processes
Sub strand	1.4 – Comparative Form and Function in Plants and Animals
Content Learning Outcome	-Discuss the transport mechanisms in plants and animals.

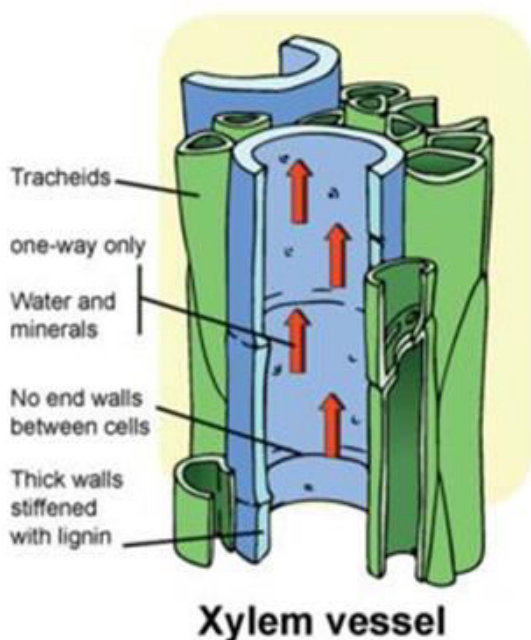
TRANSPORT

- All organisms have adaptations for getting nutrients and exchange gases.
- Complex organisms --- connects with their nutrition and gas exchange systems.
- Small or inactive organisms- Diffusion alone takes care of their transport needs.
- Active organism- efficient transport system to supply their cells with food and oxygen

TRANSPORT IN VASCULAR PLANTS

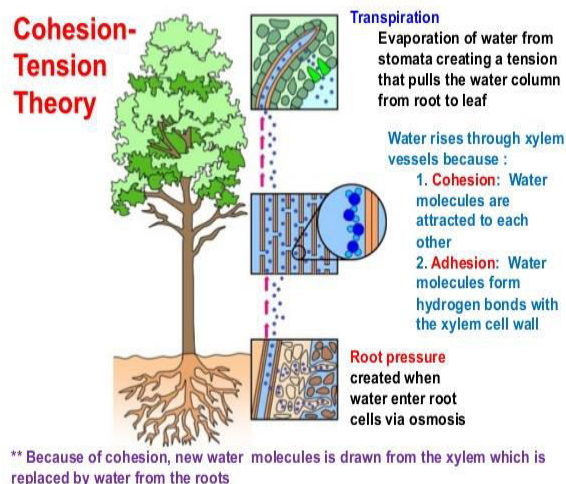
- Plants with conducting bundles (xylem- water and phloem- food)
- Eg: Flowering and seed plants, trees, ferns conifers
- Non-vascular plants- liverworts, mosses and algae----live in moist habitat—direct water diffusion.

XYLEM – THE TRANSPORT OF WATER AND MINERALS



- Xylem- carries water and dissolved minerals through plants.

Water Transport

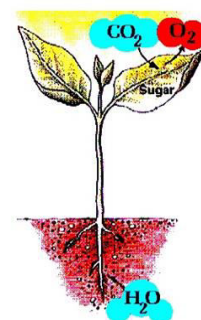


- Plants need enough water:
 - to remain **turgid**
 - to use in photosynthesis
- They also must lose a lot of water by transpiration in order to pull water up from the roots.

Phloem

Transport of Water and Minerals in Plants

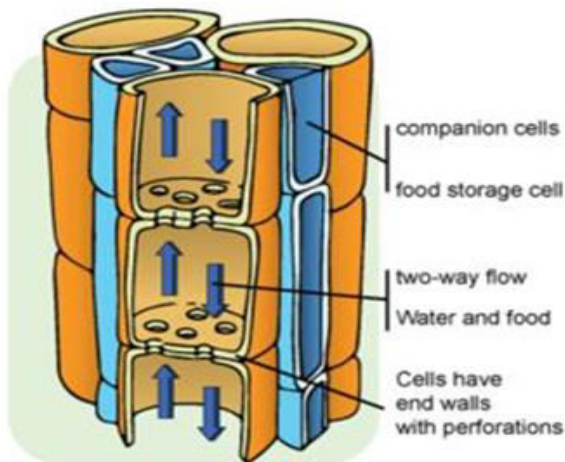
- Most plants secure the water and minerals they need from their roots.
- The path taken is: soil -> roots -> stems -> leaves
- The minerals (e.g. K^+ , Ca^{2+}) travel dissolved in the water (often accompanied by various organic molecules supplied by root cells)



- Phloem -----carrying food from leaves to all other parts of plants.
- Plant starch (carbohydrate) is produced by photosynthesis and is too large to pass through cell membranes, therefore is hydrolysed -----sucrose for transport through phloem.
- The solution of water, sucrose and other food molecules (organic materials) in the

phloem is called **sap**. The transport of the sap is called **translocation**.

- Sap in the phloem is under very high pressure. This pressure helps push sap through phloem.



Phloem vessel

Transport In Animals

- Small or sessile organisms -----by diffusion.
- Larger, more active organisms -----specialised organ system for bringing food and oxygen to and waste away from their cells.

Transport in a Grasshopper

- In a grasshopper, a long heart pumps blood into an open body cavity called a **haemocoel**.
- The blood in the haemocoel bathes the body cells directly and is not enclosed in blood vessels.
- Arthropod blood transports nutrients and cellular wastes.

Insect blood has no haemoglobin therefore; it's not red on colour. It has greenish-yellow blood which contains nutrients and body wastes, but no oxygen.

Adaptive Value for a closed circulatory system

- A closed system is necessary in larger animals for the following:
 - 1) Artery contraction can adjust the amount of blood flowing to each part of the body according to its activity level.
 - 2) A large animal filled with blood would suffer great difficulty walking with so much fluid sloshing around. If it ever tripped and felt it would burst open.

3) Blood flow through a body cavity is too slow to supply enough oxygen to the cells of larger animals.

- For small organisms such as insects, the blood flow through a body cavity is fast enough to supply sufficient nutrients to their body cells.
- Insects do not rely upon their transport system to supply oxygen to their cells.
- Open circulation is not quick enough.
- Insects and spiders have a separate **tracheal system** that allows gases to diffuse directly to their cells.

Exercises

1. What 3 factors are believed to help water move up through xylem. Describe how each force works. **(3 marks)**

2. How do plants absorb water from soil? How do they absorb minerals? **(2 marks)**

3. Describe how food is transported in vascular plants. **(1 mark)**

4. What is the difference between open and closed circulation? Give an example of an organism with each kind of circulation? **(2 marks)**

5. State how many chambers the heart of each of the following animals has: a frog-_____

A mynah-_____ a dog-_____

A fish-_____ **(2 marks)**