

CHOONG HAN JUN (COPYRIGHTED) ©

# SYSTEMS: Transport System in Living Things

# CHAPTER ANALYSIS



## 6 KEY CONCEPTS

- Explain the need for a transport system in multicellular organisms
- Identify the parts of the human circulatory system and their respective functions
- State how diffusion facilitates the transport of substances in animals
- Show an awareness of how the various parts of the plant transport system work together to transport useful substances within the plant
- State how diffusion facilitates the transport of substances in plants
- State how osmosis facilitates the absorption of water at the roots



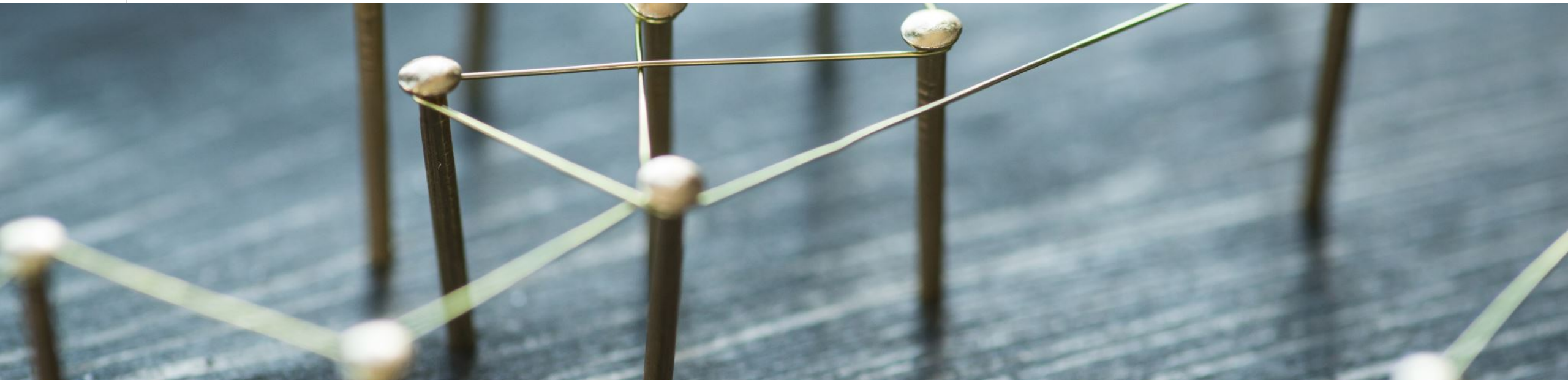
## 1 ADVANCED CONCEPTS

- Infer from investigations that particles move from a region of higher concentration to a region of lower concentration

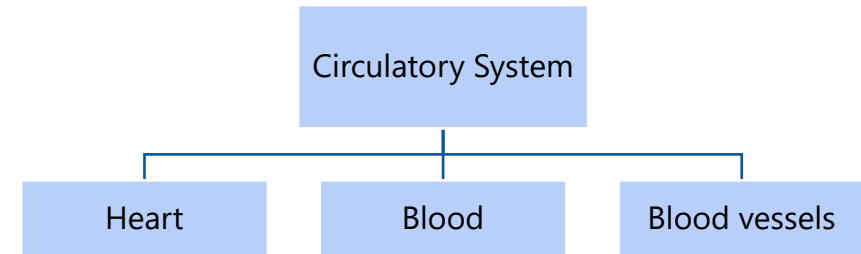


KEY CONCEPT

# HUMAN TRANSPORT SYSTEM



# HUMAN TRANSPORT SYSTEM



## Role of the heart

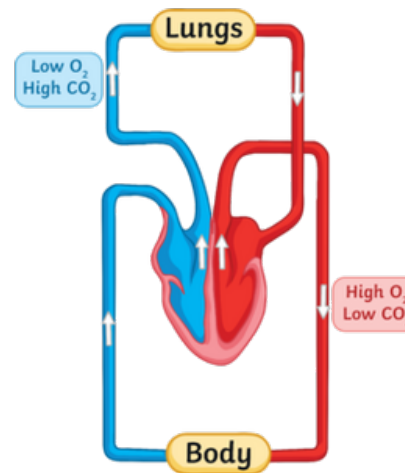
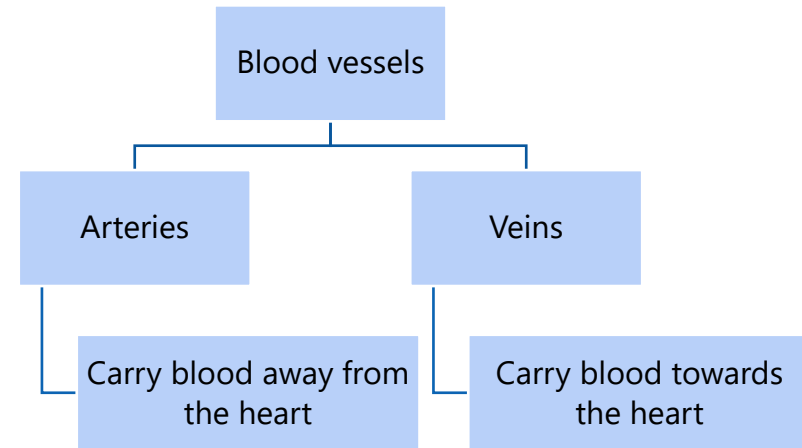
- The heart is an organ that pumps blood around the body
- The heart contains blood vessels which carry blood

## Role of blood

- Blood carries substances to and from cells in the body
  - Nutrients, oxygen, carbon dioxide
- Blood contains *red blood cells* suspended in a pale yellow liquid called *plasma*

Red blood cells	Plasma
<ul style="list-style-type: none"> <li>• No nucleus</li> <li>• Contains <i>haemoglobin</i> which binds to oxygen to carry it around the body</li> <li>• Bright red when carrying oxygen</li> </ul>	<ul style="list-style-type: none"> <li>• Made up of water and dissolved substances including nutrients (glucose, amino acids, fatty acids) and waste substances</li> </ul>

# BLOOD VESSELS

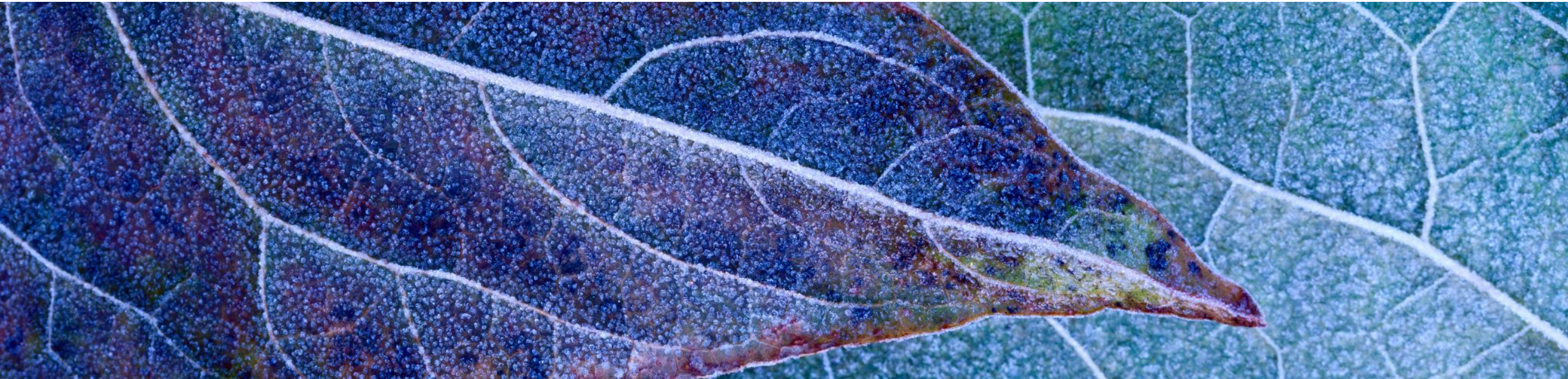


- Blood is pumped from the heart to the lungs to remove CO<sub>2</sub> and obtain O<sub>2</sub>
- Blood returning from the lungs is pumped to the rest of the body to provide O<sub>2</sub> to cells
- Arteries branch into networks of smaller vessels (capillaries) which lie close to cells. Food and oxygen pass from capillaries into cells and waste products are passed from cells into capillaries
- Capillaries join together to form veins, which carry blood back to the heart and lungs



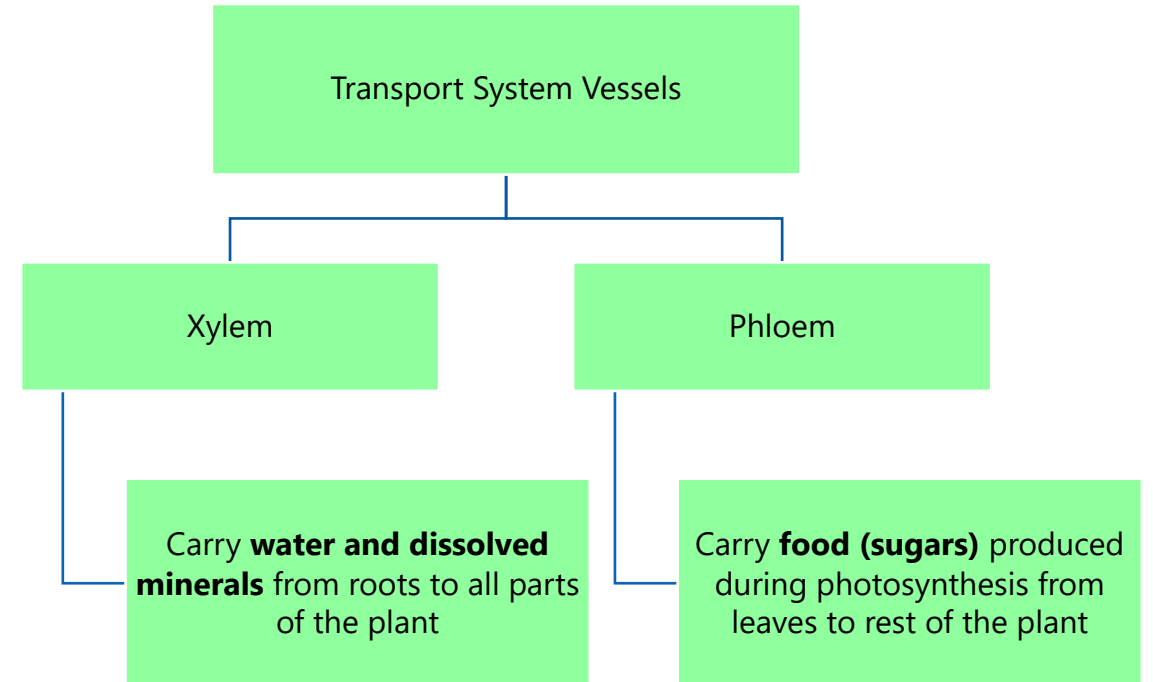
KEY CONCEPT

# PLANT TRANSPORT SYSTEM





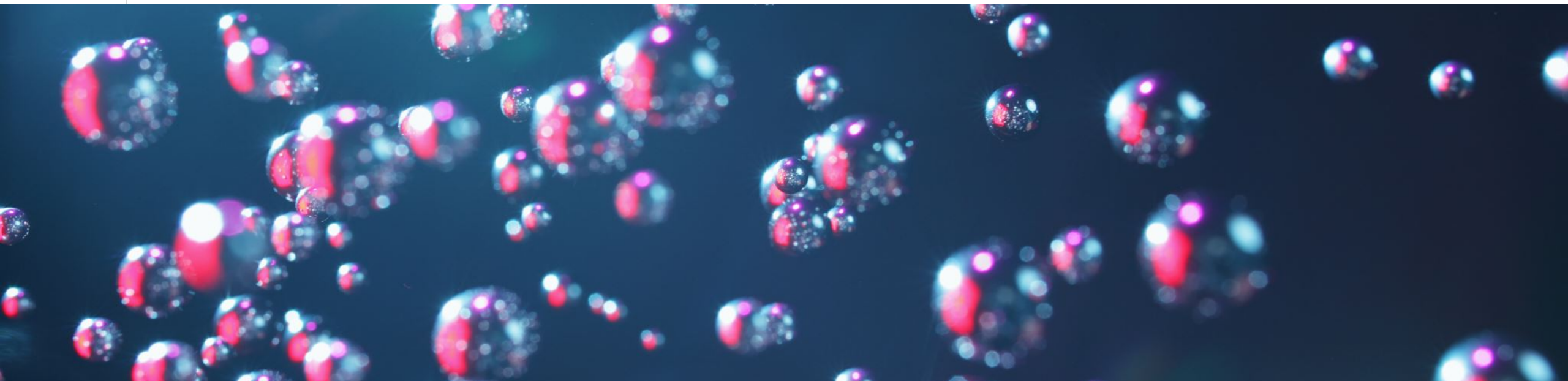
# PLANT TRANSPORT SYSTEM



- The xylem and phloem run side by side forming bundles called *vascular bundles*

KEY CONCEPT

# MODE OF TRANSPORT

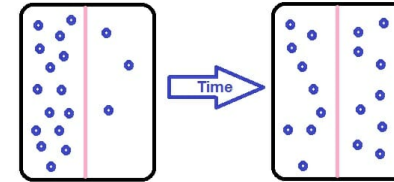




# DIFFUSION & OSMOSIS

## DIFFUSION

Definition: Diffusion is the overall movement of molecules from a region of higher concentration to a region of lower concentration.



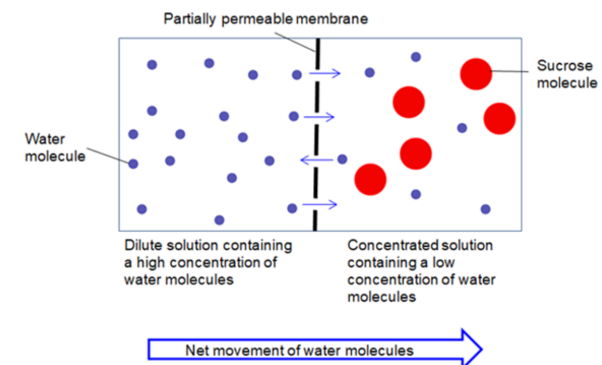
### **Diffusion through a membrane**

Membranes have pores that allow small molecules to pass through, but not large molecules.

These are called *partially permeable membranes*.

## OSMOSIS

Definition: Osmosis is the overall movement of **water molecules** from a region of higher water concentration to a region of lower water concentration through a partially permeable membrane.



A detailed microscopic image of several red blood cells. The cells are spherical with a bumpy, textured surface and a deep red color. They are clustered together, with some in sharp focus in the foreground and others blurred in the background.

# IMPORTANCE

## **IN THE HUMAN BODY**

### **Diffusion**

- Small molecules of food diffuse through the walls of the small intestine into the bloodstream
- Oxygen from the air in the lungs diffuses into the bloodstream
- Oxygen moves out of red blood cells and diffuses from blood into cells (through cell membranes)
- Waste products produced in cells diffuse out from cells into the bloodstream

## **IN FLOWERING PLANTS**

### **Photosynthesis**

- Carbon dioxide diffuses from the air into cells of the leaves
- Oxygen produced diffuses from cells in the leaves into the air

### **Absorption of water and minerals**

- Water enters root hair cells via osmosis (concentration of water in the soil is higher than in the cell sap of the root hair cells)
- Dissolved minerals diffuse into root hair cells (when concentration of minerals in the soil is higher than in root hair cells)



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