**B4 It’s a green world - summary**

Explain how leaves are adapted for efficient **photosynthesis**:

• broad so large surface area;

• thin so short distance for gases to travel;

• contain chlorophyll to absorb light; - different pigments absorb different wavelengths

• have a network of veins for support and transport;

• stomata for gas exchange.

The cellular structure of a leaf is adapted for efficient photosynthesis:

• epidermis is transparent;

• palisade layer at the top containing most of the chloroplasts;

• air spaces in the spongy mesophyll allow gas exchange by diffusion.

• internal surface area / volume ratio very large.

 **Weak solution Concentrated solution**

**Osmosis** is the net movement of water molecules from an area of high water concentration to an area of low water concentration across a partially-permeable membrane.

**Transpiration** provides plants with water for cooling, photosynthesis, support, movement of minerals.

 Turgor pressure supports plant tissues



**Xylem**:

Structure - thick strengthened cellulose cell wall with a hollow lumen (dead cells);

Function -transpiration - movement of water and minerals from the roots to the shoot and leaves;

**Phloem**:

Structure - columns of living cells.

Function - translocation - movement of food substances (sugars) up and down stems to growing and storage tissues.

Transpiration rate is increased by: \* increase in light intensity; \*increase in temperature;

\* increase in air movement; \*decrease in humidity.

Plants require the following minerals:

**Nitrogen** to make amino acids and proteins; **Phosphorus** to make DNA and cell membranes;

**Potassium** to help enzymes (in photosynthesis and respiration); **Magnesium** to make chlorophyll.

Minerals are taken up into root hair cells by **active transport** (movement of substances from low concentrations to high concentrations). Active transport uses energy from respiration.

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**Intensive farming Organic farming**

Increases productivity- produces more food cheaply More labour intensive – more expensive

Uses pesticides to kill pests Uses animal manure / compost, crop rotation

Uses herbicides to kill weeds Hand weeding and biological pest control

Pesticides may accumulate in food chains

Uses artificial fertilisers

May cause eutrophication of rivers and lakes

Raises ethical issues

Fish farming, battery hens, hydroponics

Key factors in the process of decay:

presence of microorganisms; temperature; oxygen; moisture.

Detritivores (earthworms, maggots, woodlice ) feed on dead and decaying material (detritus). They increase the rate of decay by producing larger surface area.

Decay involves saprophytic nutrition by bacteria and fungi.

Food preservation techniques reduce the rate of decay:

 canning; cooling; freezing; drying; adding salt / sugar; adding vinegar

**Limiting factors of photosynthesis**

1) light

2 )carbon dioxide

3) temperature

Photosynthesis timeline

Greek scientists concluded that plants gain mass from soil minerals

Van Helmont – plants gain mass by taking in water

Priestley – plants produce oxygen

**Photosynthesis –** only occurs in the day

 **(light)**

**6co2 + 6H2o c6H1206 + 6o2**

 **(chlorophyll)**

Two stage process

1)light splits water into oxygen gas & hydrogen ions

2)carbon dioxide gas then combines with hydrogen ions to make glucose & water

Glucose is converted into

1) energy to survive by respiration

2) lipids for storing in seeds

3) amino acids to make proteins by combining with nitretes

4) cellulose to make cell walls

5)starch, for storage (insoluble so it can’t dissolve in water and move away, doesn’t affect water concentration

**Estimate population size**

\* Quadrat \* Capture-Recapture

**Distribution of organisms**

\* Transects \* Kite diagrams

**Changes in abiotic factors (non-living, physical factors) can lead to zonation**

**Natural Ecosystems have a higher biodiversity than artificial Ecosystems**