

## 1. Key Words

Key word	Definition
Photosynthesis	Process carried out by plants that produces glucose and oxygen from water and carbon dioxide
Chlorophyll	Green pigment that absorbs light energy for photosynthesis
Chloroplasts	Organelle that is the site of photosynthesis
Transpiration	Method of transport in plants that moves water and mineral ions from the soil to the leaves
Translocation	Method of transport in plants that transports sugars and mineral ions around the plant in all directions
Xylem	Cells in the plant that carry water and mineral ions in one direction
Phloem	Cells in the plant that carry glucose and mineral ions to all cells in the plant

## 2. Uses of glucose

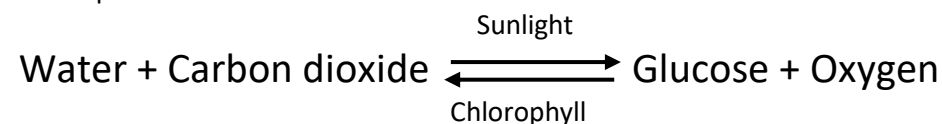
1	Respiration – to release energy in the break-down of glucose
2	Protein synthesis – in the building of protein molecules that are used for growth
3	Cellulose synthesis – used to make the cell walls of cells
4	Stored in nuts and seeds – store of glucose for when needed for respiration and growth

## 3. Minerals needed in plants

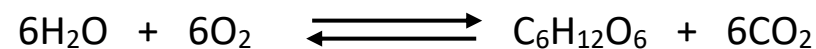
Mineral	Function	Deficiency symptoms
Nitrates	Used to make proteins for growth	Stunted growth
Magnesium	Used to make chlorophyll in plants	Yellowing leaves and dead spots

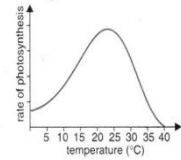
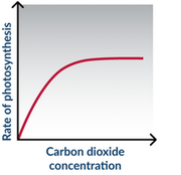
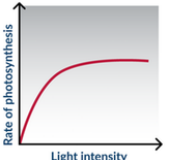
## 4. Factors affecting the rate of photosynthesis

Word equation:

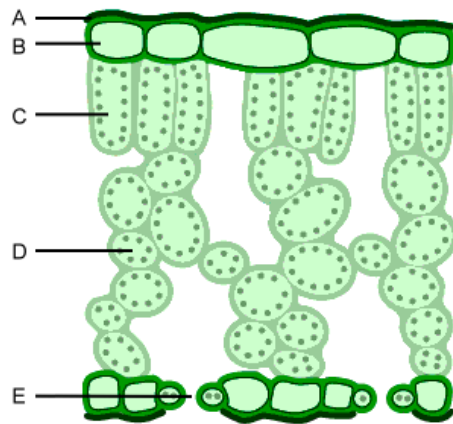


Symbol equation (HT Only)



Factor	Effect	Pattern
Temperature	Increase in temperature increases the rate to a maximum then further increases decrease the rate as the enzymes start to denature	
Concentration of CO <sub>2</sub>	An increase in CO <sub>2</sub> , increases the rate of reaction to a maximum, then further addition of CO <sub>2</sub> does not affect the rate of reaction	
Light intensity	An increase in light intensity, increases the rate of reaction to a maximum, then further increase in light intensity does not affect the rate of reaction	

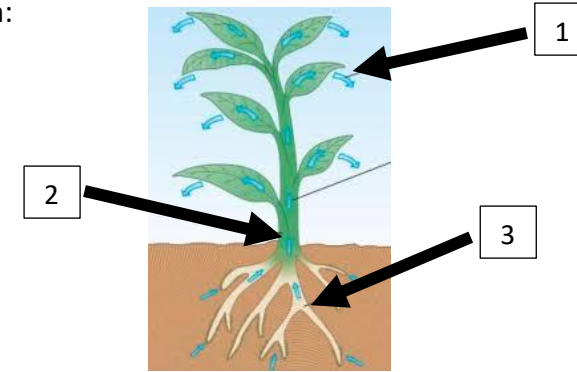
## 5. Adaptations for photosynthesis



	Part of leaf	Adaptation	Why this increases photosynthesis
A	Waxy cuticle	Waterproof	Prevents excess evaporation of water
B	Epidermis	Transparent	Allows light to pass through to the palisade cells
C	Palisade cells	Contain lots of chloroplasts and long thin cells	Allows more photosynthesis to occur
D	Spongy Mesophyll cells	Large air spaces between cells	Increases surface area for gas exchange
E	Guard cells	Can change shape to open and close the stoma	Opens stoma for gas exchange, but can close to reduce transpiration

## 6. Transport in plants

Transpiration:



- Water evaporates out of the leaves
- This pulls water through the plant from the roots, through the stem to the leaf using water turgor
- Water is absorbed into the root hair cells by osmosis

Factor affecting rate of transpiration	Effect
Humidity	Increase in humidity, decreases the concentration
Temperature	Increase in temperature increases the evaporation rate
Wind speed	Increase in wind speed maintains a high concentration gradient

## 7. Key Words

Key Word	Definition
Aerobic respiration	Release of energy from the break-down of glucose using oxygen
Anaerobic respiration	Release of energy from the incomplete breakdown of glucose in the absence of oxygen
Fermentation	Release of energy in plant and yeast cells from the break-down of glucose in the absence of oxygen
Oxygen Debt	Volume of oxygen required to break-down lactic acid in the muscles after respiration
Muscle fatigue	Where muscles can no longer contract and relax to cause movement, caused by the build-up of lactic acid

## 8. Word equations

### Aerobic respiration

Glucose + Oxygen  $\longrightarrow$  Carbon dioxide + Water (+energy)

### Anaerobic respiration

Glucose  $\longrightarrow$  Lactic acid (+energy)

### Fermentation

Glucose  $\longrightarrow$  Carbon dioxide + Ethanol

## 9. Metabolism

Definition	Sum total of the reactions in the cells of the organism
Examples of reactions	<ul style="list-style-type: none"> <li>• Break-down of amino acids to urea</li> <li>• Conversion of glucose to starch, glycogen and cellulose</li> <li>• Respiration</li> <li>• Formation of fats and proteins</li> </ul>
Factors affecting the metabolic rate	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Genetics</li> <li>• Lifestyle (diet and exercise levels)</li> </ul>