

Photosynthesis				
1	Photosynthesis	plants make their own food by absorbing and using light energy to react carbon dioxide and water		
2	Photosynthetic reaction	$\text{carbon dioxide} + \text{water} \xrightarrow{\text{light}} \text{glucose} + \text{oxygen}$ $6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$		
3	Photosynthesis description	photosynthesis is an endothermic reaction: energy is transferred via the light pathway to the chloroplasts		
4	Chloroplasts	specialised cells where photosynthesis takes place		
5	Chlorophyll	the green pigment able to absorb sunlight		
6	Rate of Photosynthesis	the amount of oxygen produced in a set time		
7	Limiting Factors	conditions that limit the rate of photosynthesis		
		carbon dioxide concentration	light intensity	temperature
8 Required Practical: Investigate the effect of light intensity on the rate of photosynthesis				
A	Independent Variable:	light intensity (distance from light source)		
B	Dependent Variable:	the rate of oxygen production (bubbles per minute)		
C	Control Variables:	temperature, type of plant, CO ₂ availability, background light		
D	Method:	i) place a piece of pondweed into a beaker of water ii) use a light a set distance from the plant, leave to acclimatise for 5 minutes iii) record the number of bubbles observed in 1 minute iv) repeat steps for different distances (eg 20,40,60,80cm)		
Nutrients				
9	Glucose	the sugar produced during photosynthesis		
10	Uses of glucose	<ul style="list-style-type: none"> • for respiration • stored as starch • produces fats, oils and amino acids • produces cellulose which strengthens the cell wall 		
11	Nitrates	nutrient absorbed from the soil to produce proteins		

Respiration		
12	Respiration	a continuously occurring reaction in cells that supplies all the energy needed for metabolism
13	Aerobic Respiration Reaction	$\text{glucose} + \text{oxygen} \longrightarrow \text{carbon dioxide} + \text{water}$ $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \longrightarrow 6\text{CO}_2 + 6\text{H}_2\text{O}$
14	Respiration is exothermic	respiration is an exothermic reaction: energy is transferred from the reaction, to the cytoplasm
15	Aerobic respiration	respiration with oxygen energy is released
16	Anaerobic respiration	respiration without oxygen less energy is released
16a	a) in muscles	glucose \longrightarrow lactic acid
16b	b) in plants	glucose \longrightarrow ethanol + carbon dioxide
16c	c) in yeast cells	glucose \longrightarrow ethanol + carbon dioxide
17	Fermentation	anaerobic respiration in yeast cells
Response to Exercise		
18	Energy need	energy demand is increased energy during exercise
19	Breathing rate	increases to supply more oxygen to the blood
20	Breath volume	increases to supply more oxygen to the blood
21	Heart rate	increases to carry oxygenated blood to the muscles
22	Insufficient oxygen	anaerobic respiration also takes place in the muscles
23	Oxygen debt	oxygen is needed to break down the lactic acid from anaerobic respiration
24	Fatigue	muscles stop contracting efficiently during long periods of intense exercise
Metabolism		
25	Metabolism	all the reactions together in a cell or body
26	Metabolic processes	chemical reactions that control living processes
26a	a) glucose	converted to starch, glycogen and cellulose
26b	b) lipids	formed from a molecule of glycerol and three molecules of fatty acids
26c	c) amino acids	used to form proteins in protein synthesis
26d	d) respiration	controls the rate of respiration
26e	e) waste	excess proteins form urea for excretion