Name		Teacher		TG	

Year 8 Science
Independent Learning Booklet

Homework	Set	Due wb	Booklet	Seneca	Parent	Teacher
1	19/02/24	26/02/24				
2	26/02/24	4/03/24				
3	4/03/24	11/04/24				
4	11/04/24	18/04/24				
5	18/04/24	25/04/24				

Please sign to show you have checked the work

Please note

All Seneca work must be completed by the Monday wb date

All booklet work must be completed by the first lesson in this subject of the week

Seneca Learning

- Seneca Learning should be completed by the Monday of each week
- It will either be revising key content that they have covered, pre-learning new content for their subject or extending their learning beyond what we can cover in lessons
- Students should complete as much as they can
- Students who complete the Seneca work will receive praise postcards
- Students who do not complete any Seneca work will receive homework interventions

How to logon to Seneca Learning

Go to www.senecalearning.com
Click on Login
Enter your school email
(username@student.foresthillschool.co.uk)
Enter the password **seneca2020**

If the password does not work reset your password using the Forgotten Password link

If it still does not work email
passwords@foresthillschool.co.uk

ASPIRING TO EXCELLENCE TOGETHER

HARD WORK AMBITION RESPECT KINDNESS

Knowledge Organiser Y8: Respiration and Photosynthesis

Aerobic Respiration

glucose + oxygen → carbon dioxide + water (+ energy released)

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ (+ energy released)

Anaerobic Respiration

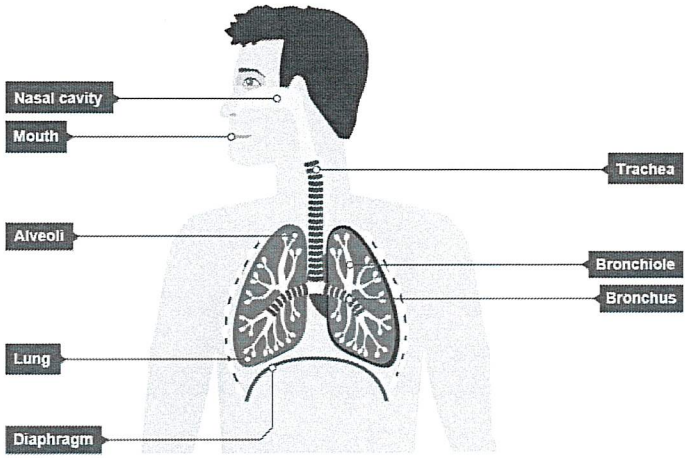
glucose → lactic acid + energy released

Glucose

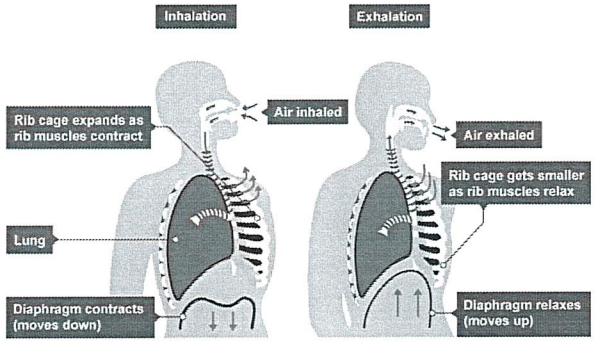
Glucose (from our diet) is absorbed into the blood once it reaches the small intestine.

It then travels in the blood to the body's cells.

The Respiratory System



Breathing



The impact of exercise

Muscles need energy to contract. While exercising, the muscles need additional energy therefore:

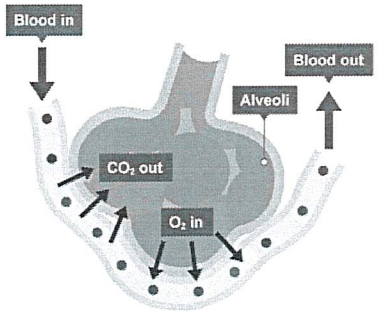
- The **breathing rate and volume of each breath increases** to bring more oxygen into the body and remove the carbon dioxide produced.
- The **heart rate increases**, to supply the muscles with extra oxygen and remove the carbon dioxide produced.

Smoking

Tobacco smoke contains many harmful substances. These include:

Tar	Causes cancer of the lungs, mouth and throat.
Smoke	Damages the cilia (cells in the trachea and bronchi with hairs that move mucus containing microbes out of the lungs). As a result of this, smokers cough to move the mucus and are more likely to get bronchitis.
Nicotine	Nicotine is addictive. It also increases the heart rate and blood pressure, and makes blood vessels narrower than normal. This can lead to heart disease.
Carbon Monoxide	Carbon monoxide is a gas that takes the place of oxygen in red blood cells. This reduces the amount of oxygen that the blood can carry.

Gas Exchange

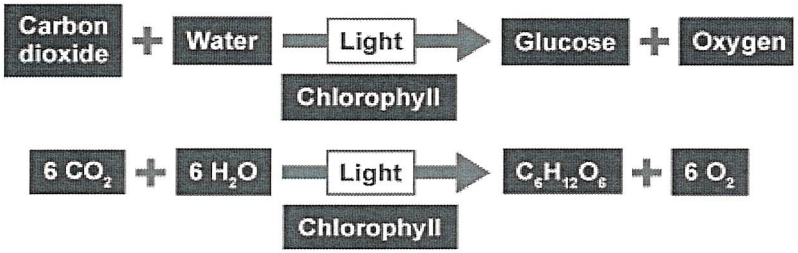


Gas exchange occurs at the **alveoli** in the lungs and takes place by **diffusion**. **Diffusion** is the movement of gas from an area of high concentration to an area of low concentration.

The alveoli are surrounded by **capillaries**. Both the capillaries and alveoli walls are **very thin** - just one cell thick. They are made of **semi-permeable membranes** which allow oxygen and carbon dioxide to pass through them.

Knowledge Organiser Y8: Respiration and Photosynthesis

Photosynthesis

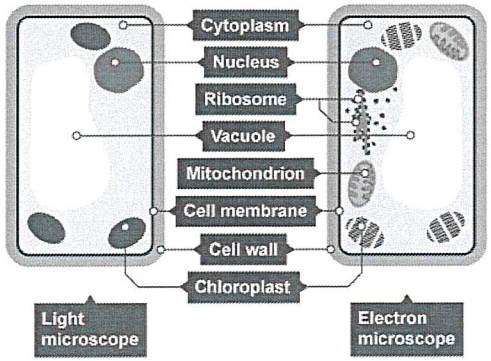


The **leaf** is where most photosynthesis takes place:

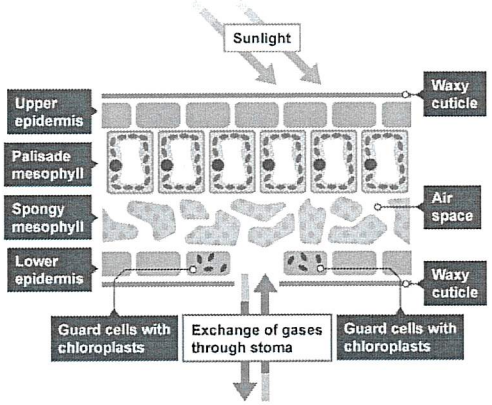
Adaptation	Explanation
Thin	Short distance for carbon dioxide to diffuse into leaf cells.
Large surface area	Maximise light absorption.
Stomata and guard cells	Control gas exchange. Stomata are tiny holes on the underside of a leaf. Guard cells control the opening and closing of the stomata.
Large amount of chloroplasts in palisade cells	To absorb light energy.
Palisade cells packed closely	To maximise light absorption.
Spongy mesophyll loosely packed	Increases surface area for gas exchange.

Photosynthesis takes place in the **chloroplasts** of plant cells.

Chlorophyll is the green pigment in chloroplasts that absorbs the light needed for photosynthesis.

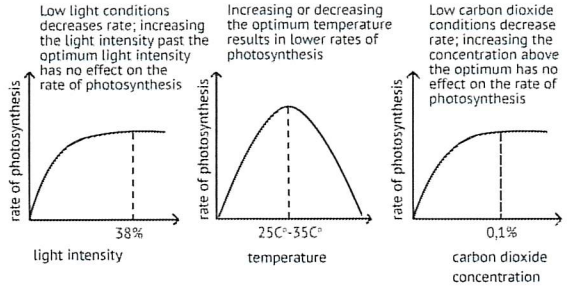


Structure of a Leaf

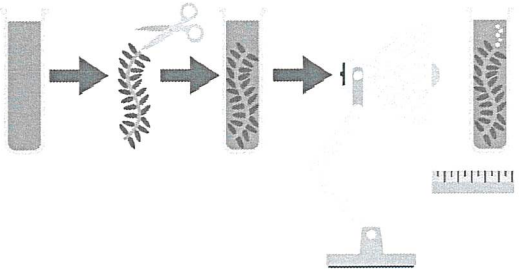


Limiting Factors

The rate of photosynthesis is affected by three main factors: temperature, light intensity and carbon dioxide concentration. A limiting factor is any factor that slows down the rate of photosynthesis if there is not enough of it.



Investigating the Rate of Photosynthesis



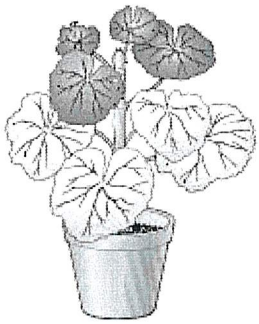
Independent: Light Intensity

Dependent: Number of bubbles in 1 min

Control: Type of pondweed/Length of Pondweed/Time/Temperature/ Carbon Dioxide Levels

HOMEWORK 1

Q1. Joe bought a potted plant. He kept it well watered but some of the leaves turned yellow.



Joe thought that the plant did **not** have enough light for photosynthesis. He moved the plant closer to the window but more leaves turned yellow.

(a) He then thought that the plant did **not** have enough minerals.
The table below gives information about minerals.

mineral	why the mineral is needed
magnesium	to make chlorophyll
nitrogen	to make protein
phosphorus	to grow and transfer energy
potassium	to make fruit

(i) Joe's plant did **not** have enough of one of the minerals in the table. Use the information in the table to suggest which mineral this was.

.....

1 mark

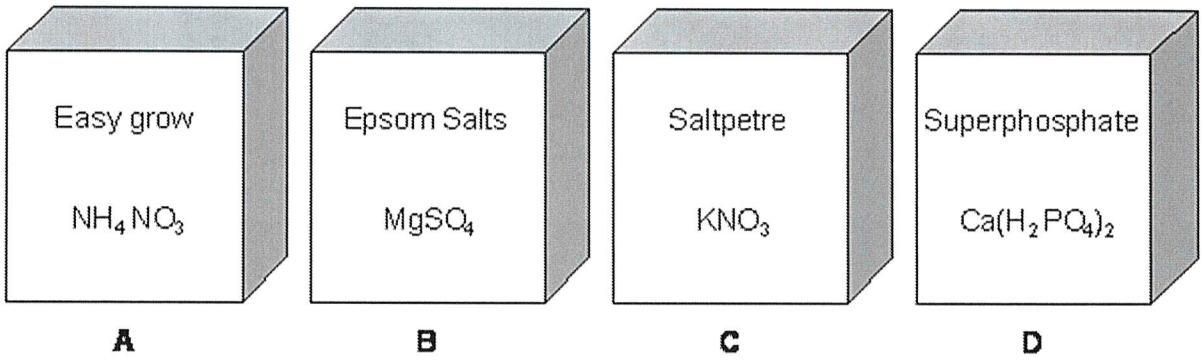
(ii) A plant growing in a pot is more likely to be affected by a shortage of minerals than a plant growing in a garden. Give the reason for this.

.....

.....

1 mark

(b) Joe bought some fertiliser for his plant.
The names and formulae of four different fertilisers are shown below.



(i) Give the letter of **one** box of fertiliser, A, B, C or D, that would provide each of the minerals in the table below.
Write the letters in the table.

mineral	letter of fertiliser
magnesium	
nitrogen	
phosphorus	
potassium	

3 marks

(ii) Easy Grow is ammonium nitrate, NH_4NO_3.

How many different elements are present in ammonium nitrate?

.....

1 mark

(iii) How many atoms are present in the formula of ammonium nitrate?

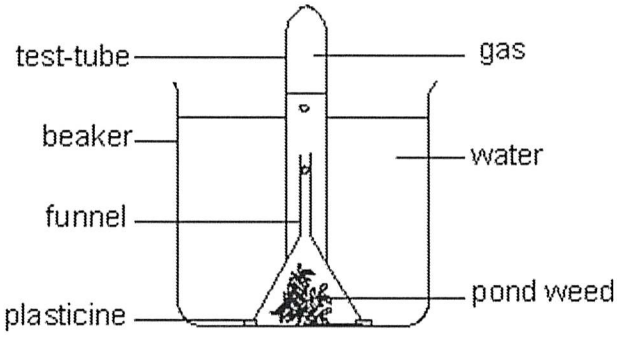
.....

1 mark

HOMEWORK 2

Homework exam questions

Q1. The drawing shows an experiment to investigate photosynthesis in weed from a pond.



Bubbles of gas produced during photosynthesis were given off from the pond weed and collected in the test tube.

(a) Name the gas given off in photosynthesis

.....

1 mark

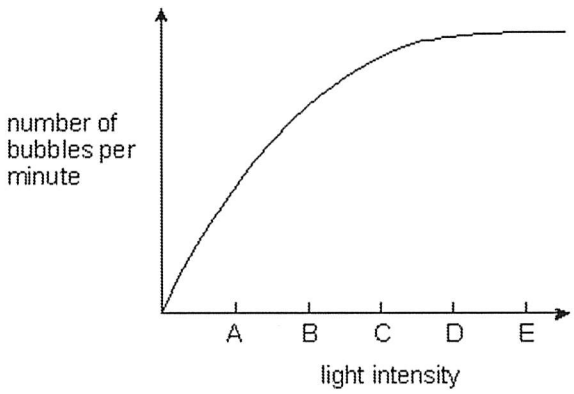
(b) What **two** substances are taken in by the plant and used for photosynthesis?

1. .....

2. .....

2 marks

Light of different intensities was shone onto the pond weed. The number of gas bubbles given off in one minute at each light intensity was counted. The results are shown in the graph.



(c) Which letter on the horizontal axis shows the light intensity at which the rate of photosynthesis first reaches its maximum?

.....

1 mark

Blue, green and red light were then shone, in turn, onto the pond weed. The number of bubbles of the gas given off in one minute was counted. The results are shown in the table.

colour of light	number of bubbles in one minute
blue	85
green	10
red	68

The leaves of the pond weed contain a green pigment which absorbs light for photosynthesis

(d) (i) Name this pigment.

.....

1 mark

(ii) Using the information in the table, tick a box by **one** colour of light which is strongly absorbed by the pigment.

blue ☐

green ☐

red ☐

1 mark

(e) Sugar is also produced during photosynthesis.

Give **two** ways in which the plant uses sugar.

1. .....

.....

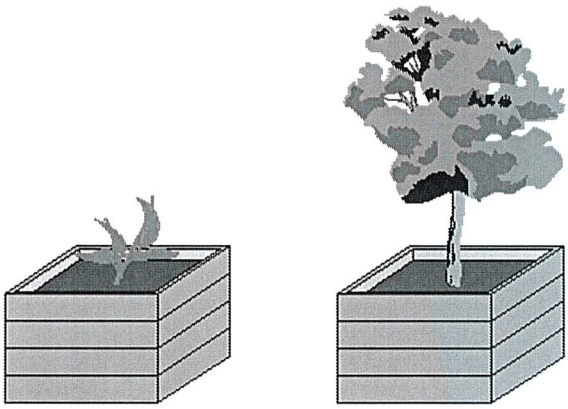
2. .....

.....

2 marks

Maximum 8 marks

Q2. In the seventeenth century a Belgian scientist, Van Helmont, planted a young willow tree in a tub of dry soil.
During the next five years he watered the plant with rain water but he did not add anything else to the tub.



at the start five years later

After five years Van Helmont removed the willow tree from the tub and weighed the tree. He also dried and weighed the soil. Results from Van Helmont's experiment are shown in the table.

	mass of willow tree, in kg	**mass of dried soil, in kg**
at the start	2.3	90.6
five years later	76.7	90.5

(a) Van Helmont concluded that the increase in the mass of the willow tree was due only to a gain in water.

(i) What **two** pieces of evidence did Van Helmont use to reach his conclusion?

.....

.....

2 marks

(ii) We now know that Van Helmont's conclusion is **not** correct.
Explain why the mass of the willow tree increased by such a large amount.

.....

.....

.....

2 marks

(b) Van Helmont believed that a plant would always grow faster if it was given more water.
We now know that this is **not** true.
Give **two** environmental conditions which can slow down the growth of a plant, even when it has plenty of water.

1. .....

.....

2. .....

.....

2 marks

(c) The fresh mass of a plant includes water. To measure plant growth accurately, scientists calculate the increase in the dry mass rather than the increase in the fresh mass of a plant.

Why is finding the increase in fresh mass **not** a reliable way to measure plant growth?

.....

.....

.....

1 mark
Maximum 7 marks

Homework 3

Photosynthesis

Use these words to fill in the gaps.

glucose	oxygen	carbon dioxide	sugar
producers	sunlight	animals	chlorophyll
water	nutrients	growth	plants

_____ + water _____ → _____ + oxygen

Photosynthesis needs:

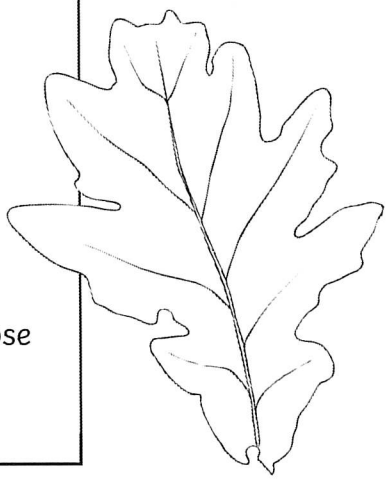
1. _____
2. _____
3. _____
4. _____
5. _____

Photosynthesis produces:

1. _____
2. _____

Photosynthesis is essential for _____ and takes place in _____.

Green plants are _____. This means that they can survive without _____. They need simple things like _____ _____-dioxide and water. Plants can make complete things like ___ _____, starch, fat and proteins. When plants are in sunlight they can make a sugar called _____. The _____gets trapped in a chemical called Chlorophyll. _____ is what makes the plant green. When plants use carbon dioxide and water to make glucose there is a lot of _____left over.



Homework 4

Q1. Scientists investigated how exercise affects blood flow to different organs in the body.

The scientists made measurements of blood flow to different organs of:

- a person resting in a room at 20°C
- the same person, in the same room, doing vigorous exercise at constant speed on an exercise cycle.

The table shows the scientists' results.

Organ	**Blood flow in cm^3 per minute whilst …**	
	resting	**doing vigorous exercise**
Brain	750	750
Heart	250	1000
Muscles	1200	22 000
Skin	500	600
Other	3100	650

(a) In this investigation, it was better to do the exercise indoors on an exercise cycle than to go cycling outdoors on the road.

Suggest **two** reasons why.

1. _____

_____

2. _____

_____

(2)

(b) Blood flow to **one** organ did **not** change between resting and vigorous exercise.

Which organ?_____

(1)

(c) (i) How much more blood flowed to the muscles during vigorous exercise than when resting?

_____

_____

Answer = _____ cm^3 per minute

(2)

10

(ii) Name **two** substances needed in larger amounts by the muscles during vigorous exercise than when resting.

1.....

2.....

(2)

(iii) Tick (✓) **one** box to complete the sentence. The substances you named in part (c)(ii) helped the muscles to

make more lactic acid. ☐

respire aerobically. ☐

make more glycogen. ☐

(1)

(iv) The higher rate of blood flow to the muscles during exercise removed larger amounts of waste products made by the muscles.

Which **two** substances need to be removed from the muscles in larger amounts during vigorous exercise?

Tick (✓) **two** boxes.

Amino acids ☐

Carbon dioxide ☐

Glycogen ☐

Lactic acid ☐

(2)

(d) The total blood flow was much higher during exercise than when resting.

One way to increase the total blood flow is for the heart to pump out a larger volume of blood each beat. Give **one** other way to increase the blood flow.

_____

_____

(1)

(Total 11 marks)

Q2. Anaerobic respiration happens in muscle cells and yeast cells.

The equation describes anaerobic respiration in muscle cells.

glucose ⟶ **lactic acid**

(a) How can you tell from the equation that this process is anaerobic?

.....

.....

(1)

(b) Exercise **cannot** be sustained when anaerobic respiration takes place in muscle cells.

Explain why.

_____

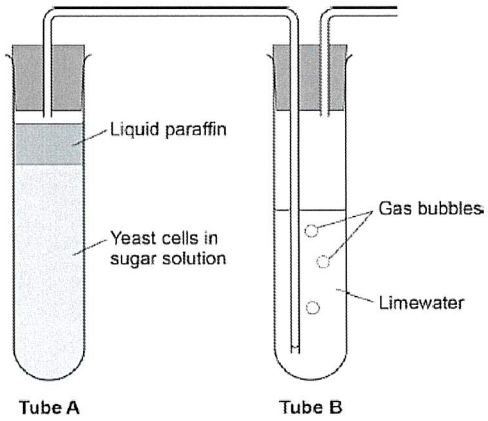
_____

_____

_____

(2)

(c) The diagram below shows an experiment to investigate **anaerobic** respiration in yeast cells.



What gas will bubble into Tube **B**?

Tick **one** box.

Carbon dioxide ☐

Nitrogen ☐

Oxygen ☐

Water vapour ☐

(1)

(d) Describe how you could use tube **B** to measure the rate of the reaction in tube **A**.

.....

.....

.....

(2)

(e) Anaerobic respiration in yeast is also called fermentation.

Fermentation produces ethanol.

Give **one** use of fermentation in the food industry.

.....

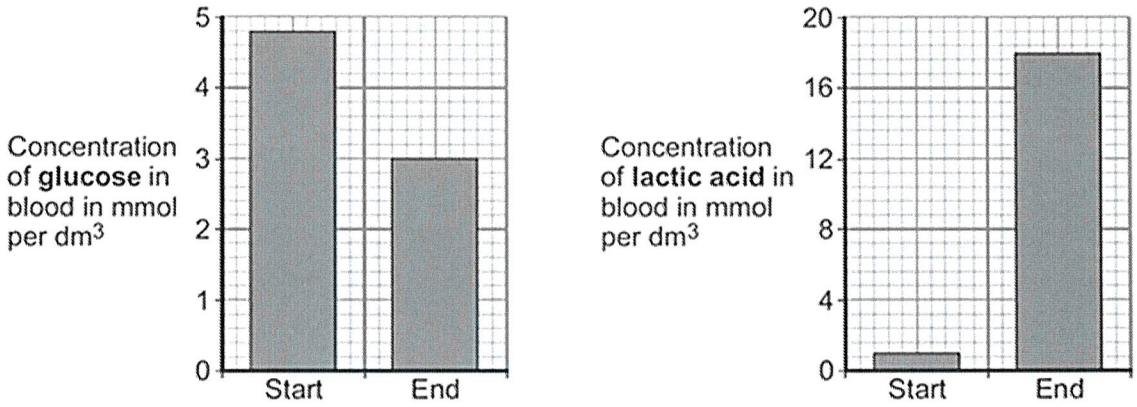
(1)

(Total 7 marks)

Q3. An athlete ran as fast as he could until he was exhausted.

(a) **Figure 1** shows the concentrations of glucose and of lactic acid in the athlete's blood at the start and at the end of the run.

Figure 1



(i) Lactic acid is made during anaerobic respiration. What does anaerobic mean?

_____

_____

(1)

(ii) Give evidence from **Figure 1** that the athlete respired anaerobically during the run.

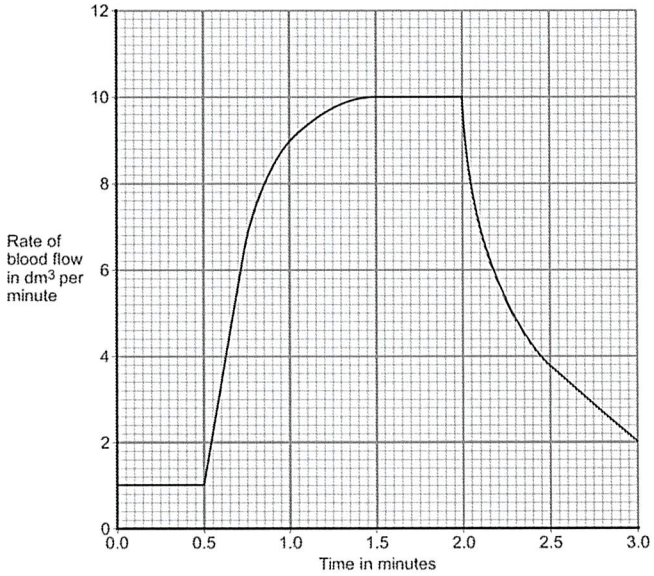
_____

_____

(1)

(b) **Figure 2** shows the effect of running on the rate of blood flow through the athlete's muscles.

Figure 2



(i) For how many minutes did the athlete run?

Time = _____ minutes

(1)

(ii) Describe what happens to the rate of blood flow through the athlete's muscles during the run.

Use data from **Figure 2** in your answer.

_____

_____

_____

_____

(2)

(iii) Explain how the change in blood flow to the athlete's muscles helps him to run.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 9 marks)

Homework 5

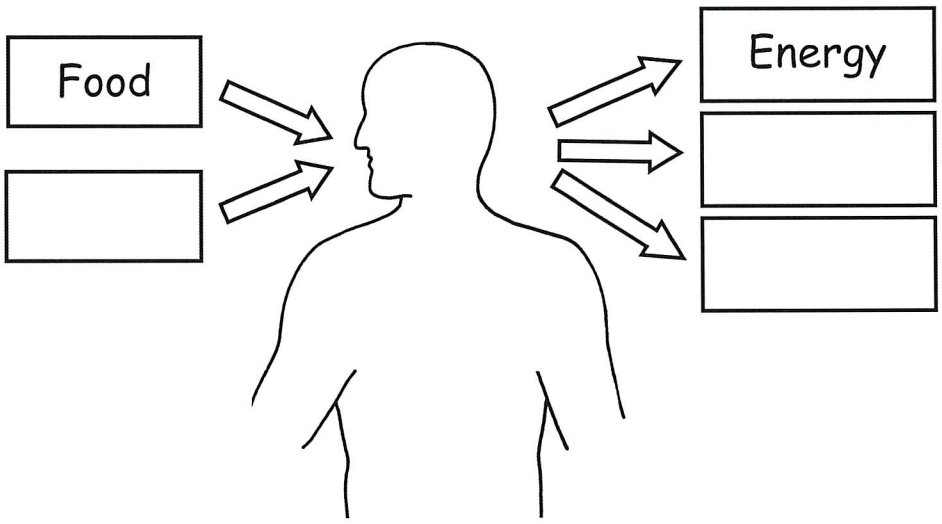
W.S.19. **Respiration.** Name .....

We need energy for movement, warmth and to keep all of the body parts working. We get our energy by reacting glucose and oxygen together in our cells. This chemical reaction is called RESPIRATION and it can be shown with a word equation.

FOOD + OXYGEN ⟹ ENERGY + WATER + CARBON DIOXIDE

Respiration is similar to burning food but it releases the energy much more slowly inside our cells.

Exercise 1 - Complete the missing labels on the diagram below.



Exercise 2 - Complete the sentences below.

1) Respiration produces useful _ _ _ _ _ _ in the cells.

2) We need energy to _ _ _ _ and to keep warm.

3) The main food substance that is used in respiration is _ _ _ _ _ _ _

4) _ _ _ _ _ _ _ _ is a similar process to respiration but it happens much more quickly.

5) The waste gas produced by respiration is C _ _ _ _ _ D _ _ _ _ _ _

6) We get rid of carbon dioxide by _ _ _ _ _ _ _ _ _ _ it out.

7) If plants did not make _ _ _ _ _ _ gas we would soon use it all up.

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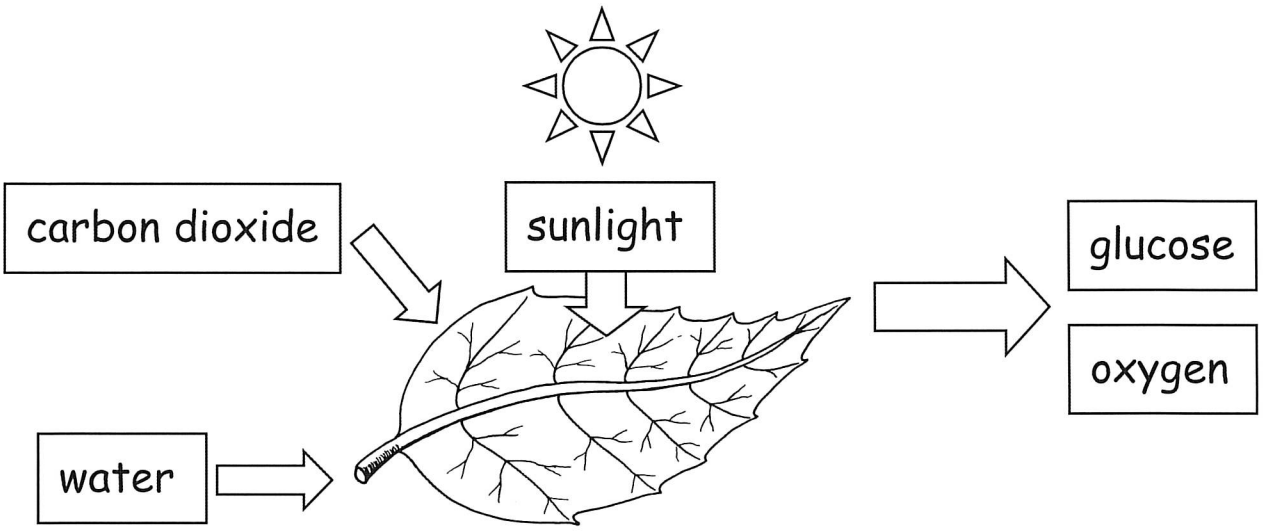
W.S.23. **Photosynthesis.** Name .....

Animals feed on plants or other animals but most plants make their own food by using light energy and simple chemicals. This process is called PHOTOSYNTHESIS. Water and carbon dioxide molecules are joined together to make GLUCOSE sugar and waste oxygen gas. This happens in the leaf cells inside tiny discs called CHLOROPLASTS. The chloroplasts contain a green chemical called CHLOROPHYLL which absorbs light energy. The diagram below shows this process.



The glucose sugar that is made may be changed into other useful chemicals for growth or storage. The plant also uses glucose as a fuel in RESPIRATION to release energy when it is needed in the cells. Respiration is the opposite process of photosynthesis :

FOOD + OXYGEN ⟹ CARBON DIOXIDE + WATER + ENERGY

Exercise - Complete the sentences below.

1) Animals can not make their own F _ _ _

2) Plants use L _ _ _ _ energy to help them make their food.

3) Photosynthesis happens in the L _ _ _ cells.

4) The gas needed for photosynthesis is C _ _ _ _ _ D _ _ _ _ _ _

5) C _ _ _ _ _ _ _ _ _ _ _ is the green chemical that absorbs light energy.

6) The opposite reaction to photosynthesis is R _ _ _ _ _ _ _ _ _ _ _

7) Plants give animals food and O _ _ _ _ _

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