

Transition Pack for A Level Biology



A level Biology will use your knowledge from GCSE and build on this to help you understand new and more demanding ideas.

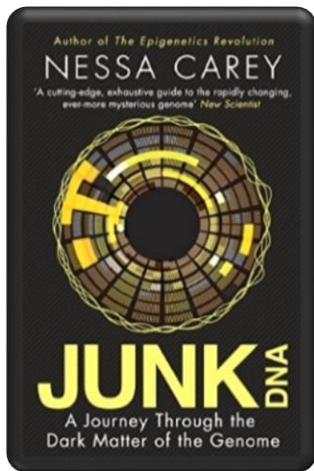
For your summer work you **must complete tasks 1 - 3**. This is to ensure that you are ready to start the course in September.

The first pages are optional but will build your independent study skills further.

You also need to bring in a **large ring binder** with file dividers to the first lesson.

Book Recommendations

Kick back this summer with a good read. The books below are all popular science books and great for extending your understanding of Biology.

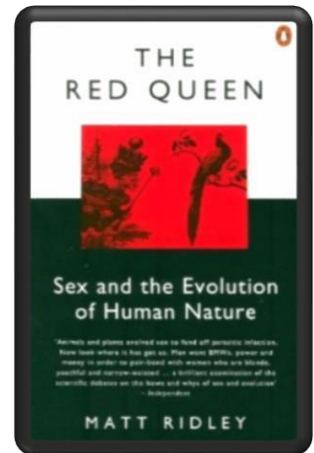


Junk DNA

Our DNA is so much more complex than you probably realize, this book will really deepen your understanding of all the work you will do on genetics. Available at [amazon.co.uk](https://www.amazon.co.uk)

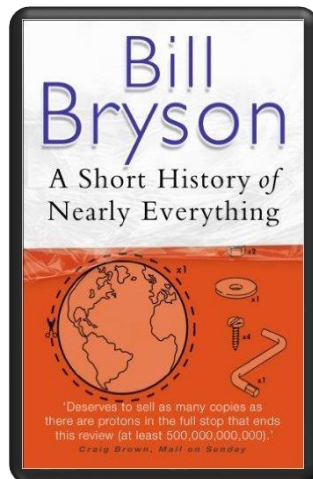
The Red Queen

Its all about sex. Or sexual selection at least. This book will really help your understanding of evolution and particularly the fascinating role of sex in evolution. Available at [amazon.co.uk](https://www.amazon.co.uk)



A Short History of Nearly Everything

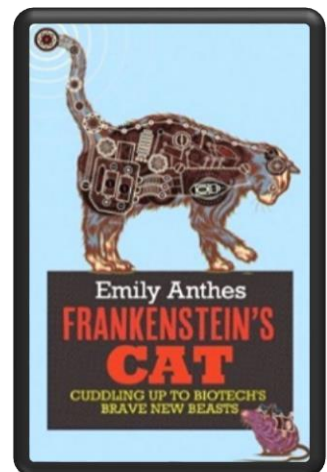
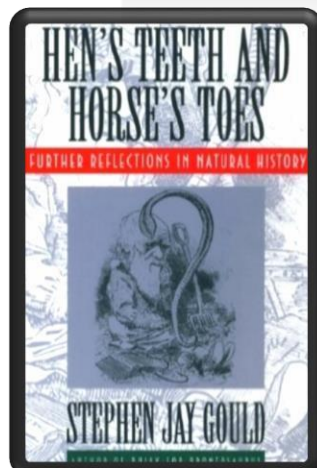
A whistle-stop tour through many aspects of history from the Big Bang to now. This is a really accessible read that will re-familiarise you with common concepts and introduce you to some of the more colourful characters from the history of science! Available at [amazon.co.uk](https://www.amazon.co.uk)



Studying Geography as well?

Hen's Teeth and Horse's Toes

Stephen Jay Gould is a great evolution writer and this book discusses lots of fascinating stories about geology and evolution. Available at [amazon.co.uk](https://www.amazon.co.uk)



Frankenstein's Cat

Discover how glow in the dark fish are made and more great biotechnology breakthroughs. Available at [amazon.co.uk](https://www.amazon.co.uk)

There are some great TV series and box sets available too, you might want to check out: Blue Planet, Planet Earth I and II, Icarus, Blackfish, The Ascent of Man, Catastrophe, Frozen Planet, Life Story, The Hunt and Monsoon.

If you have 30 minutes to spare, here are some great presentations (and free!) from world leading scientists and researchers on a variety of topics. They provide some interesting answers and ask some thought-provoking questions. Use the link or scan the QR code to view:

A New Superweapon in the Fight Against Cancer

Available at :

http://www.ted.com/talks/paula_hammond_a_new_superweapon_in_the_fight_against_cancer?language=en

Cancer is a very clever, adaptable disease. To defeat it, says medical researcher and educator Paula Hammond, we need a new and powerful mode of attack.



Why Bees are Disappearing

Available at :

http://www.ted.com/talks/marla_spivak_why_bees_are_disappearing?language=en

Honeybees have thrived for 50 million years, each colony 40 to 50,000 individuals coordinated in amazing harmony. So why, seven years ago, did colonies start dying en-masse?

What Doctors Don't Know About the Drugs They Prescribe

Available at :

http://www.ted.com/talks/ben_goldacre_what_doctors_don_t_know_about_the_drugs_they_prescribe?language=en

When a new drug gets tested, the results of the trials should be published for the rest of the medical world — except much of the time, negative or inconclusive findings go unreported, leaving doctors and researchers in the dark.



Growing New Organs

Available at :

https://www.ted.com/talks/anthony_atalla_growing_new_organs

Anthony Atalla's state-of-the-art lab grows human organs — from muscles to blood vessels to bladders, and more.

Summer Work Due in September

Task 1

Design and create an A3 poster on each of the following topics:

TOPIC 1 - cell structure and microscopes.

You should include the following information:

1. A description of the different types of microscopes and their uses.
2. An explanation of how magnification, image size, and the actual size can be calculated.
3. A description of the organelles within eukaryotic and prokaryotic cells.
4. Labelled diagrams/ images where applicable.

TOPIC 2- Exchange surfaces and breathing.

You should include the following information:

1. A description of the structure of the heart and capillaries (including diagrams)
2. An explanation of how oxygen and gases are transported in humans.
3. Transport systems within plants (xylem, phloem etc)

Use the web and other appropriate sources- for example your textbook to research this information- you will be graded on effort in September.

Scientific and Investigative Skills

As part of your A level you will complete a practical assessment. This will require you to carry out a series of practical activities as well as planning how to do them, analysing the results and evaluating the methods. This will require you to: use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH), use appropriate instrumentation to record quantitative measurements, such as a colorimeter or photometer, use laboratory glassware apparatus for a variety of experimental techniques to include serial dilutions, use of light microscope at high power and low power, including use of a graticule, produce scientific drawing from observation with annotations, use qualitative reagents to identify biological molecules, separate biological compounds using thin layer/paper chromatography or electrophoresis, safely and ethically use organisms, use microbiological aseptic techniques, including the use of agar plates and broth, safely use instruments for dissection of an animal organ, or plant organ, use sampling techniques in fieldwork.

Task 2:

Produce a glossary for the following key words:

accuracy, anomaly, calibration, causal link, chance, confounding variable, control experiment, control group, control variable, correlation, dependent variable, errors, evidence, fair test, hypothesis, independent, null hypothesis, precision, probability, protocol, random distribution, random error, raw data, reliability, systematic error, true value, validity, zero error.

Use the web and other appropriate sources- for example your textbook to research this information- you will be graded on effort in September.

Examination technique

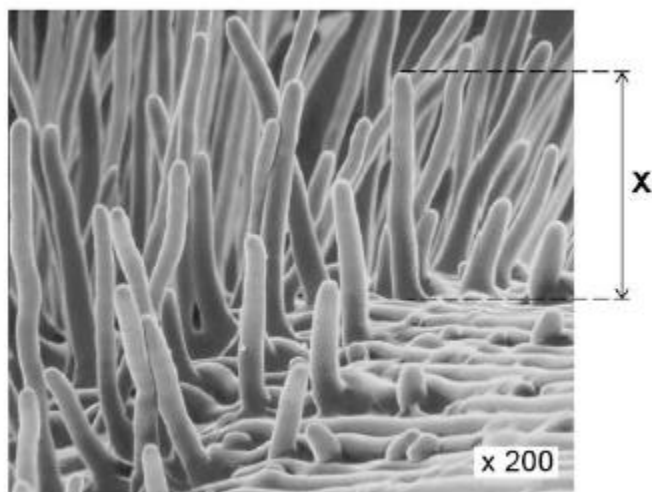
Applying knowledge to novel contexts, and across the different topics of A Level Biology, is one of the skills we will develop throughout the course. Exam question practice is an integral part of your independent learning each week so you gain plenty of experience with using your knowledge and skills in the way in which they will be assessed.

Task 3:

Complete the exam style questions below using your GCSE knowledge and what you have learnt from completing tasks 1 and 2 – you will be graded on marks gained in September.

The following exam questions are designed to test your recall, analysis and evaluative skills and knowledge.
Remember to use your exam technique: look at the command words and the number of marks each question is worth.

Q1. The image below shows part of a root from a cress plant.



- (a) What type of microscope was used to create the image above?

_____ (1)

- (b) The magnification of the cress root in the image above is $\times 200$.
There are 1000 micrometres (μm) in a millimetre (mm).

Calculate the real length of the root hair, **X**.

Give your answer in micrometres (μm).

Real length **X** = _____ μm

(2)

- (c) Root hair cells take up water from the soil.

Explain **one** way in which the root hair cell is adapted to this function.

(2)

The table shows the water uptake by a plant's roots on two different days.

	Mean water uptake in cm ³ per hour
Cold day	1.8
Hot day	3.4

- (d) Explain why the mean rate of water uptake is higher on a hot day than on a cold day.

(3)

- (e) The concentration of mineral ions in the soil is lower than in root hair cells.
Root hair cells take up mineral ions from the soil.
Root hair cells contain mitochondria.

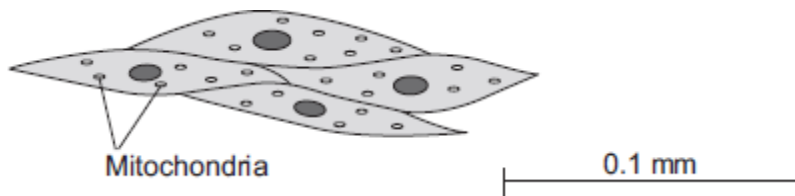
Explain why root hair cells contain mitochondria.

(4)

(Total 12 marks)

Q2.

The image below shows some muscle cells from the wall of the stomach, as seen through a light microscope.



- (a) Describe the function of muscle cells in the wall of the stomach.

(2)

- (b) The figure above is highly magnified.

The scale bar in the figure above represents 0.1 mm.

Use a ruler to measure the length of the scale bar and then calculate the magnification of the figure above.

Magnification = _____ times

(2)

- (c) The muscle cells in **Figure above** contain many mitochondria.

What is the function of mitochondria?

(2)

(d) The muscle cells also contain many ribosomes. The ribosomes cannot be seen in the figure above.

(i) What is the function of a ribosome?

(1)

(ii) Suggest why the ribosomes **cannot** be seen through a light microscope.

(1)

(Total 8 marks)

Q3.

The photograph shows a red blood cell in part of a blood clot. The fibres labelled X are produced in the early stages of the clotting process.



(a) Suggest how the fibres labelled X help in blood clot formation.

(1)

(b) The average diameter of a real red blood cell is 0.008 millimetres.
On the photograph, the diameter of the red blood cell is 100 millimetres.

Use the formula to calculate the magnification of the photograph.

Diameter on photograph = Real diameter $\times$ Magnification

Magnification = _____

(2)

(c) Some blood capillaries have an internal diameter of approximately 0.01 millimetres.

(i) Use information given in part (b) to explain why only one red blood cell at a time can pass through a capillary.

_____(1)

(ii) Explain the advantages of red blood cells passing through a capillary one at a time.

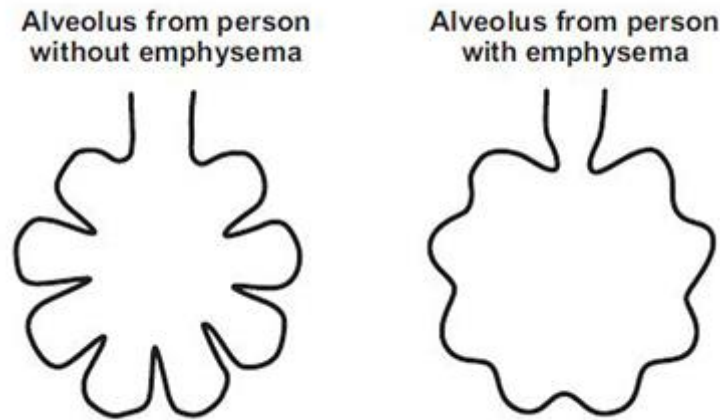
(3)

(Total 7 marks)

Q4.

Emphysema is a disease affecting the lungs. People with emphysema are often short of breath and find exercise difficult.

The diagram below shows an alveolus from a person without emphysema and an alveolus from a person with emphysema.



- (a) Describe **one** difference between the alveolus from a person without emphysema and the alveolus from a person with emphysema.

(1)

- (b) Explain how the difference you described in part (a) causes the person with emphysema to find exercise difficult.

(3)

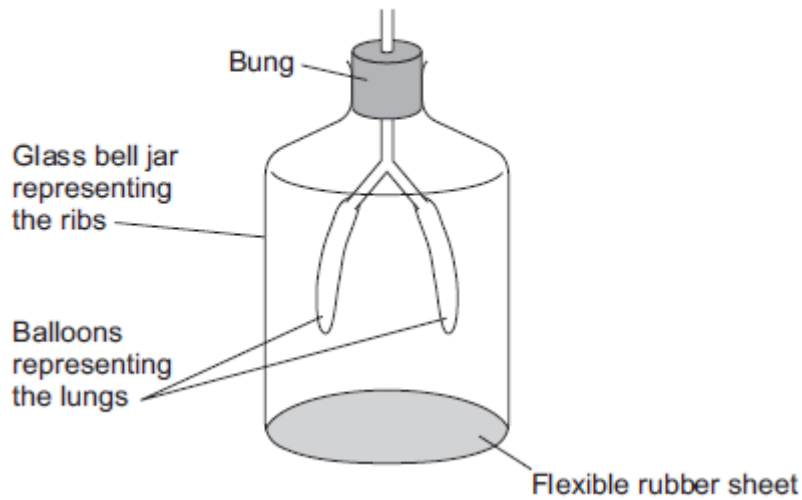
(Total 4 marks)

Q5.

Figure 1 shows a model representing the human breathing system.

The different parts of the model represent different parts of the human breathing system.

Figure 1



- (a) (i) Which part of the human breathing system does the flexible rubber sheet represent?

(1)

- (ii) Explain why the balloons inflate when the flexible rubber sheet is pulled down.

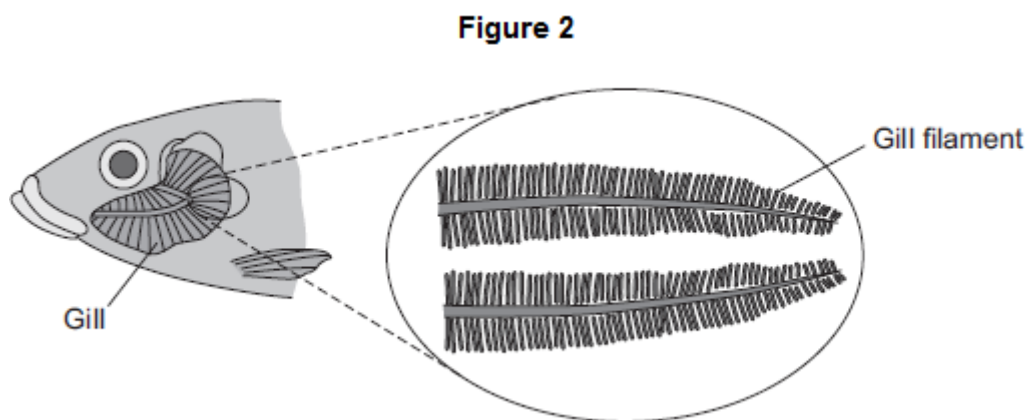
(3)

- (b) (i) During breathing, oxygen moves into the blood.

Explain how oxygen moves into the blood.

(2)

(ii) **Figure 2** shows a fish head and gill.



Fish absorb oxygen from the water. Oxygen is absorbed through the gills of the fish.

Explain **one** way in which the gills are adapted for rapid absorption of oxygen.

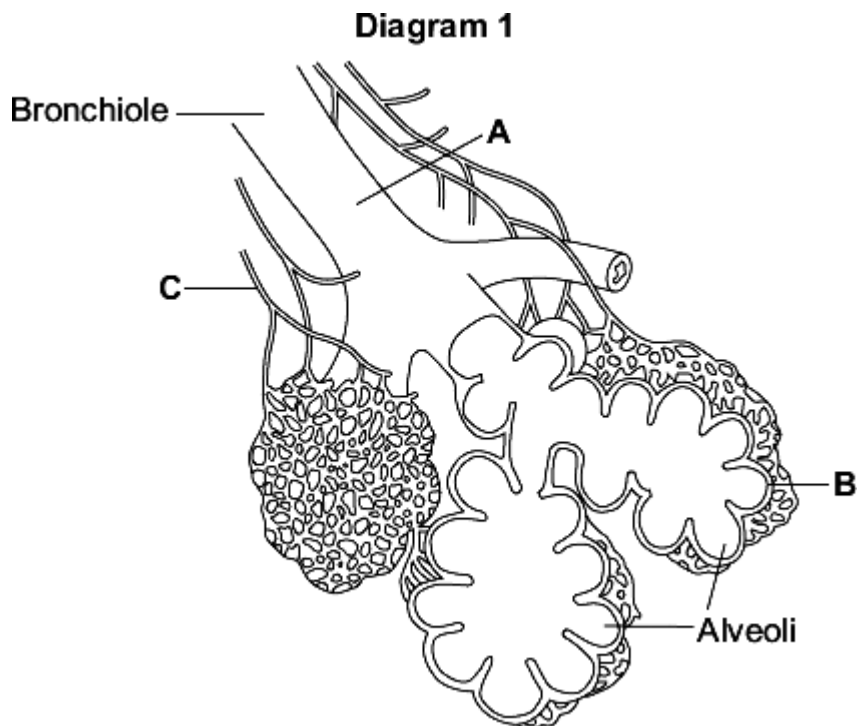
(2)

(Total 8 marks)

Q6.

People with asthma sometimes find it difficult to breathe.

Diagram 1 shows part of a human lung. Bronchioles are tubes that carry air to the alveoli.

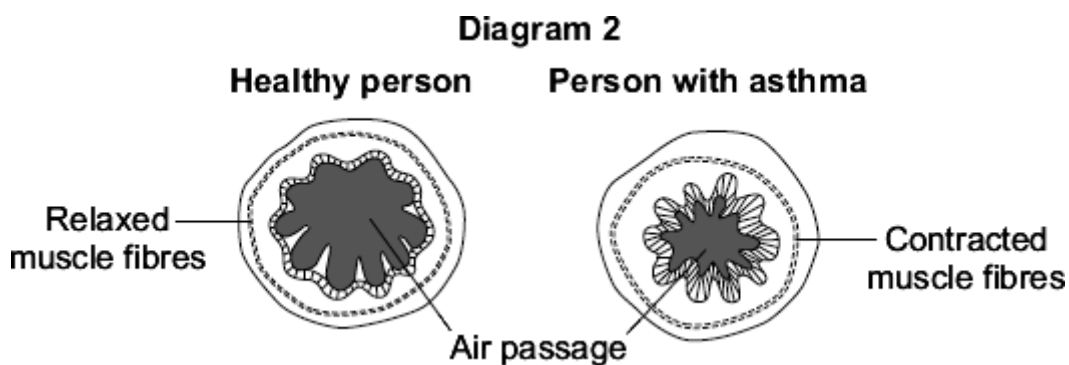


- (a) Which letter, **A**, **B** or **C**, shows where oxygen enters the blood?



(1)

- (b) **Diagram 2** shows a section through a bronchiole of a healthy person and of a person suffering from asthma.

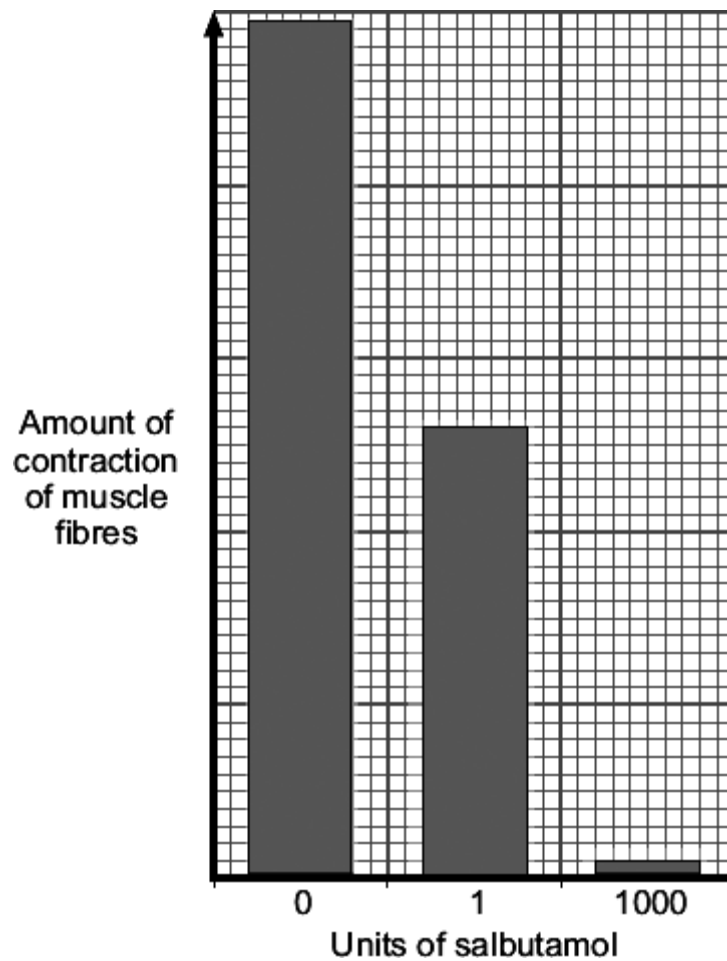


The person with asthma may find it difficult to breathe.

Use information from **Diagram 2** to give the reason for this.

(1)

- (c) A person has asthma. The bar graph shows the effect of the drug salbutamol on the contraction of the muscle fibres in the wall of this person's bronchioles.



- (i) Describe the effect of salbutamol on the person's muscle fibres.

(1)

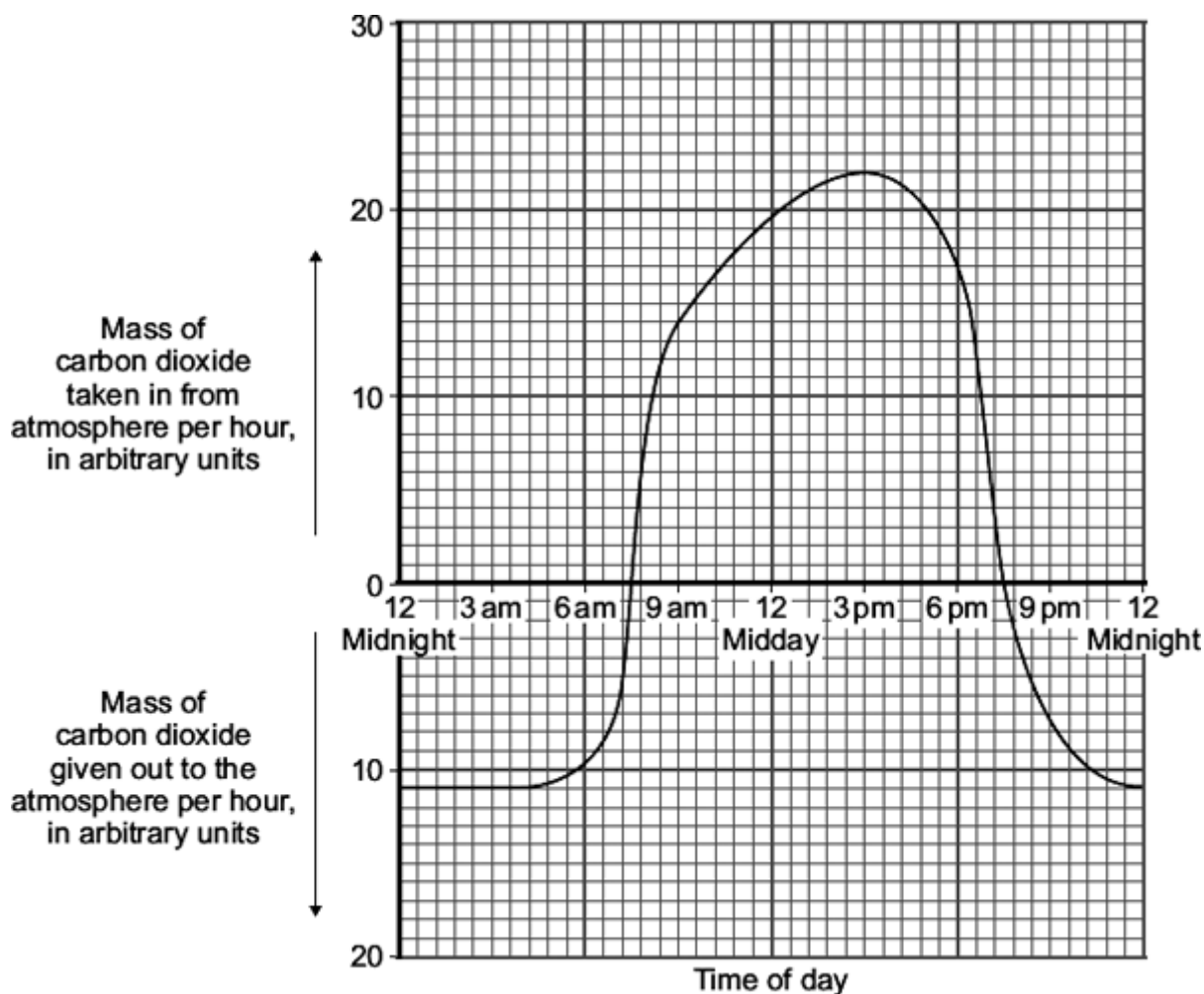
- (ii) How does salbutamol help this person?

(1)

(Total 4 marks)

Q7.

The graph shows the uptake of carbon dioxide and the release of carbon dioxide by a bean plant on a hot summer's day.



- (a) At which **two** times in the day did the rate of photosynthesis exactly match the rate of respiration in the bean plant?

(1)

- (b) The bean plant respire at the same rate all through the 24 hour period.

- (i) How much carbon dioxide is released each hour during respiration?

_____ arbitrary units

(1)

- (ii) How much carbon dioxide is used by photosynthesis in the hour beginning at 3 pm?

Answer = _____ arbitrary units

(1)

- (c) Over the 24 hour period, the total amount of carbon dioxide taken in by the bean plant was greater than the total amount of carbon dioxide given out by the bean plant.

Explain, in detail, why this was important for the bean plant.

(2)

(Total 5 marks)