

GCSE ADDITIONAL BIOLOGY (B2) REVISION BOOKLET

Name _____

These are summary questions for all topics in the GCSE Biology B2 exam. When you have completed the booklet collect a mark scheme and mark your work. Check off each section and enter your score.

If you find a section(s) produce low scores you can:

- Come to catch up and ask your teacher for help
- Go online:
 - <http://www.bbc.co.uk/schools/bitesize/>
 - <http://www.s-cool.co.uk/>
 - http://web.aqa.org.uk/qual/newgcse/science/new/bio_materials.php?id=03&prev=03
- Use your notes and revision guides
- You can purchase revision guides from Mrs Fuller in the main science prep room.

All the above will identify areas of weakness and give you strategies to swat up on.

	Score	Date	Grade	%	Grade
B2.1 Cells	/11			90+	A*
B2.2 How plants produce food	/14			80	A
B2.3 Energy Flows	/15			70	B
B2.4 Enzymes	/28			60	C
B2.5 Homeostasis	/15			50	D
B2.6 Inheritance	/15			40	E
End of unit exam	/25			30	F
				20	G

Name: _____

Date: _____

Summary questions

1 Look at this table showing how long different cells live for:

Type of cell	Life in days
Liver cell	250
Muscle cell	240
Red blood cell	100
Skin cell	18

a) What does this data tell you about how these cells are produced?

.....

.....

Now read the following information:

- All nerve cells develop when a person is very young.
- Most people in Britain live in excess of 70 years.
- Older people have increasing problem with memory.
- Memory involves nerve cells in our brain.
- Nerve cells are never replaced.

b) Explain what this information tells you about how long nerve cells live.

.....

.....

.....

.....

Continued ...

2 Read the following article:

In Japan, each child is presented with its own umbilical cord in a decorated box to remind it of the bond with its mother. At the end of the 20th century there was a nuclear accident in Japan. The two workers who were most affected had their bone marrow destroyed. One received a bone marrow transplant from his sister. His blood-cell levels improved quite fast. The other had no relatives with a tissue match. Blood stem cells were taken from his preserved umbilical cord and used to give him a chance of life.

a) What is a stem cell?

.....

b) What type of stem cells are named in this article?

.....,

c) There is one other type of stem cell – what is it?

.....

d) What are the possible benefits of using stem cells in medicine?

.....

e) What are the problems with using stem cells?

.....

f) In the UK, children are not given their umbilical cords to keep. How might umbilical blood with its stem cells be stored in this country?

.....

Total = __/11

Answers to summary questions

Answers

- 1 a) These cells must be produced on a regular basis to replace those that die otherwise the organs listed would quickly break down. *1 mark*
- b) Many nerve cells live for at least 70 years otherwise the human body could not function for that length of time. *1 mark*
- But clearly some nerve cells die sooner (progressively throughout life in fact) and this explains the decrease in memory and other brain functions with age. *1 mark*
- 2 a) Stem cells are unspecialised cells that can differentiate (divide and change) into many different types of cells when they are needed. *1 mark*
- b) Adult stem cells and umbilical cord stem cells. *2 marks*
- c) Embryonic stem cells. *1 mark*
- d) Make new cells, tissues or organs for people who have diseases or damage, e.g. new spinal nerves, treating Alzheimer's, etc. *1 mark*
1 for e.g
- e) Ethical issues, risk of side-effects such as cancer. *1 mark*
- f) Frozen straight after birth. *1 mark*

Total = 11

Name: _____

Date: _____

Summary questions

1 a) Use straight lines to link each word related to photosynthesis to its description:

A contain chlorophyll	1 big surface area for light to fall on
B broad	2 allow carbon dioxide to enter leaf cells and oxygen to leave
C have veins	3 to absorb light energy
D have air spaces	4 supply leaf cells with water

b) What do we call leaves that only contain chlorophyll in some of their cells?

.....

c) When testing a green leaf for starch the chlorophyll has to be removed.

i) Why is this necessary?

.....

ii) How is this done?

.....

2 a) Why do plants need nitrates?

.....

b) How do plants take in nitrates?

.....

.....

c) What are the possible sources of nitrates in the soil?

.....

.....

d) Plants need certain nutrients to grow well.

Nutrients	Part played in the plant
Nitrates	Making proteins – building blocks of all the plant material and enzymes.
Magnesium	Making chlorophyll for photosynthesis.
Potassium	Good for flowers, fruit and disease resistance.

Continued ...

At a plant clinic run by a local garden centre, a number of people turn up with plants that are not growing as well as they should. For each plant, explain what is wrong with it and suggest what needs to be done to the soil to make sure that the crop picks up and grows well.

Plant A has pale leaves with yellow patches. It is not growing very well.

.....

.....

.....

Plant B shows very stunted growth even though it gets lots of light and its owner keeps it well watered.

.....

.....

.....

Plant C has flowered well for the last three years. This year, however, it has only had a few small flowers and they dropped off before they could form fruit.

.....

.....

.....

Total = ____/14

Answers to summary questions

- 1 a) A-3; B-1; C-4; D-2. *4 marks*
b) Variegated. *1 mark*
c) i) To enable the colour of iodine reacting with any starch to be clearly seen. *1 mark*
ii) By boiling in ethanol. *1 mark*
- 2 a) To make amino acids/proteins. *1 mark*
b) With water from the soil. *1 mark*
c) Dead and decaying animals and plants; fertilisers. *2 marks*
d) Plant A has a magnesium deficiency; Plant B has nitrate deficiency; Plant C has a potassium deficiency. *3 marks*

Total = 14 marks

Name:

Class:

Summary questions

1 a) What do we mean by the term 'biomass'?

.....

b) What is a pyramid of biomass?

.....

.....

c) Draw a pyramid of biomass for this food chain:

rosebush → aphids → ladybirds → birds

d) Using this example, explain why a pyramid of biomass is often more useful to us than a simple pyramid of numbers.

.....

.....

.....

e) Again using this example, explain why it is easier to use a pyramid of numbers than a pyramid of biomass.

.....

.....

.....

Continued ...

- 2 Over the last 50 years, levels of carbon dioxide in the atmosphere have been rising.
- a) One possible cause of this effect is the increase in the amount of fossil fuels used by people.
Why does burning fossil fuels increase the levels of carbon dioxide?

.....
.....

- b) Why has our use of fossil fuels gone up so much?

.....
.....

- c) Over the same period of time, as fossil fuel use has gone up, people have cut down enormous areas of forest all over the earth. Using what you know about the carbon cycle, explain why this might have an effect on the levels of carbon dioxide in the air.

.....
.....
.....

Total = ____/15

Answers to summary questions

Answers

- 1 a) The mass of living material in an animal or a plant. 1
- b) A scale drawing representing the biomass of all the organisms at each stage of a food chain. 1
- c) The block representing the rose bush should be the largest, the one for the birds the smallest. 1
- d) Because, in pyramids like this one, there is only one producer but many primary consumers. 1
Looking at the pyramid of numbers gives a very inaccurate picture. 1
- Biomass shows exactly how much of each type of organism there is. 1
- e) Counting is sometimes easier than weighing and biomass often uses dry mass – 1
this involves killing the organisms before weighing them. 1
- 2 a) Fossil fuels are carbon-based chemicals 1
and burning them in oxygen (from the atmosphere) will inevitably release carbon dioxide. 1
- b) Rapid increase in world population leading to: 1
increased vehicle ownership and energy demands, economic growth leading to increased industrialisation (e.g. China). 1
- c) Deforestation reduces the number of trees that would otherwise remove carbon dioxide from the air. 1
- Also, if deforestation is combined with burning the trees then this will also add carbon dioxide to the atmosphere. 1

Total = 15

- 1 a) Underline the correct word from each of the pairs given.

Oxygen/ozone and **glycogen/glucose** react together in your body to produce **excretion/energy**. This process is **respiration/breathing**. Carbon **monoxide/dioxide** and **water/waste** are produced as by-products of respiration.

- b) Use this to help you complete the equation for aerobic respiration:

_____ + _____ → _____ + _____ + _____

- c) Why is aerobic respiration so important?

.....

- d) What are the mitochondria and why are they so well adapted for their role in your cells?

.....

2. **A, B, C, D** and **E** are the names of enzymes or groups of enzymes. The numbers **1, 2, 3, 4** and **5** refer to the functions or uses of each of these enzymes.

Match each letter with the appropriate number.

(5)

- | | |
|------------------------|--|
| A Lipase | 1 Used in the manufacture of baby foods |
| B Amylase | 2 Group of enzymes that act on carbohydrates |
| C Proteases | 3 Its substrate is starch |
| D Isomerase | 4 Used in the production of slimming foods |
| E Carbohydrases | 5 The products of its catalytic action are glycerol and fatty acids |

- 3 Amylase is an enzyme that catalyses the conversion of starch into sugar.

- (a) To which of the following groups of food does starch belong?

carbohydrates fats protein vitamins

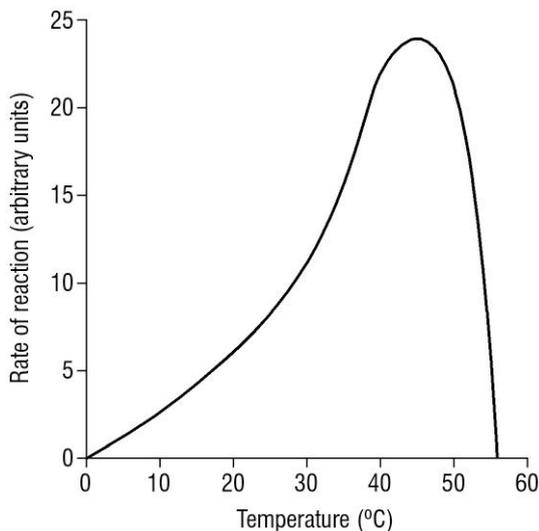
..... (1)

Continued ...

(b) Give the names of the **three** organs in the human body that secrete the enzyme amylase.

.....

 (3)



The graph above shows the effect of temperature on the activity of amylase.

(c) (i) At what temperature did the amylase work fastest?

..... (1)

(ii) Why did the amylase not work above 56°C?

..... (1)

(iii) State one other factor apart from temperature that will affect the rate of reaction of amylase.

..... (1)

Total = _____ / 28

Answers to summary questions

Answers

- 1 a) oxygen; glucose; energy; respiration; dioxide; water. (6 marks)
 b) glucose + oxygen → energy + carbon dioxide + water. (5 marks)
 c) It provides the energy needed for synthesis reactions, muscle contraction and maintaining body temperature. (3 marks)
 d) The mitochondria are organelles that are the site of the reactions involved in aerobic respiration.

They have a large internal surface area and many enzymes. (2 marks)

- 2 A 5
 B 3
 C 1
 D 4
 E 2

(1 mark each)

- 3 a) Carbohydrates (1 mark)
 b) Salivary glands
 Pancreas
 Small intestine (1 mark each)
 c) i) 45°C (1 mark)
 ii) It had become denatured. (1 mark)
 iii) pH (1 mark)

Total = 28 marks

Name: _____ Class: _____

Summary questions

- 1 a) Which parts of the body lose most heat energy?
.....
.....
- b) Which two groups of people are most at risk from hypothermia? Explain why this is.
.....
.....
.....
.....
- c) What advice would you give to elderly people regarding the prevention of hypothermia?
.....
.....
- d) Why are several layers of thin clothing better for keeping you warm than one thick layer?
.....
.....
- 2 a) What is the key reason for preventing our body temperature going too high or too low?
.....
.....
- b) Explain how a fall in your core body temperature affects the functioning of your body.
.....
.....
.....
- c) Explain how an increase in your core body temperature will affect the functioning of your body.
.....
.....
- d) Which part of your body is responsible for monitoring your core temperature?
.....

Total = ____ / 15

Continued ...

Answers to summary questions

Answers

- 1 a) Head and extremities (like fingers and toes). (2 marks)
b) The elderly and babies.
The elderly often do not eat enough food and are less likely to put heating on to keep warm (cost implications).
Babies have a large surface area to volume ratio. (4marks)
c) Wear a number of layers of clothes, eat regular hot meals, keep heating on. (3 marks)
d) Each layer of clothing traps a layer of insulating air. (1 mark)
- 2 a) To ensure enzymes are kept at an optimum temperature. (1 mark)
b) Lower temperatures reduce the activity of enzymes (i.e. rate of reaction). (1 mark)
c) Enzymes are denatured by high temperatures and will stop working. (2 marks)
d) Brain (thermoregulatory centre). (1 mark)

Total = 15 marks

Name: _____

Class: _____

1 Cystic fibrosis is an example of an inherited disease caused by gene mutation, which affects about one child in 2000.

a) Which parts of the body are mainly affected by this condition?

.....

b) What substance (produced in excess) affects these parts of the body?

c) The reproductive system is also affected by this condition. As a result, people suffering from cystic fibrosis are often

d) What are the main treatments for cystic fibrosis?

..... and

e) Enzyme treatment is also used. What is the purpose of these enzymes?

.....

.....

f) What kind of allele causes cystic fibrosis?

g) How do we describe the parents of cystic fibrosis sufferers?

2 Huntington's disease is a very serious but thankfully rare genetic disorder.

a) Which system does this condition affect?

b) It is caused by what type of allele?

c) If one of your parents has this condition what are the chances of you having it?

.....

d) Between what ages do the symptoms of this condition usually appear?

.....

e) What problems does the answer to d) create?

.....

.....

f) Can a person be a carrier of this condition? Explain your answer.

.....

.....

Total = ___/15

Continued ...

Answers to summary questions

Answers

- 1
- a) Lungs and digestive system. (2 marks)
 - b) Thick, sticky mucus. (1 mark)
 - c) Infertile. (1 mark)
 - d) Physiotherapy and antibiotics. (2 marks)
 - e) To thin the mucus in the digestive system so that it does not clog up the digestive system so easily. (1 mark)
 - f) Recessive. (1 mark)
 - g) Carriers. (1 mark)
- 2
- a) Nervous system. (1 mark)
 - b) Dominant. (1 mark)
 - c) 50% (1 mark)
 - d) 30–50 years of age. (1 mark)
 - e) Many people have started a family (and passed on the allele) before realising they have the condition. (1 mark)
 - f) No, if the allele is present you will have the symptoms. (1 mark)

Total = 15 marks

Continued ...

(b) (i) Explain why test tubes B and C were used.
..... (1 mark)

(ii) How should tubes B and C have been treated?
..... (1 mark)

(c) Fructose is often added to foods used by people on a slimming diet.

(i) Give **one** advantage of this for the company making the slimming food.
..... (1 mark)

(ii) Explain one advantage of this for a person on a slimming diet.
.....
..... (2 marks)

3 In 1868 a German scientist, Wunderlich, took the mouth temperature of 25,000 people a total of 1 million times. He concluded that the normal range for temperatures recorded from the mouth using a mercury thermometer was 36.25°C to 37.5°C. Mean temperature was 37°C.

In 2005 scientists in Baltimore measured the mouth temperature of 148 men and women aged 18–40 years. Measurements were taken 4 times daily for 3 days using an electronic digital thermometer. They found that the normal range was 37.2°C to 37.7°C, with a mean of 36.8°C.

(a) Which control variable was the same for both investigations?
..... (1 mark)

(b) How could supporters of Wunderlich argue that he had the most accurate technique?
..... (1 mark)

(c) How could supporters of the Baltimore team argue that they had the most accurate technique?
..... (1 mark)

(d) Why is it economically important to have an accurate measurement of the normal range for body temperatures?
..... (1 mark)

Continued ...

4 Huntington's disease is an inherited condition which is caused by a *dominant allele*. The effects of the disease do not appear until the person with the allele is 30–40 years old.

(a) What is meant by:

(i) *allele*?

..... (1 mark)

(ii) *dominant*?

..... (1 mark)

(b) A man and his wife are both 45 years old. The man is suffering from Huntington's disease, but his wife is not a sufferer. They have one child who is now 14 years old.

(i) What system of the body is affected by Huntington's disease?

..... (1 mark)

(ii) The man has both the H and h alleles. Draw a genetic diagram and use it to find the probability that the child will develop Huntington's disease.

Use the following symbols: H = allele for Huntington's disease

h = unaffected allele (5 marks)

Total = ___/15

Additional biology

1 (a) *Quality of written communication* (1 mark)

The mark should be given where correct scientific terms are used and the ideas are given in a sensible order. The mark can be awarded for a scientific and logical answer, even if it is inaccurate; it cannot be given if the answer is non-scientific or nonsensical.

- Microorganisms/bacteria/fungi/saprotrophs/saprophytes/saprobionts
- digest/break down organic matter/leaves/decompose (reference to decomposers)/decay/rot
- use of enzymes/correctly named example
- absorption by diffusion/active transport
- respiration/combustion
- carbon dioxide can be used (by trees) in photosynthesis.

(1 mark for any point to a maximum of 3)

- (b) • warmth/suitable temperature (*heat/hot weather are not acceptable*)
- damp/water/rain/humid/moisture
 - oxygen
 - suitable pH.

(1 mark for any point to a maximum of 2)

2 (a) The concentration of fructose increases (1 mark)
then levels off/rate of increase slows (1 mark)

- (b) (i) They acted as controls. (1 mark)
(ii) Exactly the same as tube A. (1 mark)

- (c) (i) less sugar is used/cheaper than using glucose (1 mark)
(ii) food is just as sweet/fructose is sweeter (1 mark)
there is less sugar to convert to fat/less surplus energy (1 mark)

3 (a) Mouth temperature was used in both investigations for all those tested. (1 mark)

(b) He carried out the largest survey. (1 mark)

(c) E.g. tests carried out several times on the same people; used a digital thermometer which is less easy to misread; more recent thermometers are more likely to be more accurate. (1 mark)

(d) E.g. more accurate diagnosis of disease and therefore more appropriate treatment. (1 mark)

Continued ...

- 4 (a) (i) *Either* one of two (/of several) forms of a gene
Or (a variant) form of a gene (1 mark)
- (ii) *Either* expressed even if only one copy is inherited
Or expressed/seen in heterozygote (1 mark)
- (b) (i) nervous (*'brain' is not 'a system' and therefore not allowed*) (1 mark)
- (ii) Man/affected = **Hh**, and wife unaffected = **hh** (1 mark)
correct gametes from parental genotypes (1 mark)
F₁ genotypes correctly derived from parental gametes (1 mark)
Identification of **Hh** in F₁ as having Huntington's disease (1 mark)
Correct probability from F₁ genotypes, e.g.
 $\frac{1}{2}/0.5/50\%/1$ in $2/1:1/50:50$ (1 mark)
Care should be taken not to allow '1:2' or '50/50'.

As the question specifically asks for 'a genetic diagram', a mark must be deducted if one is omitted, even though the answer itself is correct.

Provided the chain of logic can be picked up from the previous statement, the following mark can be given even if the previous statement was wrong. In other words, an error should only be penalised once as long as the rest that follows is logical and genetically accurate

[HT only]

Total = 25 marks