AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.2.2.6

The effect of lifestyle on some non-communicable diseases

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**3**
Available paper years	**2018–2024**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 01 · Mark scheme

June 2018 | 8464/B/1H | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	is not caused by a pathogen / infective organism	allow not caused by a microorganism / microbe ignore not caused by infection ignore named pathogen unless bacteria, virus and fungus all mentioned	1	AO1 4.2.2.4 4.2.2.5 4.3.1.1 4.3
	(so) is not passed / spread (from person to person)	allow cannot be spread / caught allow is not infectious / contagious	1	AO2 4.2.2.4 4.2.2.5 4.3.1.1 4.3
02.2		allow 'it' for heart		AO1 4.2.2.4
	reduced / restricted / stopped blood flow	it does not matter where blood flow is restricted to – heart / body	1	
	(so) less oxygen reaches heart (muscle / cells)	must reference heart / it allow no oxygen reaches the heart (muscle / cells)	1	
	(so heart muscle / cells) cannot respire (enough)		1	
	or (so heart muscle / cells) do not release (enough) energy	do **not** accept do not make / produce / create energy ignore references to breathing / suffocation ignore blood clots / blockages		

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 01 · Mark scheme

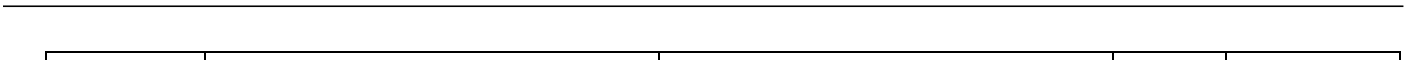
June 2018 | 8464/B/1H | Original Q2

Question	Answers	Mark	AO / Spec. Ref.
02.3	**Level 3:** Relevant points (factors / effects) are identified, given in detail and logically linked to form a clear account.	5–6	AO2
	Level 2: Relevant points (factors / effects) are identified and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2 AO1
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1–2	AO1
	No relevant content	0	
	Indicative content **medical risk factors:** • high blood pressure • high cholesterol • diabetes • genetic factors • medications **lifestyle risk factors:** • smoking • obesity • lack of exercise • high fat / energy diet • eating insufficient fruit / vegetables • alcohol • high salt intake • exposure to air pollution • certain drugs / correct named drug **examples of links:** • smoking – high bp / cholesterol / fatty deposition • obesity – lack of exercise / high bp / cholesterol / fatty deposition / diabetes • exercise – obesity / bp /diabetes • diet – obesity / cholesterol / diabetes • alcohol – bp / cholesterol • high salt intake - high blood pressure • genetic factors – bp / cholesterol / diabetes / obesity • medication – can affect blood / blood vessels / metabolism the main discriminator is the quality of linking both lifestyle and medical factors are required for **level 3**		4.2.2.2 4.2.2.4 4.2.2.5 4.2.2.6
Total		**11**	

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4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 02 · Mark scheme

June 2023 | 8464/B/1H | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	cancer		1	AO1 4.2.2.7 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	any **one** from: • (coronary) heart disease / CHD / cardiovascular disease • diabetes	ignore cancer allow atherosclerosis ignore heart attack allow high blood pressure allow stroke / asthma / depression / gallstones / (osteo)arthritis allow sleep apnoea	1	AO1 4.2.2.4 4.2.2.5 4.2.2.6

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Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	any **one** from: • taxes on high energy / fat / sugar foods • education (about diet and health) • (government) advertising • restrict media advertising of high energy / fat / sugar foods • information on food labels • help / advice / groups for obese people via the NHS • calorie information on restaurant / takeaway menus • regulation of supermarket offers on high sugar / fat / energy foods • regulation of type of foods for sale near checkouts • exercise campaigns	allow increase the price on high energy / fat / sugar foods	1	AO3 4.2.2.5 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	BMI = $\frac{69}{1.64^2}$	allow BMI = $\frac{69}{1.64 \times 1.64}$ allow BMI = $\frac{69}{2.6896}$	1	AO2
	BMI = 25.6(5437….)	allow 26 or 25.7	1	AO2
	(the person's BMI category is:) overweight	must be consistent with their calculated BMI value	1	AO3 4.2.2.5 4.2.2.6

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Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	any **one** from: • women will gain mass / weight (during pregnancy) • (developing) baby will increase mass / weight of woman	allow BMI (of woman) will increase (during pregnancy)	1	AO3 4.2.2.5 4.2.2.6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	any **two** from: • smokers had babies with lower birth mass • women / smokers / non-smokers with higher BMI had heavier babies • smoking had the greatest effect on birth mass in underweight women • smoking had the least effect on birth mass in overweight women • smoking had less effect on birth mass in overweight and obese women (than in underweight and healthy weight women)	statements must be comparative allow converse statements allow weight for mass allow obese women have the heaviest / heavier babies allow underweight women have the lightest / lighter babies allow there is only a 365 g difference between the smallest and largest babies	2	AO3 4.2.2.5 4.2.2.6

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Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	coughs / sneezes (spread virus in droplets)	assume 'it' refers to the virus allow breathing out (spreads virus in droplets)	1	AO1 4.3.1.1 4.3.1.2
	droplets / virus are inhaled	allow droplets / virus are breathed in ignore contact with infected person unqualified allow touch a contaminated surface **and** then touch your mouth / nose / eyes for **1** mark if no other marks awarded allow kissing for **1** mark only	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.8	$\frac{17}{100}$ × 67 961 900	allow 0.17 x 67 961 900	1	AO2 4.3.1.4
	= 11 553 523	allow 11 553 500	1	

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Answer 02 · Mark scheme

June 2023 | 8464/B/1H | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.9	any **one** from: • dry feet thoroughly (after washing) • do not share socks / tights / shoes / towels • use a fungicide • do not walk around barefoot in public / contaminated areas	allow use foot powder ignore keep feet dry ignore wash feet regularly allow named fungicide allow wear silver(-impregnated) socks allow wear flip flops in public / contaminated areas ignore avoid moist conditions	1	AO2 4.3.1.1 4.3.1.4

Total Question 1	14

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 03 · Mark scheme

June 2024 | 8464/B/1H | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1		allow a maximum of **3** marks if the stages are out of order		AO2 4.1.2.2
	DNA replicates **or** two copies of each chromosome form	allow DNA duplicates / doubles allow genetic material doubles ignore genetic information replicates do **not** accept DNA reproduces	1	
	one set of chromosomes is pulled to each end of the cell	allow one set of chromosomes is moved to each end of the cell ignore half the chromosomes are moved to each end of the cell	1	
	nucleus divides	allow two (new) nuclei form	1	
	cytoplasm **or** cell membrane divides **and** two genetically identical cells form	allow cytokinesis **and** two genetically identical cells form ignore names of phases of mitosis if no other mark awarded allow **1** mark for mitosis	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	uncontrolled cell division / growth		1	AO1 4.2.2.7
	invade neighbouring tissues		1	
	(tumour) cells spread to different parts of the body / tissues in the blood / lymph	allow tumour metastasises	1	

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Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3		allow the converse if clearly stated		AO2 4.2.2.6 4.2.2.2 4.4.2.1 4.4.2.2
	(need to breathe faster / deeper) to get more oxygen		1	
	(because) smaller surface area		1	
	(so) less oxygen in the blood	allow (so) less oxygenation of haemoglobin	1	
	(so) less (oxygen for) respiration	allow (so) anaerobic respiration increases allow (so) lactic acid is produced allow (so) an oxygen debt is created do **not** accept energy produced / made / created	1	

Total Question 6	11

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 01 · Examiner comments

June 2018 | 8464/B/1H | Original Q2

Question 2 (standard demand)

02.1 Few students scored the first marking point for saying that a non-communicable disease is not caused by a pathogen. Some students gave examples of non-communicable diseases, such as CHD, diabetes and cancer. Others gave a cause, such as genetics, lifestyle or diet. These were ignored.

89% of students achieved one mark, usually for saying a non-communicable disease cannot be caught or is not infectious. 5% of students achieved full marks.

02.2 The majority of students gained the first marking point for stating that blood flow is reduced in people with CHD.

For the second marking point it had to be clear that this would result in less oxygen reaching the cells of the heart, as the question asked how CHD can cause a heart attack. Many students wrote about less oxygen reaching other parts of the body.

The last marking point needed a link to less respiration or insufficient energy release. Students often incorrectly referred to less energy being made, created or produced.

There were very few three-mark answers seen (2%). Of these, some gave a complete story linking reduced respiration to there being insufficient energy released for the heart muscle to contract.

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 01 · Examiner comments June 2018 | 8464/B/1H | Original Q2

02.3 This was a 'level marked', 'extended response question'. The command word was 'Explain', so the main discriminator between the three different levels was the quality of linking ideas. Students were asked to explain how lifestyle and medical risk factors increase the chance of developing CHD. Therefore examples of both types of factor had to be included, with several examples of logical linking of ideas, in order to enter level 3. 77% of students achieved a minimum of three marks. 41% of students gave a level 3 response.

Many students phrased their response in terms of how to reduce the chance of developing CHD, which could achieve full credit if explanations were included. References to doing exercise and not eating too many fatty foods were often seen, but if these were not linked to explanations the answer was limited to level 1. References to bad or unhealthy diets were too vague without going on to mention high levels of fat, sugar or salt.

An answer such as a fatty diet and not enough exercise can lead to obesity, which increases the chance of CHD, gained 3 marks as there is an attempt to link ideas. To be awarded 4 marks better links had to be made, or more factors referred to. Smoking and alcohol consumption were sometimes mentioned. With reference to smoking, a number of students were under the impression that smoking leads to the build-up of tar in the coronary arteries.

Many responses were limited to level 2 because there was no reference to any medical risk factors. Where medical factors were included it was often in relation to diabetes or genetic factors. A family history of heart problems was sufficient for this idea. High blood cholesterol was sometimes given as a medical risk factor.

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 02 · Examiner comments

June 2023 | 8464/B/1H | Original Q1

Question 1

Question 1 was common to both tiers and was set at standard demand.

01.1 Almost all students on the Higher tier identified cancer as a non-communicable disease.

01.2 Almost all students named a non-communicable disease that obesity is a risk factor for. Diabetes or coronary heart disease, which are both listed in the specification, were the most common responses. References to heart attack or heart conditions were ignored as a named disease was required.

01.3 Fewer than half the students suggested a national policy that could help people to lose weight. The most common suggestions related to increasing taxes on unhealthy foods. This was usually phrased as increase the cost of unhealthy foods. A few suggested decreasing the cost of healthy foods.
Quite a lot of students suggested providing free gym memberships, or more public sports facilities. Some referred to mandatory PE lessons in school. References to labelling the energy content of foods and meals on packaging and menus were also made.
A common mistake was to give lifestyle changes that an individual could make, rather than a policy that a national organisation or the Government could make. Exercise regularly and eat a balanced diet were often stated, but these did not gain credit. Saying increase the recommended amount of daily exercise a person should do would gain credit, as this suggests a national policy.

01.4 In this BMI calculation 1 mark was for the correct substitution into the equation. The second mark was for a correct calculation, which was usually given as 25.65. Most students did show their working, which was good to see. The final mark was for selecting the correct BMI category that matched their final answer. Therefore, if a student did an incorrect calculation, they could still score the third mark. This was sometimes seen if they didn't square 1.64, and gave an answer of 42.07 with the BMI category obese. On the Higher tier the vast majority of students scored full marks.

01.5 Three fifths of students scored the mark for saying that women gain weight when pregnant, or that their mass will increase due to the baby. A clear reference to the weight, mass or BMI of the woman increasing was needed, so saying the woman's weight would change was insufficient. Incorrect responses included saying the BMI category was calculated before the woman became pregnant to check on her health or the baby's health, to see the change in the woman's BMI during pregnancy or for comparison. Some described the harmful effects of smoking on a developing baby, which did not answer the question.

01.6 Two conclusions were needed, so smoking or BMI of the mother had to be linked to the birth mass, or weight, of the babies. Comparative statements were needed. Almost half the students scored both marks, and two fifths scored 1 mark. The most common correct response was that non-smokers had heavier babies. Some students repeated this conclusion, and also stated the converse, saying smokers had lower birth mass babies. These two statements could only score 1 mark. A reference to a healthier weight was often seen, which was insufficient. The main misunderstanding was that smoking affected the woman's mass, and not the birth mass of the baby.

01.7 The first marking point was for how the measles virus is transferred out of an infected person. Two thirds of students scored this mark for saying by coughing or sneezing. The second mark was for how the virus is taken in by a second person. Fewer than a fifth of students scored both marks. Many thought the virus was transferred by direct contact. Some said the virus is airborne, but did not describe how it left one person and entered another.

4.2.2.6 The effect of lifestyle on some non-communicable diseases

Answer 02 · Examiner comments June 2023 | 8464/B/1H | Original Q1

01.8 The majority of students scored full marks for the percentage calculation to estimate the number of people with athlete's foot. Some students incorrectly converted 17% to 0.017, rather than to 0.17 Other students calculated 10%, 1% and then 7% of 67 961 900, then added the values for 10% and 7% together to find 17%.

01.9 Fewer than a fifth of students scored a mark for suggesting one way a person could reduce their chance of catching athlete's foot. References to changing socks or washing feet regularly were ignored. Saying keep your feet dry was too vague, a reference to drying feet thoroughly, properly or between the toes after washing was required, which was rarely seen. Use talcum powder was seen occasionally, which was allowed. The idea of covering the feet when walking around at a public swimming pool was suggested by some students, but saying don't walk around barefoot, without qualification, was ignored.

Answer 03 · Examiner comments

Question 6 (standard/high & high demand)

06.1 Many students were only able to gain the single fall-back mark of 'mitosis' for this high-demand question: 62% were only awarded 1 mark, and less than 1% gained all 4 marks.

Use of appropriate terminology proved challenging. It was common to see references to:

- DNA being copied
- genetic information duplicating
- chromosomes duplicating
- 'everything' replicating
- chromosomes doubling
- nucleus replicating.

None of these were sufficient for the first marking point.

Students rarely made any reference to one *set* of chromosomes in their answers, so this mark was rarely awarded.

There were some good descriptions beyond the specification of spindle fibre formation, although it was also common for any description attempted to infer that the chromosomes moved themselves to the poles rather than being pulled.

Students often referred to the nucleus being split, rather than using the term 'divide'; this was not enough to gain the third mark.

Although some good descriptions of cytokinesis were seen, as well as the term itself, marking point 4 was often not credited due to lack of reference to the cells being 'genetically' identical.

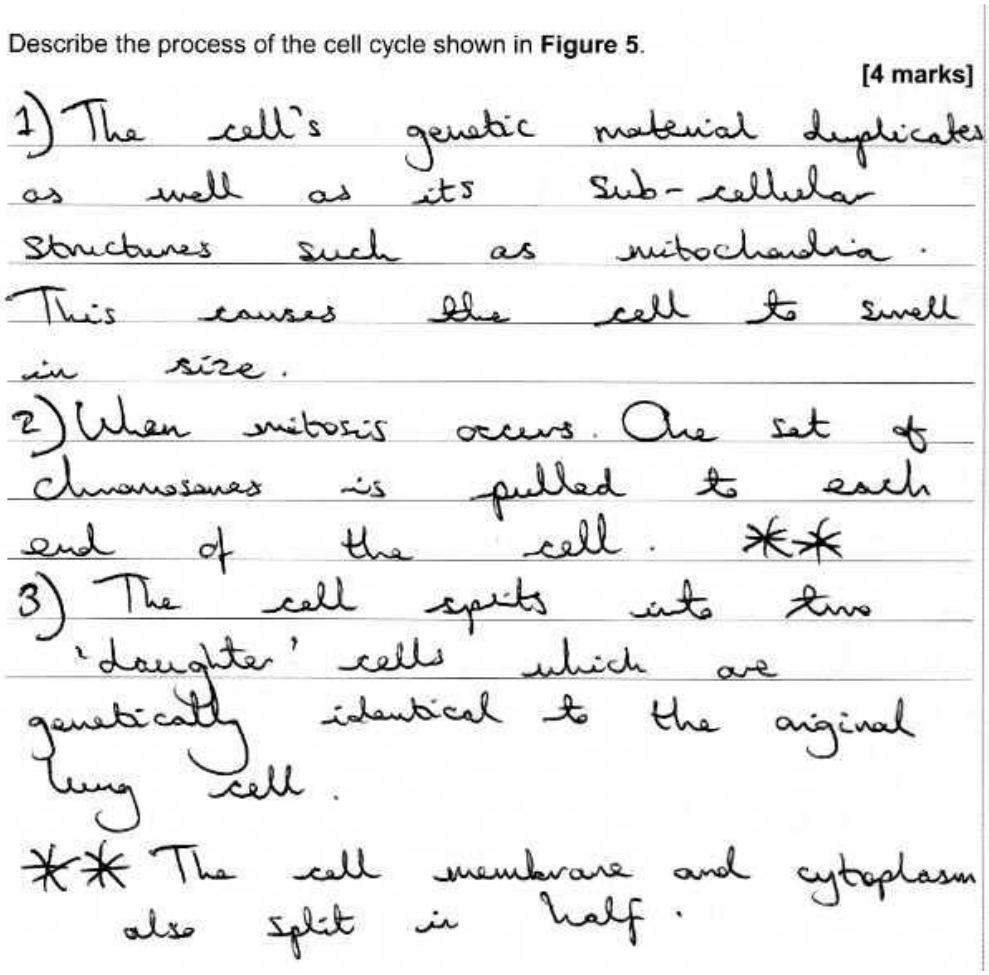
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Answer 03 · Examiner comments June 2024 | 8464/B/1H | Original Q6

Describe the process of the cell cycle shown in **Figure 5**.

[4 marks]



This response gained 3 marks: 1 mark for 'genetic material duplicates' ('genetic information' would not have gained credit), 1 mark for the set of chromosomes being pulled to each end of the cell, and 1 mark for cytoplasm splitting in half (synonymous with dividing) and forming two genetically identical cells. There is no mention of the nucleus dividing.

06.2 Students occasionally referred to uncontrolled division or growth in their answer, which gained them 1 mark. However, many students simply repeated the stem of the question, talking about cancer being malignant, which gained no credit. Many responses stated that the tumour itself spreads through the blood rather than the *cells* spreading or did not make a reference to how the cells were spreading (ie through the blood). It was common to see responses stating that the tumour invades cells rather than tissues. It was rare to see students using the term metastasise. 67% gained no credit on this question.

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06.3 28% of students were not able to access this question, often giving simple statements rather than being comparative. Some responses did not relate to the question at all: they simply referred to the adaptations of the alveoli for efficient gas exchange.

Marks were most commonly awarded for comparison of surface area, and why the person breathes faster to gain more oxygen.

A very common misconception was that B had a larger surface area than A. Although the general idea of the smaller surface area allowing less oxygen was often seen, many students did not qualify this with there being less oxygen in the blood so could not gain the mark.

Where students correctly identified B as having a smaller surface area, accurate descriptions of how this affected breathing in terms of lactic acid production and oxygen debt were more commonly seen than less respiration.

Many responses still refer to the 'production of' energy.