AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.1.1

Eukaryotes and prokaryotes

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**5**
Available paper years	**2018–2024**

Using this booklet

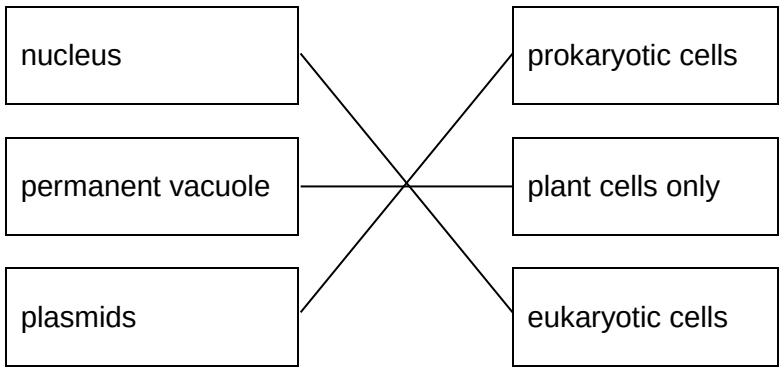
1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

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.

4.1.1.1 Eukaryotes and prokaryotes

Answer 01 · Mark scheme June 2018 | 8464/B/1H | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	 allow **1** mark for one or two correct links		2	AO1 4.1.1.1 4.1.1.2
01.2	vacuole | ribosome | cell wall tick box takes precedence if no tick is given, look at both the figure and the circling of words in the table if writing is seen on the figure and in the table both must be correct		1	AO1 4.1.1.2
01.3	turn the (fine focusing) knob until the cells are in focus	allow focus it do **not** accept increase magnification ignore decrease magnification ignore clear ignore references to resolution / illumination ignore zoom in / out	1	AO2 4.1.1.2

4.1.1.1 Eukaryotes and prokaryotes

Answer 01 · Mark scheme

June 2018 | 8464/B/1H | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	(rotate the) nosepiece / objective lens	allow change the (objective / eyepiece) lens	1	AO2 4.1.1.2
	to a higher power (lens)	allow (to) increase the magnification a comparator is required ignore change / adjust the magnification allow stronger or more powerful lens ignore references to resolution / illumination unqualified ignore zoom in / out ignore references to an electron microscope	1	

4.1.1.1 Eukaryotes and prokaryotes

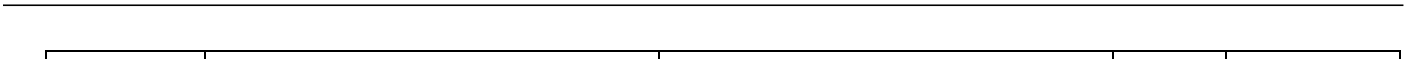
Answer 01 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5		an answer of 400 (×) scores **3** marks		AO2 4.1.1.2
	conversion of units: (112 mm →) 112 000 (µm) **or** (280 µm →) 0.28 (mm)		1	
	(magnification =) $\frac{112}{0.28}$ **or** (magnification =) $\frac{112\,000}{280}$	allow **1** mark for no conversion of units 112 / 280 **or** incorrect value from step 1 correctly substituted	1	
	400 (×)	do **not** accept if units are given	1	
		if no other mark scored allow **1** mark for: magnification = $\frac{\text{size of image}}{\text{size of real object}}$ a triangle with words or letters in is insufficient, as the correct rearrangement is needed		
Total			**9**	

4.1.1.1 Eukaryotes and prokaryotes

Answer 01 · Mark scheme

June 2018 | 8464/B/1H | Original Q1



4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Mark scheme

June 2019 | 8464/B/1H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	protist		1	AO1 4.3.1.5
04.2	any **two** methods with reason from: • Method: insecticides Reason: to kill mosquitos / vector • Method: (mosquito) nets Reason: to avoid being bitten • Method: insect repellents Reason: less likely to be bitten • Method: vaccination Reason: so people are immune (to malaria) • Method: anti-malaria tablets Reason: kills the pathogen / protist	1 mark for method and 1 mark for a correctly linked reason ignore kill insects unqualified allow long clothing ignore acts as a physical barrier allow DEET or named insect repellent allow named anti-malarial e.g. Larium / Malarone allow antibiotics allow ecf from 04.1 ignore kills malaria allow Method: drain swampy ground **or** remove pots of water **or** put oil on water / pond Reason: fewer breeding grounds for mosquitos allow Method: release GM / sterile mosquitos Reason: prevent / reduce reproduction if no other marks awarded allow **1** mark for kill mosquitos	4	AO1 4.3.1.1 4.3.1.5 4.3.1.7

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Mark scheme

June 2019 | 8464/B/1H | Original Q4

04.3	any **two** from: (bacterial cell): does not have a nucleus has plasmids is smaller	 allow DNA is free in cytoplasm allow has a single loop of DNA allow has a single strand of DNA allow description, e.g. (small) ring(s) of DNA allow bacterial cells do not have mitochondria **or** do not have membrane bound organelles allow bacteria have smaller ribosomes ignore bacterial cells do not have chloroplasts	2	AO1 4.1.1.1
04.4	to allow air / oxygen in for bacteria to respire **or** so bacteria can respire aerobically	allow to allow carbon dioxide produced in respiration to escape	1	AO3 4.4.2.1

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Mark scheme

04.5	(A) (no change in population size) because no / limited cell division / reproduction	allow (no change in population size) because bacteria / cells adjusting to environment / culture conditions ignore reference to growth unqualified	1	AO2 4.1.2.2 4.3.1.1 4.4.2.1 4.4.2.3
	(B) (rapid increase in population size) as cells dividing rapidly as (plentiful) supply of nutrients / food	allow rapid binary fission as (plentiful) supply of nutrients / food	1	
	(C) (population size stays the same) as rate of cell death equals rate of cell division		1	
	(D) (population size decreasing) as cells dying due to nutrients running out **or** (population size decreasing) as cells dying due to toxins / carbon dioxide / cell wastes building up (in solution)		1	

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Mark scheme

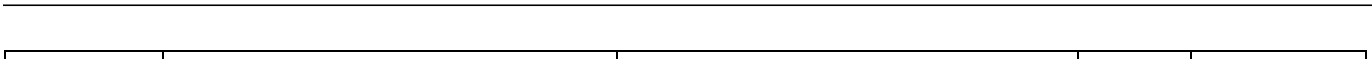
June 2019 | 8464/B/1H | Original Q4

04.6		a ratio of 30 000:1 for **X and** 0.55:1 for **Y** scores 3 marks		4.1.3.1
	(SA: vol ratio of **X** =) 2.4×10^{-7} **:** 8×10^{-12} **or** 0.000 000 24 **:** 0.000 000 000 008	if no other calculation marks awarded allow 1 mark for calculation of SA for **X and Y** **or** calculation of volume for **X and Y** **or** calculation of SA **and** volume for one **or** both cubes if not given as a ratio	1	AO2
	(SA: vol ratio of **Y** =) 726:1331		1	AO2
	conversion to same scale: 30 000:1 **and** 0.55:1		1	AO2
	(so) diffusion distance is longer in multicellular organism **or** (so) volume supplied by each unit of surface area is greater in multicellular organism	allow converse allow converse allow idea that some cells will have no surfaces exposed to outside in multicellular organism	1	AO1
	(so) diffusion rate per unit volume is slower in a multicellular organism	allow converse	1	AO2
Total			**17**	

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Mark scheme

June 2019 | 8464/B/1H | Original Q4



4.1.1.1 Eukaryotes and prokaryotes

Answer 03 · Mark scheme

June 2022 | 8464/B/1H | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	both have a cell membrane both have cytoplasm		1 1	AO1 4.1.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	any **one** from: • fever • abdominal / stomach cramps	ignore vomiting / sickness / diarrhoea ignore feel unwell unqualified ignore rashes allow high temperature allow sweating / chills	1	AO1 4.3.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	penicillin	allow phonetic spelling	1	AO2 4.3.1.9

4.1.1.1 Eukaryotes and prokaryotes

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	any **one** from: • only a few bacteria killed so live bacteria continued to reproduce • time delay before antibiotic reached bacteria • time delay before antibiotic could kill bacteria	allow bacteria reproducing when course started allow takes time (for antibiotic) to travel through the body allow takes time (for antibiotic) to work	1	AO3 4.3.1.1 4.3.1.3 4.3.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	there were fewer toxins in the body than at day 0		1	AO2 4.3.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	to reduce / prevent resistant strains / bacteria developing **or** to reduce / prevent antibiotic resistance (in bacteria)	ignore references to bacteria becoming immune allow because they will get better without taking any antibiotics ignore body will fight the infection unqualified allow some infections are caused by viruses allow because they have been told not to by NHS / NICE	1	AO1 4.3.1.8

4.1.1.1 Eukaryotes and prokaryotes

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	B		1	AO2 4.2.2.3 4.3.1.7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.8	D		1	AO2 4.2.2.3

Total Question 1		**9**

4.1.1.1 Eukaryotes and prokaryotes

Answer 04 · Mark scheme

June 2024 | 8464/B/1H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	*microscope:* electron (microscope) **and** *reason:* (has a) high resolution / magnification		1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	any **three** from: (prokaryotic cell):	allow converse for eukaryotic cell if clearly stated	3	AO1 4.1.1.1 4.1.1.2
	• does not have a nucleus **or** DNA is free in the cytoplasm **or** genetic material is free in cytoplasm	ignore genetic information		
	• does not have mitochondria	if no other mark awarded, allow prokaryotic cell has no membrane-bound organelles		
	• has a single loop of DNA **or** has a single strand of DNA	ignore genetic information		
	• (has) plasmids	allow (small) rings of DNA		
	• (is) smaller	allow bacteria have smaller ribosomes		

4.1.1.1 Eukaryotes and prokaryotes

Answer 04 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3		allow correct calculations in cm or mm		AO2 4.1.1.5
	measurement of cell 36 (mm)	allow in the range of 35 to 37 (mm) allow in the range 3.5 to 3.7 (cm)	1	
	conversion 36 × 1000 = 36 000 (μm)		1	
	real size of cell (30 × 1.5) = 45 (μm)		1	
	substitution magnification $= \frac{36\,000}{45}$		1	
	800	do **not** accept if unit given	1	
		if no other mark awarded allow **1** mark for: magnification $= \frac{\text{image size}}{\text{real size}}$ or correct rearrangement		

Total Question 5	9

4.1.1.1 Eukaryotes and prokaryotes

Answer 05 · Mark scheme

June 2024 | 8464/B/2H | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	domain		1	AO1 4.6.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	offspring are genetically identical		1	AO1 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	a gamete contains half of the number of chromosomes		1	AO1 4.6.1.1 4.6.1.2

4.1.1.1 Eukaryotes and prokaryotes

Answer 05 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	any **one** from: • similar / same structure / characteristics / phenotype (as potatoes)	allow named similar structure / characteristics such as same shape / leaves / flowers / taste allow studied with microscopes ignore 'look the same / similar' unqualified	1	AO1 4.6.4
	• similar DNA / genes	allow DNA analysis allow analysis of genetic material allow similar genetic material ignore genetic information do **not** accept same DNA / genes		
	• similar / same biochemistry			
	• same first part of binomial (name)	allow same first part of Latin / scientific name		

4.1.1.1 Eukaryotes and prokaryotes

Answer 05 · Mark scheme

Question	Answers	Mark	AO / Spec. Ref.
02.5	**Level 3:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.	5–6	AO3
	Level 2: Relevant points (reasons / causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.	3–4	AO2
	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 allow reference to named crop throughout **effects of climate change** • climate change will change weather patterns / trends • climate change causes flooding **or** drought **or** temperature change • farming land decreased by sea level rise / flooding / desertification • current crops cannot grow / survive (in changing conditions) **benefits of GM** ○ GM may allow crops to grow in wider range of conditions ○ GM may allow crops to be resistant to wider range of pests / diseases ○ GM may allow crops to be stored for longer ○ GM may increase crop yield **or** increase growth rate ○ to feed the increasing human population ○ useful if less area available for farming ○ larger human population needs more land for housing **other relevant content** ▪ variation amongst current crops reduced by asexual reproduction **or** selective breeding ▪ rate of evolution (by natural selection) may be slower than rate of climate change For **Level 3**, answers must explain effect(s) of climate change **and** benefit(s) of GM with logical link.		4.6.2.4 4.7.3.2 4.7.3.5 4.7.3.6

Total Question 2	10

4.1.1.1 Eukaryotes and prokaryotes

Answer 01 · Examiner comments

June 2018 | 8464/B/1H | Original Q1

Question 1 (standard demand)

01.1 Students demonstrated a good understanding of prokaryotic and eukaryotic cells. 87% of students achieved two marks. To gain both marks all three structures had to be correctly linked to the type of cell where each structure is found.

When only one mark was awarded it was usually for identifying the nucleus as being found in eukaryotic cells.

01.2 Students demonstrated a good understanding of cell structure. 80% of students were awarded the mark for identifying the vacuole, ribosome and cell wall in the plant cell.

Students were asked to tick one box, but some labelled the diagram, whilst others circled the names of the structures in the table.

01.3 27% of students achieved this mark. The cells on slide A appeared large, but blurred. The required response was a reference to focusing the image.

Many students referred to zooming in or out, to altering the magnification or using an electron microscope. All of these were ignored. However, if they said increase the magnification this was incorrect and negated a correct answer of focusing the image.

01.4 The cells on slide B appeared small but in focus. The required response was a description of how to obtain a larger image. There were two marks available for this question.

- One was for reference to changing the lens.
- One was for stating that the new lens would have a higher power or magnification.

45% of students obtained a mark. Where a mark was awarded it was usually for saying increase the magnification.

Changing or using a better magnification was insufficient. Many students referred to zooming in or out or said use an electron microscope, both of which were ignored.

4.1.1.1 Eukaryotes and prokaryotes

Answer 01 · Examiner comments June 2018 | 8464/B/1H | Original Q1

01.5 There were three marks available for this question.

- The first mark was for conversion of units. Many students did not attempt a conversion but could still go on to achieve two marks. A range of different errors were made which included multiplying or dividing by 10, 100 or 10 000, rather than by 1000. Some did not appreciate that a micrometre is smaller than a millimetre.
- The second mark was for correctly substituting into the rearranged equation to calculate magnification. This mark was allowed even if their initial conversion was incorrect.
- The final mark was for an answer of 400. Some students added a unit to their answer and this negated the mark.

33% of students achieved all three marks, and 33% achieved two marks. 24% of students scored zero. This was often for 280 ÷ 112 = 2.5

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Examiner comments

June 2019 | 8464/B/1H | Original Q4

Question 4 (standard, standard/high & high demand)

04.1 About 66% of students knew that malaria is caused by a protist. The most common incorrect response was virus.

04.2 Students were asked to give two methods used to prevent people catching malaria, with a reason or explanation for how each method would work. Around 65% of students gained two or more marks.

All marking points in the mark scheme were seen. Most students referred to the use of mosquito nets, but did not always gain the reason mark. A reference to avoiding being bitten, not just to there being a physical barrier, was required. Vaccination was also given as a method, but some struggled to explain how this would work.

There was confusion between antigens, antibodies and phagocytes. Many referred to the body being able to fight off the pathogen, which we always ignore. Some students confused insecticides and insect repellents. The insecticide kills the mosquito, but the repellent just reduces the chance of being bitten. Vague references to bug spray were not credited.

Some students had learnt various methods to reduce the breeding grounds for mosquitos, or talked about GM mosquitos. These were all given credit.

Some students did not appreciate that malaria is not passed from person to person. Some talked about isolating people, hygiene or protected sex, which were incorrect.

04.3 All the marking points on the mark scheme were seen. Most students gained a mark for saying a bacterial cell does not have a nucleus. 34% of students gained both marks.

4.1.1.1 Eukaryotes and prokaryotes

Answer 02 · Examiner comments

04.4 Around 16% of students scored the mark for this challenging question. Students had to relate air, oxygen or carbon dioxide to respiration. Simply saying air had to get in to the bottle was insufficient at this level of demand.

Many said the bacteria needed air to grow, reproduce or survive. These were all insufficient. There were some confused responses, saying bacteria had to be able to enter the bottle through the holes.

04.5 The question required students to apply their knowledge from different parts of the specification to cell division and survival. Over half of the students gained one or more marks. Many students just described the sections of the graph, but did not give reasons for changes in the number of living bacterial cells.

Marking points 1 and 4 were seen most often:

- In stage A, a reference to the bacterial cells dividing slowly, or the cells adjusting to the culture conditions was needed.
- In stage B, many students either referred to the rapid rate of cell division or the plentiful supply of nutrients, but both aspects were needed to gain the mark.
- Only a few students explained why the population remained constant in stage C.
- The reason why the population decreased in stage D was often well expressed. This was usually in terms of nutrients running out rather than the build-up of wastes in the solution.

04.6 In this tough question, about 11% of students scored two or more marks, whilst about 32% scored one mark. This question differentiated across the ability range of students well.

The question stated that calculations must be included, but many students did not attempt any. Three of the five marks were for calculations. Two of these were for calculating the surface area:volume ratio for each cube. Some students calculated the surface area and volume, but did not write them as a ratio. Others forgot to multiply the surface area of one face by 6. The third calculation mark, for converting the two ratios to the same scale, was rarely seen.

If no calculation marks were gained, there was a compensation mark for calculating the total surface area of both cubes, calculating the volume of both cubes or calculating the surface area and volume of one cube when they had not written it as a ratio. Most students who had attempted to do calculations gained a compensation mark.

There were many confused explanations. Quite a lot said active transport would have to be used by the multicellular organism. Many realised that the surface area of cube Y is larger than the surface area of cube X, but did not relate this to the volume. Others thought that cell Y was 55 000 times larger than cell X, which was incorrect.

4.1.1.1 Eukaryotes and prokaryotes

Answer 03 · Examiner comments — June 2022 | 8464/B/1H | Original Q1

Question 1 (standard demand)

01.1 66% of students scored both marks for identifying the cell membrane and cytoplasm as structures that are found in both bacterial and animal cells.

01.2 One symptom of salmonella food poisoning was asked for, with students instructed not to refer to vomiting and diarrhoea. 60% of the students were awarded the mark, usually for stomach ache or fever. Many described fever as having a high temperature or sweating, which were allowed.

01.3 64% of students knew that penicillin was the first antibiotic developed. A wide range of phonetic spellings were accepted. The most common incorrect answers were the names of well-known painkillers.

01.4 Fewer than half of the students scored this mark. Most correct responses referred to a time delay before the antibiotics became effective, or started working. A few students said the bacteria would be reproducing or multiplying. There was some confusion with antibodies, and incorrect references to bacteria fighting the antibiotics, or antibiotics fighting bacteria.

01.5 Two-thirds of students knew that a child will start to feel better after taking antibiotics for a few days because there will be fewer toxins in the body. Most other students thought the child had become resistant to the bacteria.

01.6 31% of students scored the mark, usually for saying overuse of antibiotics could result in antibiotic resistance. Alternatively, they scored the mark for the idea that the person would get better without taking any antibiotics, which was allowed.

Quite a lot of students said the patient or the antibiotic would become resistant, which was incorrect. A common mistake was to confuse immunity with resistance.

Answer 03 · Examiner comments — June 2022 | 8464/B/1H | Original Q1

01.7 A third of students correctly identified the drawing of the white blood cell as the cell that produces antibodies. More than half of the students thought the red blood cell produced antibodies; potentially as a result of students being unfamiliar with drawings of blood components.

01.8 63% of students identified platelets as the part of the blood that starts the clotting process. Few selected plasma as their answer.

4.1.1.1 Eukaryotes and prokaryotes

Answer 04 · Examiner comments

June 2024 | 8464/B/1H | Original Q5

Question 5 (standard/high & high demand)

05.1 This question required students to make the link between the size of bacteria and the requirement for a high magnification or resolution. Therefore, an electron microscope is needed. Many students referred to an 'electronic microscope', which was insufficient. References to black and white images were also insufficient. 40% of students correctly linked electron microscope and the reason why it was used.

05.2 Just under a quarter of students understood this concept well and gained all 3 marks. A common mistake was to confuse a single loop of DNA with rings of DNA called plasmids.

05.3 This proved to be a very challenging question, with students often unable to work the calculation through and making mistakes at many of the different stages: 41% of students were only awarded 1 mark. Many students did not realise they needed to measure the diagram of a cell using a ruler, instead giving the image size as 30 mm. Many managed to calculate the real size as 45 µm; however, many were weak in correctly converting the units with frequent mistakes in converting 45 µm in 45 nm. Some students did not seem to think about whether their final answer made mathematical sense, giving a result that was unreasonably large or small.

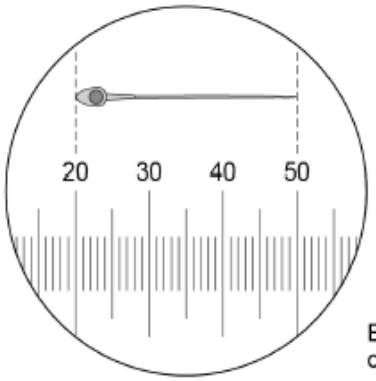
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4.1.1.1 Eukaryotes and prokaryotes

Answer 04 · Examiner comments June 2024 | 8464/B/1H | Original Q5

0 5 . 3 **Figure 4** shows a special slide used to determine the size of a cell viewed using a microscope.

Figure 4



Each small division on the scale is 1.5 µm

Calculate the magnification of the cell shown in **Figure 4**.

[5 marks]

Calculate the magnification of the cell shown in **Figure 4**.

[5 marks]

magnification = image size / actual size

30 ÷ 1000 = 0.03

magnification = 3.6 / 0.03 = 120

Magnification = x 120

This was a common response, with a correct equation given for the fallback mark. The student has correctly measured the cell size at 3.6 cm and this is still awarded even if it is marked on the diagram.

The student cannot correctly work out the actual size of the cell instead giving 30 µm. They also incorrectly divide the 30 µm by 1000 giving an incorrect actual size. Although they correctly substitute in their numbers these are too far from the correct calculation to be awarded anything other than 1 mark for measuring the size of the cell correctly.

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4.1.1.1 Eukaryotes and prokaryotes

Answer 05 · Examiner comments

Question 2 (standard demand)

02.1 More than 50% of students could select that the classification group 'Eukaryota' is a domain.

02.2 Almost all students knew that asexual reproduction produces genetically identical offspring.

02.3 More than 80% of students knew that a gamete contains half the number of chromosomes compared to the other cells in a potato plant.

02.4 Most students could describe how a new plant species could be identified as being in the same genus as potatoes. DNA analysis or similar characteristics were the most common correct answers.

Misconceptions were seen, such as the idea that the species would have identical DNA.

02.5 Most students followed the direction of the question, stating that GM crops can be made to grow even if the climate changes.

Some students were aware of food insecurity as a result of climate change, and this could be given credit for the idea that current crops will not be able to grow/survive.

Lists of possible benefits of GM were limited to Level 1 if there was no link to climate change. Most students made very good attempts at this question and many recognised some of the effects of climate change and were able to link these to the idea that current crops would struggle to grow in these conditions. This was an attempt at a logical link and achieved a Level 2 mark.

Some students further developed this idea, and clearly had a grasp of the question being asked, as they then went on to describe how GM would enable crops (or potatoes) to survive the conditions that climate change brings. They could further strengthen their account with suggestions that more crops could be grown or crops could be grown faster. These responses were detailed and logically linked accounts and were therefore Level 3 responses.

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4.1.1.1 Eukaryotes and prokaryotes

Answer 05 · Examiner comments June 2024 | 8464/B/2H | Original Q2

Some students gave explanations of causes of climate change, but this did not answer the question.

Some students responded in terms of 'how' GM crops can be produced, mentioning enzymes and vectors. This was not answering the question and therefore could not be given credit. These responses often gained marks from the rest of their explanation.

0 2 . 5 Scientists have collected and stored seeds from species in the same genus as potatoes.

In the future, these seeds may be used for genetic modification of potato plants.

Genetically modified potato plants could help supply food to the human population as the climate changes.

Explain why genetic modification of crop plants may be important for the human population to survive climate change.

[6 marks]

As climate changes occurs the global temperature could get warmer. This means that agriculture will become harder and it will become harder for crops to be grown under hot conditions. This means that genetically modified crops could be modified to withstand greater heat and be produced in bigger yields. These crops could be produced with more nutrients and be bigger so that humans could get more energy in the future where there will be limited resources.

The student has described two effects of climate change (global temperature getting warmer and that it will be harder for crops to be grown). They then give two relevant benefits of GM linked to these ideas. This meets and exceeds the description for entry into Level 3, for both logical linking and detail, therefore 6 marks were awarded.

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