AQA GCSE Biology | 8461

SPECIFICATION POINT 4.6.1.3

Advantages and disadvantages of sexual and asexual reproduction (biology only)

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**17**
Available paper years	**2007–2025**

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.

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 01 · Mark scheme March 2007 | BLY1B | Original Q4 | Legacy

Four	**A**	evolved	**1**
	B	genes	**3**
	C	natural selection	**2**
	D	survived	**4**

Answer 02 · Mark scheme November 2008 | BLY1BP | Original Q6 | Legacy

Six	**3**	**4**	**2**	**3**

Answer 03 · Mark scheme March 2009 | BLY1BP | Original Q7 | Legacy

Seven	**3**	**2**	**4**	**4**

Answer 04 · Mark scheme March 2009 | BLY1BP | Original Q9 | Legacy

Nine	**1**	**3**	**2**	**3**

Answer 05 · Mark scheme June 2009 | BLY1BP | Original Q8 | Legacy

Eight	**3**	**1**	**3**	**1**

Answer 06 · Mark scheme March 2010 | BLY1BP | Original Q3 | Legacy

Three	**4**	**3**	**2**	**2**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 07 · Mark scheme

March 2011 | BLY1BP | Original Q1 | Legacy

Question	Key		
One	**A**	embryo transplants	**2**
	B	sexual reproduction	**4**
	C	taking cuttings	**1**
	D	tissue culture	**3**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 08 · Mark scheme

June 2011 | BLY1H | Original Q7 | Legacy

Question 7

question	answers	extra information	mark
7(a)	any **two** from: • no fusion in asexual **or** sexual involves fusion **or** no mixing of genetic information in asexual **or** mixing of genetic information in sexual **or** asexual involves splitting (of one individual) • no gametes in asexual **or** sexual involves gametes • only one parent in asexual **or** sexual involves two parents • no variation in asexual **or** asexual produces clones **or** sexual leads to variations	assume it refers to asexual accept no fertilisation in asexual **or** fertilisation in sexual accept genes / alleles / chromosomes / genetics for genetic information accept named gametes allow offspring of sexual have characteristics of both parents for this point ignore sexual intercourse ignore external / internal ignore plants / animals ignore mitosis / meiosis	2
7(b)	nucleus of egg removed **or** involves empty egg cell so only one nucleus **or** one set of genetic information / genes / chromosomes **or** so genetic information / genes / chromosomes from one parent only		1 1
Total			**4**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 08 · Mark scheme June 2011 | BLY1H | Original Q7 | Legacy

BLY1H

Answer 09 · Mark scheme November 2011 | BLY1BP | Original Q6 | Legacy

Six	**4**	**3**	**4**	**1**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 10 · Mark scheme

June 2013 | BL1HP | Original Q5 | Legacy

Question 5

question	answers	extra information	mark
5(a)	auxin	accept other named plant hormones	1
5(b)(i)	any **three** from: • no (fusion of) gametes / fertilisation • only one parent • no mixing of genetic material • no genetic variation **or** genetically identical offspring	 allow no meiosis **or** new cells only produced by mitosis allow not two parents allow clones	3
5(b)(ii)	more / many offspring / plants (produced from one parent plant)	allow less damage to parent plant ignore speed / cost	1
Total			**5**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 11 · Mark scheme

June 2013 | BL3HP | Original Q3 | Legacy

Question 3

question	Answers	extra information	mark
3(a)(i)	wheat → humans chain transfers 10 times more energy than wheat → pigs → humans chain or wheat → pigs → humans chain transfers 810 000 (kJ per hectare) less	allow 10% if given as a comparison e.g. one is 10% of the other ignore less unqualified	1
3(a)(ii)	any **one** reason for energy loss from pigs e.g.: • movement • (maintaining) body temperature • waste materials • not all parts of pig eaten by human • because there is an extra stage (pigs) in the food chain and energy is lost at each stage	ignore respiration, growth ignore heat unqualified allow named examples allow longer food chain so more energy lost	1

Question 3 continues on the next page . . .

Question 3 continued

3(b)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		6
0 marks	**Level 1 (1-2 marks)**	**Level 2 (3-4 marks)**	**Level 3 (5-6 marks)**
No relevant content.	There is a basic description of at least one factory farming method **or** identification of an advantage or disadvantage of factory farming.	There is a description of at least one factory farming method **and** an advantage or disadvantage is explained.	There is a description of factory farming methods **and** advantage(s) and disadvantage(s) are explained.

examples of biology points made in the response:

factory farming methods e.g.:

- Kept in cramped conditions / battery hens / calf crates / pig barns / fish tanks
- Controlled temperature / heating
- Controlled feeding / modified food given / growth hormones
- Controlled lighting
- Treated with prophylactic antibiotics

Advantages e.g.:

- Increased efficiency / profit / greater food production / cheaper food / faster growth
- Farmer can have more livestock
- Less energy is lost through movement
- Less energy is used keeping warm
- (Food is high in calories / protein) so animals will grow faster / lay more eggs
- Easier to vaccinate all the animals
- Easier to protect animals from predators
- Antibiotic treatment stops infections in animals

Disadvantages e.g.:

- Stress / cruelty / inhumane / unethical
- Restricted movement / overcrowding
- Faster spread of diseases
- Antibiotics in the food chain / residual chemicals in the food chain
- Wasting fossil fuels / increasing global warming
- Increased pollution from animal waste and from additional transport

Total			**8**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 12 · Mark scheme June 2017 | BL1HP | Original Q7 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7(a)	idea that sexual reproduction results in genetic variation	allow converse if clearly referring to asexual reproduction allow reference to natural selection / evolution (if conditions change)	1	AO1 1.7.2a
7(b)(i)	any **four** from: • nucleus taken from egg (cell) (of female) **A or** cytoplasm (and membrane) discarded • nucleus removed / discarded from egg (cell) (from female) **B or** only cytoplasm (and membrane) kept • nucleus from **A** inserted into (enucleated / empty cell / cytoplasm from) egg (cell) (of female) **B** • fertilised / fertilisation (of 'hybrid' cell) • electric shock (after fertilisation) **or** grown into embryo	accept throughout: female **A** = person with faulty mitochondria female **B** = person without faulty mitochondria allow egg and sperm fuse allow cell division / mitosis	4	AO1/3 1.7.2a/c
7(b)(ii)	idea of cytoplasm / mitochondria of 'hybrid' / fertilised cell / embryo comes from cell / female / B with 'normal' mitochondria **OR** only the nucleus is used from A (1) the nucleus does not contain mitochondria **or** these faulty genes (1)		1 1	AO2 1.7.2c

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

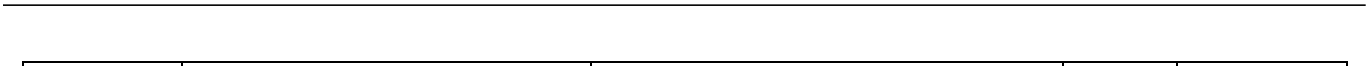
Answer 12 · Mark scheme

7(b)(iii)	any **one** from: • idea that child has unknown parentage **or** 3 parents • against religious beliefs / teachings • could cause (more) prejudice (against people with perceived imperfection)	ignore ref to unethical / immoral ignore ref to being against religion / God's will unqualified	1	AO3 1.7
Total			**8**	

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 12 · Mark scheme

June 2017 | BL1HP | Original Q7 | Legacy



4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 13 · Mark scheme June 2018 | 8461/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	<table><tr><th></th><th colspan="3">statement is true for</th></tr><tr><th></th><th>mitosis only</th><th>meiosis only</th><th>both mitosis and meiosis</th></tr><tr><td>all cells produced are genetically identical</td><td>✓</td><td></td><td></td></tr><tr><td>in humans, at the end of cell division each cell contains 23 chromosomes</td><td></td><td>✓</td><td></td></tr><tr><td>involves DNA replication</td><td></td><td></td><td>✓</td></tr></table>	3 correct = **2** marks 2 correct = **1** mark 0 or 1 correct = **0** marks	2	AO1 4.1.2.2 4.6.1.2
05.2	any **two** from: • many offspring produced • takes less time • (more) energy efficient • genetically identical offspring • successful traits propagated / maintained / passed on (due to offspring being genetically identical) • no transfer of gametes or seed dispersal • not wasteful of flowers / pollen / seeds • colonisation of local area	ignore references to one parent only allow asexual is faster allow offspring are clones allow no vulnerable embryo stage allow no need for animals must imply local area	2	AO3 4.6.1.1 4.6.1.3

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

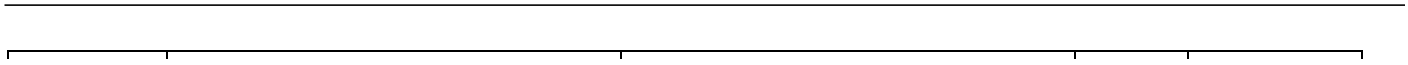
Answer 13 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3		allow bluebell example described (**max 3** if not bluebell)		
	genetic variation (in offspring)		1	AO1
	(so) better adapted survive	allow reference to natural selection or survival of the fittest	1	AO1
	(and) colonise new areas by seed dispersal **or** can escape adverse event in original area (by living in new area)	must imply new area	1	AO3
	many offspring **so** higher probability some will survive		1	AO3 4.6.1.1 4.6.2.1 4.6.1.3 4.7.1.1
Total			**8**	

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 13 · Mark scheme

June 2018 | 8461/2H | Original Q5



4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Mark scheme

November 2020 | 8461/2H | Original Q8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	38 500 000 – 36 000 000	allow 500 000 × 5	1	AO2 4.6.3.6
	2 500 000 (years) **or** 2.5 million (years)	if no other mark awarded, allow 38.5 – 36 = 2.5 **or** 0.5 × 5 = 2.5 for **1** mark	1	

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Mark scheme

November 2020 | 8461/2H | Original Q8

08.2	(extinction of Andrewsarchus) led to population increase / evolution of another predator because Andrewsarchus no longer competing for food / resources other predator (population) hunted more Brontotherium **or** (extinction of Andrewsarchus) led to population increase / evolution of another herbivore (previously eaten by Andrewsarchus) (1) because Andrewsarchus no longer predating (other) herbivore (1) more competition with other herbivores (1) **or** (extinction of Andrewsarchus so) Brontotherium are not eaten so therefore the population increases (1) so much that the food source decreases (1) Brontotherium compete with each other so much that they all die (1)	allow idea of a new predator allow because Andrewsarchus no longer eating another predator max **2** marks if reference to hunted by humans **or** still killed by Andrewsarchus **or** reference to climate change or factors relating to climate change	1 1 1	AO2 4.6.3.6 4.7.1.1 4.7.1.3 4.7.4.1

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Mark scheme

08.3	any **three** from: • fossils buried deep(er) so hard(er) to find • fossils smaller so harder to find • more likely to be destroyed by geological activity / earthquakes / erosion • oldest organisms were soft-bodied so most of the tissue decayed • dating older fossils is hard • older eras less researched by scientists because less to find • (usually) unclear when one species evolves into another species (because not enough fossils found)	allow oldest organisms were soft-bodied so there were very few fossils	3	AO2 4.6.3.5

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Mark scheme

November 2020 | 8461/2H | Original Q8

Question	Answers	Mark	AO / Spec. Ref.
08.4	**Level 3:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.	5–6	AO3 4.6.3.6 4.7.1.2 4.7.1.3
	Level 2: Some logically linked reasons are given. There may also be a simple judgement.	3–4	
	Level 1: Relevant points are made. They are not logically linked.	1–2	
	No relevant content	0	
	Indicative content **Supporting the statement** • decrease (in large mammals) is large(r) in some areas • decrease (in large mammals) occurs when humans enter areas • decrease occurs at different times in the areas, so not suggestive of worldwide climate change or meteor impact or volcanic activity • decrease is not (always) immediate, suggesting human population grew, then had impact **or** decrease accelerates as human population grows **Not supporting the statement** • only shows large mammals **or** does not show other species • correlation does not mean causation • there were always some left so it wasn't a 'mass extinction' • decrease could have been due to other factors / named • no information about climate change / abiotic factors • no information about predators / pathogens / food sources / other biotic factors • decrease (in mammal population) in Africa (after humans present) is small • decrease (in mammal population) in Madagascar (after humans present) was gradual / slow • only shows data for four areas of the world **or** no data shown for other areas of the world Answers in level **3** must refer to evidence supporting **and** not supporting the statement		

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Mark scheme

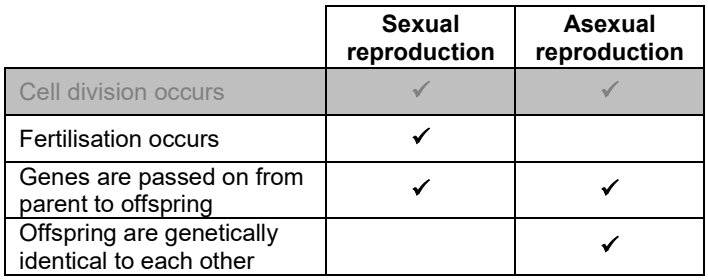
November 2020 | 8461/2H | Original Q8

08.5	(disadvantage) any **one** from: • loss of potential, future biodiversity • reduction in range of alleles (advantage) allows evolution of new species / varieties	 allow loss of biodiversity allow reduction in gene pool allow opportunity for speciation	 1 1	AO3 4.6.3.6
Total			**16**	

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 15 · Mark scheme

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1			2	AO1 4.6.1.1

allow **1** mark for 1 or 2 correct rows
ignore 'x' in blank boxes

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	pollen (grain)	allow nucleus in pollen (grain)	1	AO1 4.6.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	between 3 and 4 hours		1	AO2 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	5 hours 6 hours		1 1	AO2 4.6.1.2

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 15 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	2		1	AO2 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	4		1	AO2 4.6.1.2

Total Question 1		**8**

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 16 · Mark scheme

June 2023 | 8461/1H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.1	vector		1	AO1 4.3.1.5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.2	any **three** from: • protist / it has mitochondria • protist / it has (a) nucleus **or** protist DNA / genetic material is not free in the cytoplasm • protist / it does not have a single loop of DNA / genetic material • protist / it does not have plasmids • protist / it does not have a cell wall	allow converse for prokaryotic cells allow eukaryotic for protist if neither mark awarded, allow **1** mark for protist has membrane-bound structures ignore genetic information ignore genetic information do **not** accept eukaryotic cell does not have a cell wall allow protist / it does not have a slime capsule ignore cilia / flagellae / ribosomes ignore size / shape	3	AO2 4.1.1.1 4.3.1.5

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 16 · Mark scheme

June 2023 | 8461/1H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.3	less oxygen carried (in blood) less energy released from respiration	allow less oxygen carried (to cells) ignore reference to number of red blood cells unqualified do **not** accept no oxygen carried do **not** accept energy produced / made / created	1 1	AO2 4.4.2.3 4.4.2.1 4.2.2.3

Question	Answers	Mark	AO / Spec Ref.
05.4	any **three** pairs from:	3	AO1 4.6.1.1 4.1.2.2

Sexual reproduction	Asexual reproduction
involves two parents	involves one parent
involves gametes joining / fusing **or** involves fertilisation	involves no (fusion of) gametes **or** does not involve fertilisation
there is mixing of genetic material / information **or** there is genetic variation **or** offspring are genetically different	there is no mixing of genetic material / information **or** there is no genetic variation **or** offspring are genetically identical ignore reference to clones
involves (only) meiosis	involves mitosis **or** does not involve meiosis
more energy required	less energy required
slower	faster

if no other mark awarded allow **1** mark for asexual reproduction produces many offspring

pairs of answers can be in any order

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 16 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.5	(no bases so) DNA replication cannot occur	allow copying / duplicating / doubling for replication ignore cannot make DNA unqualified	1	AO2 4.1.2.2

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.6	(after DNA replication) one set of chromosomes is pulled to each end of the cell	allow one (member) of each pair of chromosomes is pulled to each end of the cell ignore (half the) chromosomes are pulled to each end of the cell	1	AO1 4.1.2.2
	nucleus divides	allow two (new) nuclei form	1	
	cytoplasm **or** cell membrane divides to form two cells	allow cytokinesis	1	

Question	Answers	Extra information	Mark	AO / Spec Ref.
05.7	having disorder **S** reduces incidence / percentage of malaria	allow having disorder **S** reduces chance of getting malaria allow having disorder **S** protects against malaria	1	AO3 4.2.2.5 4.3.1.5
	as age increases a lower percentage of children with disorder **S** get malaria until age 10, then the percentage increases	allow protection against malaria increases with (increasing) age until age 10, then it decreases	1	

Total Question 5	15

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 17 · Mark scheme

June 2025 | 8461/2H | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	cell division **1**		1	AO2 4.1.2.2 4.6.1.1 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	**A** and **C**		1	AO2 4.1.2.2 4.6.1.1 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	23 **or** twenty three	do **not** accept 23 pairs	1	AO2 4.6.1.2 4.6.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	5 / five **or** 6 / six	ignore reference to letters	1	AO2 4.6.1.2 4.6.1.8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	(only) mitosis	do **not** accept meiosis / meitosis / metosis	1	AO1
	(so) **all** cells receive a copy of every allele / gene	allow (so) **all** cells receive a copy of every chromosome **or** (so) **all** cells receive a copy of all the DNA **or** (so) **all** cells receive a full set of chromosomes	1	AO2 4.6.1.1 4.1.2.2 4.6.1.3

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 17 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	gametes are produced by meiosis		1	AO1
	(so) offspring have unique / different / random combinations of alleles / genes / chromosomes from each parent / gamete	allow (so) gametes fuse creating unique / different / random combinations of alleles / genes / chromosomes in offspring	1	AO2 4.6.1.1 4.6.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.7	any **two** from: • faster than sexual • many offspring produced to colonise local area **or** many offspring produced to out-compete other species • genetically identical offspring so well adapted to current conditions / environment • only one parent needed so no need for pollinators / bees • offspring receive water **and** sugars / minerals / ions / salts from parent • less energy / materials required as no need to produce gametes / flowers / seeds / fruits		2	AO1 4.6.1.1 4.6.1.3

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 17 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.8	any **two** from: • new combinations of alleles gives genetic variation **or** genetic variation gives selective advantage • seeds dispersed to new / wider area so less vulnerable to habitat loss **or** seeds dispersed to new / wider area so not competing with (parent / offspring) plants for space / water / minerals • larger number of offspring produced so will increase the population quickly	allow genetic variation provides the opportunity for evolution allow genetic variation enables species to adapt to new / changed environments allow larger number of offspring produced will improve survival of the species	2	AO1 4.6.1.1 4.6.1.3 4.6.2.2 4.6.3.1

Total Question 6	12

Answer 14 · Examiner comments

November 2020 | 8461/2H | Original Q8

Question 8 (standard, standard/high & high demand)

This question was about extinct mammals and the causes of their extinction. In **08.1** many students had difficulty reading the scale on the graph as the numbers increased from right to left on a time scale showing millions of years ago. The overlap in existence between the two species could be determined either by subtracting the end of the overlap from its beginning (38.5 - 36 million years = 2.5 million years) or by ascertaining that each small square represented 0.5 million years, hence 5 small squares represented 2.5 million years. Many did not gain a mark due to omitting the word 'million' in front of years on the answer line.

In **08.2** students found it conceptually difficult that the extinction of a carnivore should lead to the subsequent extinction of a herbivore, so much so that many of them imagined that the carnivore had been eaten by the herbivore, the latter thus running out of food. Higher-attaining students followed one of three possible routes to develop a hypothesis to explain the situation:

1. The extinction of the carnivore led to an increase in numbers of another carnivore which ate the herbivore.
2. The extinction of the carnivore led to an increase in numbers of a different herbivore which outcompeted (for food) the herbivore given in the question.
3. The extinction of the carnivore led to an increase in numbers of the herbivore which competed with other members of its own species so that their food ran out.

The concept of the fossil record being unclear for older species was difficult for the majority of students in **08.3**: 40% scored any marks in this question with a minority achieving the full 3 marks. Higher-attaining students stated that older fossils were more likely to have been destroyed by geological events such as earthquakes. Some alluded to the fact that older fossils were more likely to be buried deeper underground or were in inaccessible places such as the ocean bed, or that they were smaller, and so were more difficult to find.

In **08.4** students had to evaluate data in the form of four simple graphs showing the percentage survival of large mammal species in four different areas of the world over millions of years in relation to the time when humans first appeared in each area in order to decide whether the hypothesis that humans caused mass extinctions was correct or not. Most students noticed that large decreases in the percentage survival of the large mammals occurred when humans entered three of the areas, which supported the hypothesis. Many pointed out that, to the contrary, the decrease in survival was much less in one of the areas (Africa) and that it might have been due to some other factor, that only large mammals were considered rather than all animal species, that there was no information given about, for example, predators, pathogens, food sources, any abiotic factors, and that these four areas of the world were not necessarily representative of the effects of humans elsewhere. To obtain the highest marks, students had to have considered both sides of the argument and made a judgement based upon the evidence (or lack of it) which they had cited. 4% of students attained the highest level in their answers in order to be awarded 5 or 6 marks, the majority of the rest scoring either 2 or 3 marks.

Concluding Remarks

Particular problems which occurred quite frequently included:

- confusion of certain terms, eg mitosis / meiosis, reabsorption / filtration / excretion
- paying insufficient attention to information provided in the stem of a question in order to guide a reasoned response, avoid misconceptions and the inclusion of irrelevant information
- repeating, rather than using, information given in the question, for which no marks are available
- careless reading of the question resulting in an inappropriate answer, or not following instructions in multiple-choice items, such as to tick the correct number of boxes
- careless reading of data from a graph
- omitting numbers when a question asks for the use of data
- missing a question when no answer lines were provided and the answer needed to be in a table or a Punnett square
- poor handwriting, for example with numerals – especially the distinction between the numbers 1 and 2
- not checking whether the answer to a calculation is sensible – for example, in converting units over an appropriate order of magnitude, such as the conversion of nanometres to metres.

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 14 · Examiner comments

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 15 · Examiner comments June 2022 | 8461/2H | Original Q1

Question 1

This was the first of three questions common to both the Foundation and Higher Tier papers. The topic was reproduction and meiosis.

01.1 Three-quarters of students correctly selected whether each of the three statements applied to sexual and/or asexual reproduction. The most common error was not knowing that in *both* types of reproduction genes are passed from parents to offspring.

01.2 Almost the same proportion knew that pollen is the male gamete formed in flowering plants. Incorrect answers included 'anther', 'stamen, 'stem', 'stigma', 'sperm' and even 'testis'.

01.3 -01.6 Interpretation of the graph in **Figure 4**, which showed changing amounts of DNA in a cell before, during and after meiosis, was good in questions **01.3** and **01.4** where, respectively, the correct period of DNA synthesis and the correct times of cell divisions were selected. However, only half the students chose the correct values for the amount of DNA expected in a sperm cell and in an embryo in **01.5** and **01.6**.

Answer 16 · Examiner comments June 2023 | 8461/1H | Original Q5

Question 5 (Standard, standard/high and high demand)

05.1 The majority of students answered this question correctly with just over 68% of students gaining credit. A number of students referred to 'communicable disease' or 'carrier' which were not creditworthy.

4.6.1.3 Advantages and disadvantages of sexual and asexual reproduction (biology only)

Answer 16 · Examiner comments

June 2023 | 8461/1H | Original Q5

05.2 Students were told in the stem of the question that the malarial protist is a eukaryotic cell, and clearly most students processed this information and just under 95% of student gained some marks. Incorrect responses were seen often when students mixed up protist and prokaryote structures or had misconceptions regarding prokaryote structure suggesting a lack of cell membrane or cytoplasm.

05.3 Most students gained credit for stating that lesson oxygen could be carried by the blood, if red blood cells burst. Only around 20% of students linked this idea to respiration and energy release for the second marking point. Some students suggested that as a result 'no oxygen would be carried' which was not creditworthy. We again this year saw the usual incorrect idea of energy being produced or created which lost students this second marking point.

05.4 Over 70% of students were able to gain some marks on this question, with 8% gaining the full 3 marks available. Many students knew that sexual reproduction involved 'gametes' but they failed to include the idea of fusion and missed out on the first marking point. A pleasing number of students gave the idea of genetic variation for the second marking point, but when 'genetic' was omitted or students simply referred to 'clones' credit was not awarded. The full array of possible creditworthy ideas were seen, as well as the fallback mark.

05.5 Only around 37% of students gained this mark. Those that did not, often lacked detail in their answer. Students were required to specifically refer to DNA, and terms such as 'chromosome' or 'genetic material' were ignored. Furthermore, references to DNA 'multiplying' or 'reproducing' did not gain credit.

05.6 This was a high demand question, and in particular the first marking point proved a good discriminator with very few students referring to 'one set of chromosomes' being pulled to each end of the cell, and instead giving vague references to 'chromosomes pulling apart', or 'DNA halves' which are insufficient at this level. While the process of mitosis is undoubtedly familiar to most students, they struggled to articulate their ideas clearly in their responses. Less than 3% of students gained all 3 marks as a result. Almost 37% gained 1 mark for references either the 'nucleus dividing' or 'the cell membrane / cytoplasm dividing' to form 2 cells.

05.7 The majority of students got muddled with the data in this question or misinterpreted it due to misreading the information provided in the stem informing them that 'the incidence of malaria in children with disorder S was calculated as a percentage of the incidence in children without disorder S'. Consequently, most students concluded that that having disorder S *increased* the chances of children getting malaria and therefore only a minority gained credit, with only 1% of students gaining 2 marks. The trend was however described correctly by around 27% of students for the whole age range obtaining 1 mark.

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June 2025 | 8461/2H | Original Q6

Question 6 (Standard, Standard/high and High demand)

06.1
Over 70% of students identified the correct cell division that represented mitosis.

06.2
Over half of students identified cells A and C as being genetically identical.

06.3
Just over 85% of students gained the marking point here, knowing that cell J had 23 chromosomes. The most common incorrect response was '23 *pairs*'.

06.4
Students appeared to struggle with the high demand of this question, with only around 15% of students gaining the mark. Knowledge of the *stages* of meiosis is not required for this specification – as such the exact point that the reduction in chromosome numbers happens is not needed, hence, it was reasonable for students to give an answer of 5 or 6 depending on their interpretation.
The most common correct answer was '6', and there was a range of incorrect responses, with '4' being the most common. Some responses gave a list of letters without a number which did not answer the question.

06.5
Students struggled to clearly explain why offspring produced using runners are genetically identical. While many students correctly identified mitosis as being involved for mark point 1, simply stating that offspring were 'clones' was not sufficient without mentioning mitosis. 30% of students gained 1 mark – overwhelmingly for mark point 1. Mark point 2 was rarely awarded due to ineffective articulation at this level of demand. Even answers containing pertinent details often struggled to fully meet the mark scheme requirements. Additionally, many students focused on describing asexual reproduction, with answers such as 'only one parent is required' or 'no gamete fusion,' rather than explaining **why** the offspring were genetically identical. Some described mitosis as producing two genetically identical cells, but this was insufficient to explain why the whole plant was genetically identical.
Despite detailed attempts by most students, only 1% of students gained both available marks.

06.6
Only 10% of students managed to gain any marks in this question. Again, features of sexual reproduction were given, with little additional detail explaining why the offspring produced using flowers, fruits and seeds are not genetical identical. To earn mark point 1, students needed to explicitly link meiosis with the production of gametes, a connection rarely seen in responses that typically mentioned one without the other. Mark point 2 proved highly demanding due to its strict detail requirements. Many good attempts were seen but

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unfortunately lacked the precision needed at this level of demand. A very common error was the suggestion that meiosis actually produced the flowers, fruits and seeds which is incorrect.

06.7

One fifth of students were able to describe at least one advantage of asexual reproduction to the survival of the strawberry plants. For bullet point 1, a direct comparison to sexual reproduction had to be made, but many responses did not use this comparative language. However, if awarded bullet point 1 was by far the most common correct response seen.
For bullet points 2 through to 6, a clear link to a survival advantage was required. Many responses stated that 'less energy was needed', or 'only one parent needed' but then did not link it to the appropriate survival advantage and as such could not be awarded credit.

06.8

This question was set at very high demand with only a quarter of students gaining at least 1 mark. Bullet point 1 was the most common advantage of sexual reproduction given – articulated in many ways to match the variety of options on the mark scheme. Responses such as, 'genetic variation will decrease the chance of a disease killing all the plants' was most commonly awarded – which equated to 'genetic variation gives selective advantage' gaining one mark. Several good answers were seen but sadly students had only referred to 'variation' and not 'genetic variation' and so could not be credited. In addition, some responses correctly stated that 'seed dispersal would lead to less competition' but then didn't qualify this with any of the required examples from the mark scheme and as such were not credited.