AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.5.1

Factors affecting food security

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**4**
Available paper years	**2009–2020**

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.

4.7.5.1 Factors affecting food security

Answer 01 · Mark scheme

January 2009 | BLY1H | Original Q6 | Legacy

question	answers	extra information	mark
6(a)	any **four** from:		4
	• nucleus / DNA / chromosomes / genetic material removed (from egg)	linked to second point allow 'empty egg cell' for first **two** marks	
	• from (unfertilised) egg / ovum	do **not** allow fertilised egg allow egg from champion cow	
	• nucleus from body cell of champion (cow)		
	• inserted into egg / ovum		
	• electric shock		
	• to make cell divide **or** develop into embryo		
	• (embryo) inserted into womb / host / another cow	allow this point if wrong method eg embryo splitting	

Question 6 continued on next page…

4.7.5.1 Factors affecting food security

Answer 01 · Mark scheme

January 2009 | BLY1H | Original Q6 | Legacy

COMPONENT NUMBER: BLY1H

COMPONENT NAME: Science B / Biology

STATUS: Final

DATE: January 2009

Question 6 continued…

question	answers	extra information	mark
6(b)	any **four** from: Pros: • economic benefit eg increased yield / more profit • clone calf not genetically engineered • genetic material not altered • milk safe to drink / same as ordinary milk Cons: • consumer resistance • caused by misunderstanding process • not proved that milk is safe • ethical / religious argument • reduce gene pool / eg Conclusion: sensible conclusion for or against, substantiated by information from the passage and / or own knowledge	max **3** marks max **3** marks ignore 'God would not like it' **or** 'it's not natural' conclusion at end	4 1
Total			**9**

4.7.5.1 Factors affecting food security

Answer 02 · Mark scheme

November 2009 | BLY1BP | Original Q9 | Legacy

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

4.7.5.1 Factors affecting food security

Answer 03 · 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**

4.7.5.1 Factors affecting food security

Answer 04 · Mark scheme

November 2020 | 8461/2H | Original Q7

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1	triangular pyramid with 3 levels		1	AO1 4.7.4.1 4.7.4.2
	correct labels: (waste) vegetables / plants; insect(s); dog(s)	do **not** accept additional incorrect labels	1	AO2 4.7.4.2
07.2	any **two** from: • carbon dioxide from respiration (from dog) • urea from excretion (from dog) • not all parts (of insects) are absorbed / digested (by dog)	allow carbon dioxide breathed out (by dog) allow urea in urine (from dog) allow faeces from egestion (from dog) ignore references to loss of energy if no other mark awarded allow **two** factors without descriptions for **1** mark	2	AO1 4.7.4.3
07.3	less land required		1	AO2 4.7.5.1 4.7.3.5
	(so) more space for crops (for humans)	allow more meat (from cows etc) for humans	1	
	less methane (from animals) therefore less global warming	allow less methane from rotting vegetables in landfill	1	
	(therefore) less harmful effects of global warming on (human) food production	allow example such as less flooding of farmland allow may lead to the development of more foods for humans made from insects	1	
Total			**8**	

4.7.5.1 Factors affecting food security

Answer 04 · Mark scheme November 2020 | 8461/2H | Original Q7

Answer 04 · Examiner comments November 2020 | 8461/2H | Original Q7

Question 7 (standard, standard/high & high demand)

This question presented students with a novel situation: the development of a new type of food for dogs from insects. This was set in the context of a food chain, the transfer of biomass and, ultimately, in the provision of food security for humans. **07.1** was a relatively straightforward question for students. Problems mainly arose in the labelling with the use of terms such as 'secondary' and 'tertiary' consumers (the latter being entirely inappropriate), or by adding multiple labels that included the names of the organisms, the types of producer and consumer and the numbered trophic levels, but with an error in one of these, and thus this mark could not be awarded. In 07.2 reasons given by students for the incomplete transfer of biomass from the insects to the dogs were largely incorrect, with 1% of students being able to describe two. Some students made inappropriate references to some of these processes occurring in the insects rather than in the dogs.

07.3 related the scenario of insect-based dog food to human food security. Students found this difficult and, although nearly three-quarters scored one mark (usually for stating that more meat would be available for human consumption if dogs were fed on insects), 7% gained further credit. Few realised that if less meat were consumed by dogs, then less land would be required for animal grazing and hence it could be utilised for growing crops. Hardly any suggested that a reduction in farm animals would perhaps reduce methane output and the negative effects of methane on the climate and hence on the growth of crops.