



GCSE Science A 2

Higher Tier

Unit 6H

SPECIMEN MARK SCHEME

Version 1.0

Quality of Written Communication and levels marking

In Question 4 candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

In order to attain a mark within a certain level, **both** the science **and** the QWC must be of a standard appropriate to that level.

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
1(a)	photosynthesis		1
	carbon dioxide taken in		1
1(b)	2.5(:1)	correct answer with or without working ignore rounding with correct working do not allow other equivalent ratios for both marks if answer incorrect evidence of selection of 10 (insects) and 4 (frogs) or 50 and 20 or 1 and 0.4 for 1 mark if no other working allow 1 mark for 0.4(:1) on answer line	2
1(c)	(increase as) fewer insects eaten by frogs		1
1(d)	all living organisms respire		1
	and the process of respiration releases energy		1
	some of this energy is used when organisms move		1
	and energy is also lost to the environment as heat		1
	in addition to losses related to respiration. Energy is also lost from organisms via waste		1
	organisms that are not eaten eventually die and the energy in their bodies will eventually be transferred to microorganisms / detritivores.		1
Total			11

COMPONENT NUMBER: SCA2HP

COMPONENT NAME: GCSE Science A 2 Unit 6H

STATUS: Specimen V1.0

question	answers	extra information	mark
2(a)	most leaves lie close / flat on the ground therefore the leaves are less likely to be eaten / mown or thick root (1) therefore the plant is less likely to be pulled out by grazers (1)	reason must be linked to adaptation given	1 1
2(b)	long stems therefore the plant is a better competitor for light or therefore the plant grows higher than other plants to gain light or wide spread roots (1) therefore the plant is a better competitor for water or therefore the plant is able to collect water from a larger area (1)		1 1
Total			4

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
3(a)(i)	the continents of South America and Africa would have fitted together like a jigsaw		1
	there are matching / similar rocks / fossils on the continents of South America and Africa		1
3(a)(ii)	other scientists thought that continents are fixed / cannot float or Wegener had no evidence to prove that continents can move	allow Wegener was not respected by other scientists / PhD in astronomy	1
	and that a land bridge could explain the matching / similar rocks / fossils on the continents of South America and Africa		1
3(b)	radioactive	words must be in the order shown	1
	mantle		1
Total			6

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

4			
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 2.			
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief description of a positive and a negative environmental impact involved with one or more methods used to reduce the amount of plastic bags sent to landfill.	There is some description of both positive and negative environmental impacts involved with at least 2 methods used to reduce the amount of plastic bags sent to landfill.	There is a clear, balanced and detailed description of both a positive and a negative environmental impact of using each of the 3 methods used to reduce the amount of plastic bags sent to landfill.

examples of the points made in the response**Reuse:**

Reuse means less bags used so:

Positive environmental impact

- Saves raw materials/crude oil
- Saves energy
- Cuts down on CO₂ emissions
- Less global warming

Negative environmental impact

- Could cause litter
- Could still be sent to landfill

Recycle:

Bags can be recycled so:

Positive environmental impact

- Used to make new plastic bags / objects
- Saves raw materials / crude oil
- Saves energy compared to producing plastic bags from crude oil
- Cuts down on CO₂ emissions
- Less global warming

Negative environmental impact

- Collection point sites cause an eyesore / litter problem
- Transportation to recycling plant releases carbon dioxide / causes global warming

Burn:

Bags can be burned so:

Positive environmental impact

- Could provide energy for heating buildings
- Could provide energy for generating electricity

Negative environmental impact

- Increases CO₂ emissions
- Increases global warming
- Could release toxic gases
- Does not conserve raw materials / crude oil

Total			6
--------------	--	--	----------

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
5(a)	Doppler effect		1
5(b)	the wavelength increases		1
	the frequency decreases		1
Total			3

question	answers	extra information	mark
6(a)	40 (cm/s)	correct answer an answer 0.4 m/s gains full credit if answer is incorrect allow 1 mark for correct wavelength $\lambda = 8$ cm or allow 2 marks for correct substitution into the correct equation, ie $V = 5 \times 8$ or allow 2 marks for clearly stated wrong wavelength correctly substituted into correct equation and correctly calculated, ie $\lambda = 16$ cm/s $V = 5 \times 16$ $= 80$	3
6(b)	line extended following pattern		1
	14 m/s	accept their numerical value, if not 14, provided the first mark has been awarded	1
Total			5

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
7(a)(i)	to compare mobile phone usage between the two groups		1
7(a)(ii)	enough data to indicate relationships or reduce effect of anomalous data		1
7(b)(i)	ethical		1
7(b)(ii)	research may be biased (in favour of companies) negative effects on health may not get published	accept negative effects on health may be played down	1 1
7(b)(iii)	it allows people to easily identify lower risk phones and this allows people to make a more informed choice	accept and this allows a comparison to be made	1 1
Total			7

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
8(a)	there was no mixing of genes / genetic material		1
	because the nucleus was removed from the egg cell before fusion		1
8(b)(i)	male and white-faced	both required	1
8(b)(ii)	because the genetic material / genes		1
	comes from the white-faced male only		1
Total			5

question	answers	extra information	mark
9(a)	the higher the latitude the longer the wing length		1
	the lower the temperature the longer the wing length		1
9(b)	birds with longer wing spans are likely to have a larger body mass and therefore a smaller surface area to volume ratio		1
	having a smaller surface area to volume ratio will result in proportionately less heat to the environment and therefore a higher chance of survival in cooler climates		1
Total			4

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
10(a)	idea of survival of the fittest		1
10(b)	(the hypothesis should be rejected because) <ul style="list-style-type: none">• having a long neck for feeding would not be an advantage for feeding in the dry season• and would not be an advantage most of the time for females• therefore the feature would be unlikely to be selected for		1 1 1
10(c)	<ul style="list-style-type: none">• the feature that could explain the evolution of long neck is that males with longer necks are more likely to win fights with other males• the winning males are more likely to mate with females• this means the allele for long neck is more likely to be passed to the next generation		1 1 1
Total			7

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
11(a)(i)	(healthiest oil is) sunflower (oil) or rapeseed (oil)	no mark for the choice of oil accept the use of values from the table for these comparisons	
	sunflower (oil) is healthiest because it has less saturated fat than both olive (oil) and corn (oil)		1
	or rapeseed (oil) is healthiest because it has the lowest value of saturated fat compared with the other oils		
	sunflower (oil) is healthiest because it has the highest value of polyunsaturated fat compared with all the other oils		1
	or rapeseed (oil) is healthiest because it has more polyunsaturated fat than both olive (oil) and corn (oil)		
11(a)(ii)	no, because hydrogen adds to the unsaturated fat or no, because hydrogen reduces the number of carbon-carbon double bonds	accept no because reacting with hydrogen increases number of single bonds	1
	therefore there will be less polyunsaturated fat	accept therefore there will be more saturated fat	1
11(b)	molecules in egg yolk act as emulsifiers	accept lecithin molecules act as emulsifiers	1
	because molecules in egg yolk have a 'head' which dissolves in / attracted to water	accept because molecules in egg yolk are hydrophilic	1
	because molecules in egg yolk have a 'tail' which dissolves in / attracted to oil	accept because molecules in egg yolk are hydrophobic	1
Total			7

COMPONENT NUMBER: SCA2HP

COMPONENT NAME: GCSE Science A 2 Unit 6H

STATUS: Specimen V1.0

question	answers	extra information	mark
12(a)	polytetrafluoroethene		1
12(b)	$\begin{array}{c} \text{F} & & \text{F} \\ & & \\ \text{C} & = & \text{C} \\ & & \\ \text{F} & & \text{F} \end{array}$	4 single bonds C-F 1 double bond C=C	1 1
12(c)	many tetrafluoroethene monomers / molecules join / bond together to form a very large molecule / chain	accept higher level answer relating to 'double bond opening'	1 1 1
Total			6

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
13(a)	ammonia	accept NH ₃	1
13(b)(i)	because the gases are unreactive	accept because the measuring equipment was not very precise	1
13(b)(ii)	by fractional distillation		1
13(b)(iii)	argon has a density greater than the density of nitrogen		1
Total			4

question	answers	extra information	mark
14(a)	distance from Earth		1
	speed stars / galaxies are moving (away from Earth)		1
	supports theory that the Universe is expanding / Big Bang theory		1
14(b)	the microwave radiation comes from radiation present just after Big Bang		1
	and the Big Bang theory is currently the only way of explaining CMBR		1
14(c)	wavelength is decreased and frequency increased	both required	1
Total			6

COMPONENT NUMBER: SCA2HP**COMPONENT NAME: GCSE Science A 2 Unit 6H****STATUS: Specimen V1.0**

question	answers	extra information	mark
15(a)	decrease in (proportion of) oil as reserves are decreasing	no marks are awarded for simply describing the differences	1
	increase in (proportion of) coal / nuclear / gas / as new reserves / more nuclear power stations built		1
15(b)(i)	prediction		1
	forecast based on scientific evidence		1
15(b)(ii)	less methane goes into the atmosphere	accept air for atmosphere	1
	therefore making global warming less rapid		1
15(c)	idea that many devices transform electricity into other useful forms of energy		1
	example related to public health eg refrigeration / production of vaccines / X-ray machines		1
	example related to modern communications eg Internet / telephones		1
Total			9