



GCSE

COMBINED SCIENCE: TRILOGY

8464/B/2F

Biology Paper 2F

Mark scheme

Specimen (set 2)

Version: 1.0

Keep secure

Please be aware that not all schools and colleges will be using these tests at the same time.

Help us to maintain the security of these papers by ensuring they are not distributed on social media or other platforms.

Important – please note

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers.

It must be stressed that a mark scheme is a working document. This mark scheme has **not** been through the full standardisation process. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way.

Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

The Information to Examiners is included as a guide to how the mark scheme will function as an operational document.

The layout has been kept consistent so that future operational mark schemes do not appear different from these test materials.

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

- 2.1** In a list of acceptable answers where more than one mark is available ‘any **two** from’ is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.
- 2.4** Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error / contradiction negates each correct response. So, if the number of error / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

3.10 Do not accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- Level of response mark schemes are broken down into levels, each of which has a descriptor.
- The descriptor for the level shows the average performance for the level.
- There are two marks in each level.

Before you apply the mark scheme to a student's answer, read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1: Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

Step 2: Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this.

The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

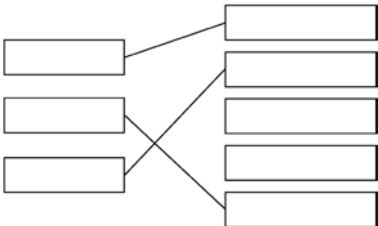
You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
01.1	between 200 and 500 million years ago		1	AO1 4.6.3.2 Low
01.2	the organism was replaced by minerals		1	AO2 4.6.3.2 Low
01.3	there are no organisms of that species alive today		1	AO1 4.6.3.3 Low
01.4	DNA analysis		1	AO3 4.6.4 Low
01.5	(Carl) Linnaeus		1	AO1 Low
01.6	Protoceratops and Triceratops	allow Coronosaurus and Triceratops or Protoceratops and Coronosaurus or Margocephalia and Pachycephalosaurus	1	AO3 4.6.4 Low
01.7	Margocephalia		1	AO2 4.6.4 Low
01.8	older fossils have a simpler structure		1	AO2 4.6.4 Low
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
02.1	asexual	in this order	1	AO1 4.6.1.1 Low
	clones		1	
	gametes		1	
	variation		1	
	mitosis		1	
02.2	8		1	AO2 4.6.1.2 Low
02.3	XY		1	AO1 4.6.1.6 Low
02.4	both bars correctly plotted	allow labels mark even if bars incorrect	1	AO2 4.6.1.4 Low
	correct labels on x-axis		1	
02.5	30		1	AO2 4.6.1.4 Low
02.6	any one from: <ul style="list-style-type: none"> • because zebra fish is small and has high number of chromosomes • not all animals are listed • not enough data • animals have different sizes during their life but the chromosome number stays the same 	allow other sensible conclusions	1	AO3 4.6.1.4 Low
Total			11	

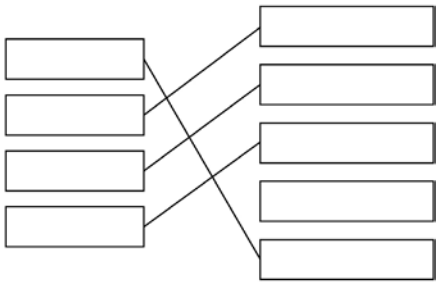
Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
03.1	by helping people relax in outdoor spaces		1	AO2 4.7.3.1 Low
	by reducing the noise pollution		1	
03.2	by making new habitats for plants and animals		1	AO2 4.7.3.1 Low
	by providing a resting place for migrating birds		1	
03.3	2 640 000 or 2.64×10^6		1	AO2 4.7.3.1 Low
03.4	2 640 000/24 or $\frac{2.64 \times 10^6}{24}$ 110 000 or 1.1×10^5	an answer of 110 000 or 1.1×10^5 scores 2 marks	1	AO2 4.7.3.1 Low
		allow 1 mark for answer to 03.3 divided by 24		
03.5	the variety of different species of organisms in an ecosystem		1	AO1 4.7.3.1 Low

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
04.1			1 1 1	AO1 4.5.3.4 Low
04.2	23%	allow 1 mark for evidence of pill + condom = 180°/50%	2	AO2 Low
04.3	any two from: <ul style="list-style-type: none"> • want to have a baby • not having sex • past the menopause • pregnant 	allow any sensible reason	2	AO2 4.5.3.4 Low

04.4	Level 2: Scientifically relevant features are identified; the way(s) in which they are similar/different is made clear and (where appropriate) the magnitude of the similarity/difference is noted.	3–4	AO3 4.5.3.4 Low
	Level 1: Relevant features are identified and differences noted.	1–2	
	No relevant content	0	
	Indicative content combined pill <ul style="list-style-type: none"> • A – easy to take, very effective and free on NHS, but • D – it can cause headaches/side effects, must remember to take it every day condom <ul style="list-style-type: none"> • A – only need it when you have sex, no side effects, very inexpensive, but • D – it is not as reliable, more difficult to use sterilisation <ul style="list-style-type: none"> • A - 100% effective but • D – probably will not be able to have a family, risks of surgery 		
Total		11	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
05.1	any two pairs from: <ul style="list-style-type: none"> • light (intensity) • more light means more / faster photosynthesis / glucose • temperature • higher temperature more / faster photosynthesis • water • right amount for transpiration / cell function / photosynthesis • soil pH / ions • needed for healthy growth 	ignore 'growth' unqualified ignore carbon dioxide and oxygen	1 1 1 1	AO1 4.7.1.2 4.4.1.1 4.4.1.2 Low Standard
05.2	hand lens moth guide		1 1	AO1 4.7.2.1 Low
05.3	any one from: <ul style="list-style-type: none"> • can work gently and not disturb moths • moths might fly away outside 		1	AO2 4.7.2.1 Standard
05.4	any one from: <ul style="list-style-type: none"> • damage to eyes (from UV / bright light) • burns from hot lamp • diseases / pathogens from wild organisms 		1	AO2 4.7.2.1 Standard

05.5	any one from: <ul style="list-style-type: none"> • wear sunglasses or eye protection • wear gloves or allow lamp to cool. • wear gloves or wash hands after handling moths 	answer must relate to hazard	1	AO2 4.7.2.1 Standard
05.6	bristles / hairs make it unpleasant to eat or bright colour acts as warning to predators (that it is poisonous)		1	AO3 4.7.1.4 Standard
Total			10	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
06.1		4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark (4-5)	3	AO2 4.5.2 Standard
06.2	time awake		1	AO2 4.5.2 Standard
06.3	description of how to do a 'ruler drop' how to measure length in cm a control measure taken or how to use a conversion chart to get reaction time		1 1 1	AO1 4.5.2 Standard
06.4	any one sensible reason: for ruler drop test: <ul style="list-style-type: none"> • have lots of equipment • inexpensive equipment • many students can do it at same time for computer test: <ul style="list-style-type: none"> • more accurate • more repeatable • students can cheat on ruler drop test 		1	AO3 4.5.2 Standard

06.5	0.556..... or (0.44+0.49+0.83+0.27+0.75)/5 0.56	an answer of 0.56 scores 2 marks	1 1	AO2 4.5.2 Standard
06.6	at first stays same / has slight dip (until 12 hours) increases from 12 hours awake	12 hours only needed once ignore 'increases' alone	1 1	AO3 4.5.2 Standard
06.7	either: does support, because overall goes up or does not support, because it goes down / stays the same at first and only goes up after 12 hours		1	AO3 4.5.2 Standard
06.8	any two from: <ul style="list-style-type: none"> • use more volunteers • make sure they all do the same activities at the same time • give them the same food and coffee/tea at the same time • control the age / gender of volunteers • make sure they all had a good night's sleep the night before the investigation began 		2	AO3 4.5.2 Standard
Total			15	

Question	Answers	Extra information	Mark	AO / Spec. Ref. / Demand
07	Level 3: Relevant adaptations are identified, given in detail and logically linked to form a clear account.		5–6	AO1 4.7.1.1 Standard
	Level 2: Relevant adaptations are identified, and there are attempts at logical linking. The resulting account is not fully clear		3–4	
	Level 1: Adaptations are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.		1–2	
	No relevant content.		0	
	Indicative content <ul style="list-style-type: none"> • a small SA:V ratio • means less thermal energy transferred to surroundings • thick fur or hollow hair shafts • traps a layer of air which acts as an insulating layer stopping transfer of thermal energy • a layer of fat or blubber under the skin • acts as an insulating layer or as a food store for respiration when food is in short supply • small ears • reduces surface area for thermal energy transfer • white colour • camouflage in the snow so prey do not see them coming and they get more to eat or so predators do not see them and they can escape • large feet • to spread weight over snow so they can run faster • hibernate in winter • to conserve energy stores allow 'heat loss' for transfer of thermal energy			
Total			6	