

Mark Scheme for June 2012

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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






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Annotations

Used in the detailed Mark Scheme:

| Annotation | Meaning |
|---------------------|---|
| / | alternative and acceptable answers for the same marking point |
| (1) | separates marking points |
| not/reject | answers which are not worthy of credit |
| ignore | statements which are irrelevant – applies to neutral answers |
| allow/accept | answers that can be accepted |
| (words) | words which are not essential to gain credit |
| <u>words</u> | underlined words must be present in answer to score a mark |
| ecf | error carried forward |
| AW/owtte | credit alternative wording / or words to that effect |
| ORA | or reverse argument |

Available in scoris to annotate scripts:

| | |
|---|---|
|  | indicate uncertainty or ambiguity |
|  | benefit of doubt |
|  | contradiction |
|  | incorrect response |
|  | error carried forward |
|  | draw attention to particular part of candidate's response |
|  | draw attention to particular part of candidate's response |
|  | draw attention to particular part of candidate's response |
|  | no benefit of doubt |
|  | reject |
|  | correct response |
|  | draw attention to particular part of candidate's response |
|  | information omitted |

Subject-specific Marking Instructions

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

e.g. for a one-mark question where ticks in the third and fourth boxes are required for the mark:

| |
|--------------|
| |
| |
| ✗ |
| ✗ |
| |

*This would be worth
1 mark.*

| |
|--------------|
| |
| |
| ✓ |
| ✗ |
| |

*This would be worth
0 marks.*

| |
|--------------|
| ✗ |
| ✗ |
| ✓ |
| ✓ |
| |

*This would be worth
1 mark.*

- c. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

| | |
|-------------|--|
| Edinburgh | |
| Manchester | |
| Paris | |
| Southampton | |

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

| | | | | | | | | | | |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Edinburgh | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | |
| Manchester | ✓ | x | ✓ | ✓ | ✓ | | | | ✓ | |
| Paris | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | |
| Southampton | ✓ | x | | ✓ | | ✓ | ✓ | | ✓ | |
| Score: | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | NR |

- e. For answers marked by levels of response:
- i. **Read through the whole answer from start to finish**
 - ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
 - iii. **To determine the mark within the level**, consider the following:

| Descriptor | Award mark |
|--------------------------------------|------------------------------|
| A good match to the level descriptor | The higher mark in the level |
| Just matches the level descriptor | The lower mark in the level |

- iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

| Question | | | Answer | Mark | Guidance |
|--------------|-----|------|---|----------|--|
| 1 | (a) | (i) | gas | 1 | |
| | | (ii) | 2(%) | 1 | |
| | (b) | | <i>any three points:</i> carbon fuel decreases /named example (1); because they are non-renewable/ running out/becomes scarce/polluting (1); renewables increase (1); because they are non-polluting/resource will not run out/ no fuel cost (1) | 3 | ignore any reference to nuclear allow examples, e.g. to reduce global warming allow correct description of changes to the diagram, e.g. the renewable bar will be bigger |
| | (c) | | 36% | 1 | |
| Total | | | | 6 | |

| Question | | | Answer | Mark | Guidance | | | | | | | | | | | | | | | | | | |
|------------------------|---|---|--|----------|----------|---|----------------|--|---|---------------|---|--|------------------------|---|--|----------------------|--|---|-------------------|---|--|---|--|
| 2 | | | <table border="1"> <thead> <tr> <th></th> <th>A</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>An accident...</td> <td></td> <td>✓</td> </tr> <tr> <td>Each tonne...</td> <td>✓</td> <td></td> </tr> <tr> <td>No CO₂...</td> <td>✓</td> <td></td> </tr> <tr> <td>Radioactive waste...</td> <td></td> <td>✓</td> </tr> <tr> <td>The world has ...</td> <td>✓</td> <td></td> </tr> </tbody> </table> | | A | D | An accident... | | ✓ | Each tonne... | ✓ | | No CO ₂ ... | ✓ | | Radioactive waste... | | ✓ | The world has ... | ✓ | | 2 | accept any unambiguous correct indication of response all correct (2); 4 or 3 correct (1); less than 3 correct (0) |
| | A | D | | | | | | | | | | | | | | | | | | | | | |
| An accident... | | ✓ | | | | | | | | | | | | | | | | | | | | | |
| Each tonne... | ✓ | | | | | | | | | | | | | | | | | | | | | | |
| No CO ₂ ... | ✓ | | | | | | | | | | | | | | | | | | | | | | |
| Radioactive waste... | | ✓ | | | | | | | | | | | | | | | | | | | | | |
| The world has ... | ✓ | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | 2 | | | | | | | | | | | | | | | | | | | |

| Question | | Answer | Mark | Guidance | | |
|--------------|------|---|---|---|--|--|
| 3 | (a) | If the material is heated it will give off more radiation. | | 2 | accept any unambiguous correct indication of response | |
| | | The amount of radiation emitted will decrease with time. | ✓ | | | |
| | | The emitted radiation can penetrate several centimetres of metal. | | | | |
| | | The emitted radiation is absorbed by a single sheet of paper. | | | | |
| | | The emitted radiation is an ionising radiation. | ✓ | | | |
| | (b) | (i) | Healthy cells will not be affected. | | 2 | accept any unambiguous correct indication of response |
| | | | Diseased cells may be killed. | ✓ | | |
| | | | Radioactive material cannot harm the patient. | | | |
| | | | The radiation removed ions from the cells. | | | |
| | | | The patient is contaminated by the infected material. | ✓ | | |
| | (ii) | Benefit: cure of medical problem/treatment may work (1); idea that benefit outweighs risk/ risk is small (1) | 2 | allow idea of destroying diseased/harmful cells ignore it is worth taking the risk –stem of question | | |
| Total | | | 6 | | | |

| Question | | Answer | Mark | Guidance | | | | | | | | | | | | | | | |
|--------------|-----|--|-------------------|--|--------------------|-----------|---|--|------------|--|---|------|--|---|------|--|---|---|---|
| 4 | (a) | scar on face | 1 | accept any unambiguous correct indication of response | | | | | | | | | | | | | | | |
| | (b) | <table border="1"> <thead> <tr> <th>change</th> <th>natural selection</th> <th>selective breeding</th> </tr> </thead> <tbody> <tr> <td>head lice</td> <td>✓</td> <td></td> </tr> <tr> <td>racehorses</td> <td></td> <td>✓</td> </tr> <tr> <td>cows</td> <td></td> <td>✓</td> </tr> <tr> <td>hens</td> <td></td> <td>✓</td> </tr> </tbody> </table> | change | natural selection | selective breeding | head lice | ✓ | | racehorses | | ✓ | cows | | ✓ | hens | | ✓ | 2 | accept any unambiguous correct indication of response all 4 correct = 2 3 or 2 correct = 1 |
| | | change | natural selection | selective breeding | | | | | | | | | | | | | | | |
| | | head lice | ✓ | | | | | | | | | | | | | | | | |
| | | racehorses | | ✓ | | | | | | | | | | | | | | | |
| | | cows | | ✓ | | | | | | | | | | | | | | | |
| hens | | ✓ | | | | | | | | | | | | | | | | | |
| Total | | | 3 | | | | | | | | | | | | | | | | |

| Question | | Answer | Mark | Guidance |
|--------------|-----|--|----------|---|
| 5 | (a) | Amrit; | 1 | |
| | (b) | Caroline; | 1 | |
| | (c) | <i>any two from:</i> get eaten; (1) idea of competition; (1) lack of resources - there is not enough food/water/ nutrients/light; (1) not enough space/territory; (1) disease; (1) | 2 | ignore ideas on lack of a mate/ species extinction ignore adaptation ignore environmental change |
| Total | | | 4 | |

| Question | | Answer | Mark | Guidance | | | | | | | | |
|--------------|-----|--|-------------|--|-----------|--|------------|--|----------|---|---|--|
| 6 | (a) | brain and spinal cord | 1 | need both to score mark do not accept spine | | | | | | | | |
| | (b) | detect responses; | 1 | need both to score mark must be in correct order | | | | | | | | |
| | (c) | <table border="1" style="border-collapse: collapse;"> <tr> <td style="padding: 2px;">circulatory</td> <td style="width: 20px; text-align: center;"> </td> </tr> <tr> <td style="padding: 2px;">digestive</td> <td style="width: 20px; text-align: center;"> </td> </tr> <tr> <td style="padding: 2px;">electrical</td> <td style="width: 20px; text-align: center;"> </td> </tr> <tr> <td style="padding: 2px;">hormonal</td> <td style="width: 20px; text-align: center;">✓</td> </tr> </table> | circulatory | | digestive | | electrical | | hormonal | ✓ | 1 | accept any unambiguous correct indication of response more than 1 tick = 0 |
| circulatory | | | | | | | | | | | | |
| digestive | | | | | | | | | | | | |
| electrical | | | | | | | | | | | | |
| hormonal | ✓ | | | | | | | | | | | |
| Total | | | 3 | | | | | | | | | |

| Question | | Answer | Mark | Guidance |
|--------------|-----|--|----------|---|
| 7 | (a) | leaves → worm → blackbird → hawk ; | 1 | all correct for 1 mark |
| | (b) | <i>any three from:</i> the environment changes / example of change; (1) human activity/influence / example; (1) idea of competing for resources; (1) new predator / example; (1) disease / example; (1) not enough food/water / example; (1) | 3 | accept idea of either global or local extinction e.g. climate change; flooding; habitat destruction e.g. hunting; e.g. competitor, competition for food / water / light; allow explosion in predator population |
| Total | | | 4 | |

| Question | | | Answer | Mark | Guidance | |
|--------------|-----|---|---|--|---|---|
| 8 | (a) | (i) | All organic fruit is larger and looks better. | | 2 | accept any unambiguous correct indication of response 3 ticks deduct 1 mark 4 or 5 ticks = 0 |
| | | | There are no pests on organic fruit. | | | |
| | | | Organic farms do not use synthetic pesticides. | ✓ | | |
| | | | An organic farm employs fewer people. | | | |
| | | | Pesticides left on intensively farmed fruit may be a health hazard. | ✓ | | |
| | | (ii) | example (1) explanation of benefit (1) allow reverse arguments | 2 | more hedges/unfarmed areas (1) idea of no pesticides used / biological control (1) more food for wildlife or wildlife not killed (1) more habitats for wildlife (1) do not allow organic farms don't use chemicals | |
| | (b) | Maximum of 2 points (nitrogen/nitrates) in soil taken up in plants/lost when plants are harvested (1) soil fertility decreases (1) (nitrogen/nitrates) added to increase the yield/ more growth (1) Maximum of 2 points intensive farmers use synthetic fertilisers (1) organic farmers use animal and plant waste (1) idea of organic farmers use crop rotation (1) | 3 | allow reverse arguments (nitrogen/nitrates) needed for building proteins in plants allow alternatives to synthetic, e.g. man-made, nitrates in bags NOT nitrates on its own | | |
| Total | | | | 7 | | |

| Question | | Answer | Mark | Guidance | | | | | | | | | | | | |
|---|-----|---|--|--|---|--|--|--|--|---|---|--|-----------------------------|--|---|--|
| 9 | (a) | | 3 | multiple lines from individual boxes will score 0 for that line all 4 lines correct = 3 marks 3 lines correct = 2 mark 2 or 1 line correct = 1 mark | | | | | | | | | | | | |
| | (b) | <table border="1"> <tbody> <tr> <td>Biscuits contain starch that is digested into glucose.</td> <td>✓</td> </tr> <tr> <td>Biscuits contain starch which is digested into amino acids.</td> <td></td> </tr> <tr> <td>Biscuits contain fat which is digested into the fatty acids.</td> <td></td> </tr> <tr> <td>Sugar can be absorbed directly into the blood.</td> <td>✓</td> </tr> <tr> <td>Biscuits contain starch molecules which are too large to be absorbed.</td> <td></td> </tr> <tr> <td>Fat is digested into sugar.</td> <td></td> </tr> </tbody> </table> | Biscuits contain starch that is digested into glucose. | ✓ | Biscuits contain starch which is digested into amino acids. | | Biscuits contain fat which is digested into the fatty acids. | | Sugar can be absorbed directly into the blood. | ✓ | Biscuits contain starch molecules which are too large to be absorbed. | | Fat is digested into sugar. | | 2 | accept any unambiguous correct indication of response |
| Biscuits contain starch that is digested into glucose. | ✓ | | | | | | | | | | | | | | | |
| Biscuits contain starch which is digested into amino acids. | | | | | | | | | | | | | | | | |
| Biscuits contain fat which is digested into the fatty acids. | | | | | | | | | | | | | | | | |
| Sugar can be absorbed directly into the blood. | ✓ | | | | | | | | | | | | | | | |
| Biscuits contain starch molecules which are too large to be absorbed. | | | | | | | | | | | | | | | | |
| Fat is digested into sugar. | | | | | | | | | | | | | | | | |
| | (c) | 3; (1) 4; (1) | 2 | either order | | | | | | | | | | | | |
| Total | | | 7 | | | | | | | | | | | | | |

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