

Sc

KEY STAGE

3

LEVELS

3-7

2004

Science tests

# Mark scheme for Papers 1 and 2

2004



department for

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## Introduction

The test papers will be marked by external markers. The markers will follow the mark scheme in this booklet, which is provided here to inform teachers.

This booklet includes the mark scheme for paper 1 and paper 2 in both tiers.

## The structure of the mark scheme for tiers 3–6 and 5–7

The mark scheme for each question shows:

- the teaching points from the key stage 3 programme of study;
- the marks available for each part of the question;
- the total marks available for the question;
- the answer or answers expected, indicated by an asterisk;
- additional guidance to assist markers in making professional judgements.

When a question appears in an identical form in both tiers, the answers to the question are given only once in the mark scheme. For clarity, both question numbers are given. The following example, from tier 3–6 paper 1 question 11 and from tier 5–7 paper 1 question 2, illustrates this.

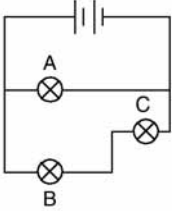
| Tier<br>3–6<br>5–7 | Q No<br>11<br>2 |   |   |  |
|--------------------|-----------------|---|---|--|
| Part               | Mark            | Answer  | Accept  | Additional guidance  |
| <b>a</b><br>1/2h   | 1               | any <b>one</b> from:<br>* to allow his resting pulse rate to be determined<br>* to compare his pulse before and after drinking the cola<br>* so he would know if it had changed | accept 'to get a reading of heart rate when relaxed'<br>accept 'to make sure his heart rate was steady'<br>accept 'to see if there was any change'<br>accept 'so he could find out his normal heart rate'<br>accept 'to get a reliable reading of his pulse rate'<br>accept 'to find the average' | 'he wanted to know his heart rate before he drank his cola' is insufficient as this is given in the question |
| <b>b</b><br>1/2k   | 1               | * his heart rate went up after he drank some cola   | accept 'his heart rate <b>or</b> pulse went up'<br>accept 'it shows his heart rate went up'<br>accept 'the graph shows his heart rate changed'<br>accept 'the line goes up <b>or</b> changed'<br>accept 'the points get higher'   |  |

Where more than one answer is acceptable, this is indicated in the mark scheme by ‘any **one** from’. Each possible correct answer is marked with an asterisk. In some cases, alternative answers are indicated by ‘**or**’.

In the following example from part (a) (ii) of tier 5–7 paper 2 question 13, an answer giving ‘alcohol increases the reaction time’ and ‘alcohol reduces co-ordination’ will be awarded two marks. However, an answer which gives ‘alcohol reduces co-ordination’ and ‘they would feel dizzy’ will be given only one mark, as both points are correct answers for the same mark.

| Part                | Mark | Answer  | Accept  | Additional guidance                  |
|---------------------|------|---|---|--------------------------------------|
| <b>a ii</b><br>2/2m | 2    | any <b>two</b> from:<br>* alcohol increases the reaction time<br>* alcohol reduces co-ordination<br>* alcohol causes <b>or</b> increases errors of judgement<br>* alcohol reduces concentration | accept ‘it slows reactions’ <b>or</b> ‘it slows the reaction time’<br>accept ‘they would feel dizzy’<br><br>accept ‘they would be sleepy <b>or</b> drowsy’<br><br>accept ‘alcohol makes them lose more heat’<br>accept ‘it causes blurred vision’ | ‘it slows them down’ is insufficient |

In the following example, from part (a) of tier 3–6 paper 1 question 17 and tier 5–7 question 8, the statement in **bold type** in the ‘Additional guidance’ column is given in order to indicate the general requirement of that part of the question.

| Part             | Mark | Answer  | Accept | Additional guidance   |
|------------------|------|---|--------|---|
| <b>a</b><br>4/1a | 2    | * one mark for B and C in series<br>* one mark for A in parallel with B and C, for example<br><br> |        | <b>both</b> marks should only be awarded if the circuit is correct<br><br>award one mark if all three bulbs are drawn in parallel <b>or</b> all in series |

In the ‘Accept’ column there may be:

- examples of answers which are acceptable, although they do not correspond exactly to the expected answers;
- some examples of higher level answers, which could be given by higher attaining pupils answering questions on the lower levels in the tier.

In the ‘**Additional guidance**’ column there may be:

- answers which are not acceptable;
- a reminder, in questions involving calculations, that consequential marking may be used;
- instructions on action in the event of consequential marking (see below);
- guidance to markers where pupils have not followed the instructions on the question.

## Marking

The number of marks available for each part of a question and the maximum number of marks for the question as a whole are shown on the question paper. Every part of a question which has been attempted by a pupil will be marked and the mark for each part recorded in the mark box alongside that part. Half marks will not be given in any question.

The total number of marks awarded for all the parts of questions on a double page will be written in the box at the bottom of the right-hand page. In some instances, this will be the sum of marks awarded for two questions. The total number of marks obtained on the paper will be recorded on the front of the test paper.

The total number of marks available is 180 in tier 3–6 and 150 in tier 5–7.

## Using professional judgement in marking

The instructions given in the mark scheme will enable the markers to decide whether pupils have correctly answered a particular question. However, there will be instances where an answer given by a pupil does not correspond to any of the possible responses shown in the mark scheme. In such cases, markers will apply their professional judgement to decide if credit should be given. They will consider whether the response:

- is equivalent to those listed;
- conveys the ideas underlying the question as outlined in the statement in **bold type** in the mark scheme, if one is given.

If any doubt persists, markers will consult with their supervisors for guidance.

## Marking misspellings of words

If a pupil misspells a word, markers will apply the following procedures:

- if it is clear that the pupil has made a simple error, eg ‘tow’ for ‘two’ or ‘Son’ for ‘Sun’, then the incorrect spelling will be accepted and the mark awarded;
  - if a pupil misspells a word copied from the text of the question or from a selection given, and the new word does not have any inappropriate meaning, the incorrect spelling will be accepted and the mark awarded;
  - if specific scientific vocabulary is required in the answer, a creditworthy misspelling must be a phonetic equivalent of the required word, with the major syllables of the correct word represented in the answer.
-

### Marking lists of alternative answers

In some instances, pupils give more than one answer to a single question. If any of the answers given is incorrect, the mark will not be awarded, irrespective of the order in which the answers are given. In some cases, a correct answer is given alongside other answers which, while correct, would be insufficient for the mark. In these cases, the mark will be given for the correct answer.

### Marking questions containing calculations

Some questions require pupils to perform calculations. Where two marks are available, they are advised to show their working. Pupils who do not show their working but give the correct answer will be awarded full marks.

The result of one calculation may be required in order to carry out further calculations. In such instances:

- the term ‘consequential marking’ appears in the ‘Additional guidance’ column;
- a pupil’s result for the first calculation is treated as the starting point for the second;
- the pupil is awarded full credit for the second calculation if it is carried out correctly, even if the result of the first calculation was wrong.

### Marking answers given in the wrong place

In some cases, pupils may write correct answers in the wrong part of the question. Markers will use professional judgement to decide whether a pupil has correctly understood the question and simply written the answer in the wrong place. Similarly, if pupils identify an answer by a cross or other indication when a tick is required, they will be given credit for their responses.

### Awarding levels

The sum of the marks gained on both papers determines the level awarded. A copy of the level threshold tables which show the mark ranges for the award of different levels will be sent to each school by QCA in July 2004.

Schools will be notified of pupils’ results by means of a marksheet, which will be returned to schools by the External Marking Agency with the pupils’ marked scripts. The marksheet will include pupils’ scores on the test papers and the levels awarded.

The 2004 key stage 3 science tests and mark schemes were developed by the University of Cambridge Local Examinations Syndicate and the Centre for Research into Primary Science and Technology (CRIPSAT) on behalf of QCA.

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**Mark Allocation Grid: Tier 3–6**

**TIER 3–6 Paper 1**

**TIER 3–6 Paper 2**

| Q            | Sc1       | Sc2       | Sc3       | Sc4       |
|--------------|-----------|-----------|-----------|-----------|
| 1            |           | 5         |           |           |
| 2            | 6         |           |           |           |
| 3            |           | 4         |           |           |
| 4            |           |           | 6         |           |
| 5            | 2         |           |           | 2         |
| 6            | 5         |           |           |           |
| 7            |           |           |           | 5         |
| 8            |           |           | 1         | 2         |
| 9            |           |           |           | 7         |
| 10           | 1         | 4         |           |           |
| 11           | 4         |           |           |           |
| 12           |           | 6         |           |           |
| 13           |           |           | 5         |           |
| 14           |           |           | 4         |           |
| 15           |           |           | 5         | 1         |
| 16           |           |           |           | 8         |
| 17           |           |           |           | 4         |
| 18           |           |           |           | 3         |
| <b>Total</b> | <b>18</b> | <b>19</b> | <b>21</b> | <b>32</b> |

| Q            | Sc1       | Sc2       | Sc3       | Sc4       |
|--------------|-----------|-----------|-----------|-----------|
| 1            |           |           |           | 4         |
| 2            |           | 2         |           | 3         |
| 3            | 4         |           |           |           |
| 4            |           |           | 4         |           |
| 5            |           |           | 5         |           |
| 6            |           |           | 4         |           |
| 7            | 6         |           |           |           |
| 8            |           | 6         |           |           |
| 9            |           | 7         |           |           |
| 10           |           |           |           | 5         |
| 11           | 2         |           |           | 3         |
| 12           | 7         |           |           |           |
| 13           |           | 1         | 6         |           |
| 14           |           | 5         |           |           |
| 15           | 5         |           |           |           |
| 16           |           | 7         |           |           |
| 17           | 4         |           |           |           |
| <b>Total</b> | <b>28</b> | <b>28</b> | <b>19</b> | <b>15</b> |

|                     |           |           |           |           |                |
|---------------------|-----------|-----------|-----------|-----------|----------------|
| <b>Total P1 + 2</b> | <b>46</b> | <b>47</b> | <b>40</b> | <b>47</b> | <b>Overall</b> |
|                     |           |           |           |           | <b>180</b>     |

**Mark Allocation Grid: Tier 5–7**

**TIER 5–7 Paper 1**

**TIER 5–7 Paper 2**

| Q            | Sc1       | Sc2       | Sc3       | Sc4       |
|--------------|-----------|-----------|-----------|-----------|
| 1            | 1         | 4         |           |           |
| 2            | 4         |           |           |           |
| 3            |           | 6         |           |           |
| 4            |           |           | 5         |           |
| 5            |           |           | 4         |           |
| 6            |           |           | 5         | 1         |
| 7            |           |           |           | 8         |
| 8            |           |           |           | 4         |
| 9            |           |           |           | 3         |
| 10           |           | 4         |           |           |
| 11           | 3         | 3         |           |           |
| 12           |           |           | 6         |           |
| 13           |           |           | 5         |           |
| 14           | 4         |           |           |           |
| 15           |           |           |           | 5         |
| <b>Total</b> | <b>12</b> | <b>17</b> | <b>25</b> | <b>21</b> |

| Q            | Sc1       | Sc2       | Sc3       | Sc4       |
|--------------|-----------|-----------|-----------|-----------|
| 1            |           |           |           | 5         |
| 2            | 2         |           |           | 3         |
| 3            | 7         |           |           |           |
| 4            |           | 1         | 6         |           |
| 5            |           | 5         |           |           |
| 6            | 5         |           |           |           |
| 7            |           | 7         |           |           |
| 8            | 4         |           |           |           |
| 9            |           |           |           | 4         |
| 10           | 2         |           |           | 3         |
| 11           | 5         |           |           |           |
| 12           |           |           | 6         |           |
| 13           |           | 4         |           |           |
| 14           | 5         | 1         |           |           |
| <b>Total</b> | <b>30</b> | <b>18</b> | <b>12</b> | <b>15</b> |

|                     |           |           |           |           |                |
|---------------------|-----------|-----------|-----------|-----------|----------------|
| <b>Total P1 + 2</b> | <b>42</b> | <b>35</b> | <b>37</b> | <b>36</b> | <b>Overall</b> |
|                     |           |           |           |           | <b>150</b>     |

The requirements of the Introduction to the Programme of Study apply across Sc1, Sc2, Sc3 and Sc4.

The Mark Allocation Grids on this pair of pages show the context of these questions in relation to Sc1, Sc2, Sc3 and Sc4.

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| Tier<br>3–6 | Q No<br>1 | Part                 | Mark     | Answer  | Accept  | Additional guidance  |
|-------------|-----------|----------------------|----------|---|---|--|
|             |           | <b>a i</b><br>2/4a   | 1        | * Katie ✓<br>Becca ✓  |   | <b>both</b> answers are required for the mark<br>if more than two boxes are ticked, award no mark  |
|             |           | <b>a ii</b><br>2/4a  | 1        | any <b>one</b> from<br>* their mother <b>or</b> Pam has freckles<br>* their father <b>or</b> David has freckles<br>* their parents have freckles<br>* their grandmother <b>or</b> Mary has freckles<br>* only family B has freckles | accept 'Rachel and Bill do not have freckles'<br>accept 'a grandparent has freckles'<br>accept 'their family <b>or</b> the family on the right has freckles'<br>accept 'freckles run in the family'<br>accept 'family A does not have freckles' |  |
|             |           | <b>a iii</b><br>2/4a | 1        | * his parents <b>or</b> Bob and Emily do not have freckles  | accept 'his family does not have freckles'<br>accept 'his grandparents do not have freckles'<br>accept 'he is not in family B' if the answer for <b>a ii</b> is 'only family B has freckles'  |  |
|             |           | <b>b i</b><br>2/1e   | 1        | * egg cell ✓<br>sperm cell ✓  |   | <b>both</b> answers are required for the mark<br>if more than two boxes are ticked, deduct one mark for each incorrect tick<br>minimum mark zero |
|             |           | <b>b ii</b><br>2/2g  | 1        | * reproductive system ✓   |   | if more than one box is ticked, award no mark  |
|             |           | <b>Total</b>         | <b>5</b> |   |   |  |

| Tier<br>3–6 | Q No<br>2 | Part                | Mark | Answer   | Accept   | Additional guidance                               |
|-------------|-----------|---------------------|------|--|--|---|
|             |           | <b>a</b><br>1/2e    | 1    | any <b>one</b> from<br>* to make the measurements reliable<br>* to make it fair<br>* make sure the measurement is correct<br>* to make it accurate                                   | accept 'it is hard to measure a bent finger'<br>accept 'the measurement would be wrong'  |   |
|             |           | <b>b i</b><br>1/2g  | 1    | * mm   | accept 'millimetres'   |   |
|             |           | <b>b ii</b><br>1/2i | 1    | any <b>one</b> from<br>* some of the lengths appear in more than one bar<br>* some people were counted twice<br>* the range varies for the bars<br><br>* some lengths are missed out | accept 'they did 65 twice <b>or</b> three times'<br><br>accept correct references to specific numbers eg 'they could not record 55.5 <b>or</b> 60.5 mm'<br>accept suggestions for improving the bar chart such as 'the last bar should be 71–75' | 'the numbers are written wrongly' is insufficient |
|             |           | <b>c</b><br>1/2b    | 1    | * observe pupils' tongues ✓  |  | if more than one box is ticked, award no mark     |
|             |           | <b>d</b><br>1/2i    | 1    | * a bar drawn to 10  |  |   |

| Tier<br>3–6  | Q No<br>2 | Mark | Answer   | Accept  | Additional guidance  |
|--------------|-----------|------|--|---|--|
| e<br>1/2e    | 1         |      | * more children were recorded in investigation 1 than in investigation 2 | accept the converse<br>accept '16 children recorded with measurements 50–60 mm. Only 14 children recorded in investigation 2'<br>accept '36 people in the first investigation, but only 14 in the second'<br>accept 'there are more higher bars'<br>accept 'higher bars'<br>accept 'they add up to different numbers' | numbers need not be precise for this mark<br><br><i>do not accept</i> an answer which only compares the number of bars on the bar charts |
| <b>Total</b> | <b>6</b>  |      |  |   |  |

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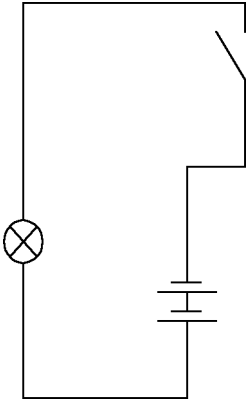
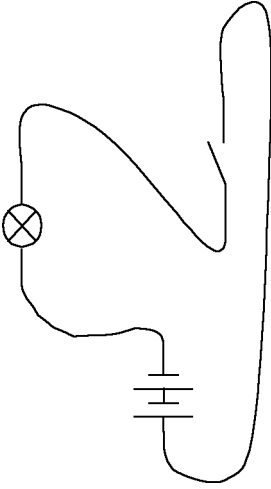
<https://www.SATs-Papers.co.uk>

| Tier 3–6                 |          | Q No   | Additional guidance  |   |
|--------------------------|----------|--|--|---|
| Part                     | Mark     | Answer   | Accept   | Additional guidance   |
| <b>a i</b><br>2/2i       | 1        | * oxygen   | accept 'O <sub>2</sub> '   | <i>do not accept</i> 'air'  |
|                          | 1        | any <b>one</b> from<br>* glucose<br>* digested food<br>* vitamins<br>* minerals<br>* water   | accept 'sugar'<br>accept 'amino acids' <b>or</b> 'fatty acids' <b>or</b> 'glycerol'<br>accept 'food' <b>or</b> 'nutrients'<br>accept a named vitamin<br>accept a named mineral   |   |
| <b>b</b><br>2/2c<br>2/2i | 1        | any <b>one</b> from<br>* it prevents oxygen getting to the organ<br>* it prevents food getting to the organ<br>* it stops blood getting to the organ | accept 'it stops oxygen'<br>accept 'it blocks the blood vessel'<br>accept 'it causes a heart attack' <b>or</b> 'a stroke' <b>or</b> 'thrombosis'<br>accept 'it stops the flow of blood' <b>or</b> 'it stops blood flowing around the body' | 'you would die' is insufficient   |
|                          | 1        | any <b>one</b> from<br>* it stops bleeding<br>* it prevents bacteria <b>or</b> viruses from entering   | accept 'microbes' <b>or</b> 'germs' for bacteria<br>accept 'it stops dirt getting in'<br>accept 'it stops infection'<br>accept 'it stops disease'  | these less precise terms are accepted if the answer indicates that the scab acts as a barrier<br>'to keep it clean' is insufficient<br>'it stops diseases getting in' is insufficient |
| <b>Total</b>             | <b>4</b> |  |  |   |





| Tier 3–6           | Q No<br>4    | Mark     | Answer  | Accept  | Additional guidance  |
|--------------------|--------------|----------|---|---|--|
| <b>a</b><br>3/1d   | 1            |          | * It has a high melting point. ✓  |   | if more than two boxes are ticked, deduct one mark for each incorrect tick<br>minimum mark zero                  |
|                    | 1            |          | * It is a good conductor of heat and electricity. ✓   |   |  |
| <b>b i</b><br>3/1h | 1            |          | * filtration <b>or</b> filtering  | accept 'filter'   |  |
|                    | 1<br>1       |          | * A: black particles <b>or</b> solid <b>or</b> residue<br>* B: blue solution <b>or</b> filtrate | accept 'particles' <b>or</b> 'solids'<br>accept 'solution'<br>accept 'liquid'   | <i>do not accept</i> 'blue particles'<br><i>do not accept</i> 'black solution'<br><i>do not accept</i> 'mixture' |
| <b>c</b><br>3/1h   | 1            |          | * the water had evaporated  | accept 'the liquid had evaporated' <b>or</b> 'it had evaporated'<br>accept a description of evaporation eg 'it turned into gas' | 'it had dried up' is insufficient<br><br><i>do not accept</i> 'the solution evaporated'                          |
|                    | <b>Total</b> | <b>6</b> |   |   |  |

| Tier<br>3–6 | Q No<br>5 | Part                | Mark     | Answer  | Accept   | Additional guidance   |
|-------------|-----------|---------------------|----------|---|--|---|
|             |           | <b>a i</b><br>4/3g  | 1        | * vibrate   | accept 'move in and out'   | 'move' is insufficient  |
|             |           | <b>a ii</b><br>4/3g | 1        | any <b>one</b> from<br>* it stops the sound waves <b>or</b> vibrations reaching our eardrums<br>* it stops the eardrum vibrating<br>* the eardrum vibrates less | accept 'it stops sound reaching our eardrum'<br>accept 'it absorbs sound'<br>accept 'it blocks the ear'<br>accept 'it stops the eardrum moving in and out'<br>accept 'soundwaves are reflected by the wax' |   |
|             |           | <b>b i</b><br>1/2k  | 1        | * human <i>and</i> sparrow <i>and</i> rabbit  | accept 'bird' for sparrow  | answers may be in any order<br><b>all three</b> answers are required for the mark |
|             |           | <b>b ii</b><br>1/2k | 1        | * cat   |  |   |
|             |           | <b>Total</b>        | <b>4</b> |   |  |   |

| Tier 3–6 | Q No 6 | Part                | Mark     | Answer  | Accept  | Additional guidance  |
|----------|--------|---------------------|----------|---|---|--|
|          |        | <b>a</b><br>1/2a    | 1        | any <b>one</b> from<br>* it describes how they will carry out their investigation<br>* it has more information <b>or</b> detail<br>* it includes a fair test<br>* it includes measurement | accept a description which identifies a factor to be kept constant<br>accept 'the second plan includes apparatus to be used <b>or</b> a measurement <b>or</b> a comparison'   | accept the converse of any marking point<br><br>accept a statement referring to any of the points in the second plan<br>accept answers which describe a consequence of the test not being fair |
|          |        | <b>b</b><br>1/2f    | 1        | * to avoid scalding <b>or</b> burning themselves  | accept 'it is very hot'<br>accept 'to avoid spilling'   | credit may be given for answers which, although not accurate, imply that the water is at a high temperature eg 'it is nearly boiling'  |
|          |        | <b>c</b><br>1/2h    | 1        | any <b>one</b> from<br>* it allowed them to compare the times for different tea bags<br>* it told them when the measurement was completed<br><br>* so they knew when to stop              | accept 'as soon as it has gone they stopped timing'<br>accept 'so they know how long it takes'<br>accept 'the cross let them see when the tea produced by the 3 bags was the same'<br>accept 'so they could stop at the right time'<br>accept 'it tells them when they have dissolved the same' | answers must indicate that the cross shows when the teas are the same colour <b>or</b> allows a measurement to be made<br><br>'it made it fair' is insufficient                                |
|          |        | <b>d i</b><br>1/2i  | 1        | * results ✓   |   | if more than one box is ticked, award no mark  |
|          |        | <b>d ii</b><br>1/2k | 1        | * triangle circle square  | accept a drawing of a triangle, a circle and a square   | <b>all three</b> answers are required in the correct order   |
|          |        | <b>Total</b>        | <b>5</b> |   |   |  |

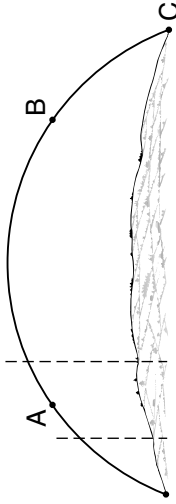
| Tier 3–6 Q No 7 |              | Accept  | Additional guidance   |
|-----------------|--------------|---|---|
| Part            | Mark         | Answer  |   |
| a i<br>4/1a     | 1            | any <b>one</b> from<br>* it let the current <b>or</b> electricity flow<br>* current could flow through the bulb<br>* it completed the circuit   |   |
|                 | 1            | * all three components must be correctly connected in series  | a mark may be awarded for any correctly connected circuit drawn with straight <b>or</b> curved wires<br>award a mark for a correct circuit diagram in which the pupil has drawn the symbols instead of connecting the printed symbols |
| b i<br>4/1b     | 1            | any <b>one</b> from<br>* the bulb is broken <b>or</b> blown<br>* the filament is broken   |    |
|                 | 1            | * turn one of the cells around  |   |
| c<br>4/1b       | 1            | any <b>one</b> from<br>* it stopped current from flowing<br>* paper does not conduct <b>or</b> is an insulator<br>* the circuit was broken <b>or</b> incomplete<br>* so that the circuit can be completed |   |
|                 | <b>Total</b> | <b>5</b>  |   |

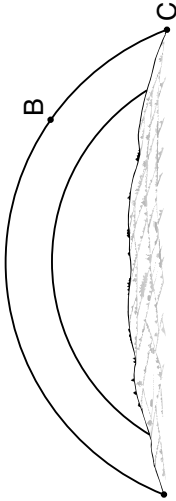


| Tier 3–6     | Q No 8 | Mark     | Answer  | Accept  | Additional guidance   |
|--------------|--------|----------|---|---|---|
| <b>a</b>     | 4/1d   | 1        | *  |    | all <b>four</b> poles must be correct for the mark  |
| <b>b</b>     | 4/1d   | 1        | *  |    | all <b>four</b> poles must be correct for the mark  |
| <b>c</b>     | 3/1d   | 1        | any <b>one</b> from<br>* nothing<br>* they would both point towards magnetic north    | accept 'they would not point to the aluminium'<br>accept 'they would all point north <b>or</b> up <b>or</b> down'<br>accept 'they would point the same way <b>or</b> in the same direction'<br>accept 'they would go back to how they were' | do <b>not</b> accept 'the compasses <b>or</b> the experiment <b>or</b> it would not work' |
| <b>Total</b> |        | <b>3</b> |   |   |   |

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| Tier 3–6            |      | Q No  | Accept   |  | Additional guidance |
|---------------------|------|---|--|--|---------------------|
| Part                | Mark | Answer  |  |  |                     |
| <b>a</b><br>4/4b    | 2    | * <i>Earth</i> : B<br>* <i>Sun</i> : A<br>* <i>Moon</i> : C   | answers must be in the correct order<br>if all three answers are correct, award two marks<br>if one <b>or</b> two answers are correct, award one mark  |  |                     |
| <b>b</b><br>4/4e    | 1    | any <b>one</b> from<br>* weather forecasting<br>* communications<br>* television <b>or</b> TV<br>* spying<br>* space telescope<br>* global positioning system <b>or</b> GPS | accept 'to look at the weather'<br>accept 'telephone' <b>or</b> 'internet'<br><br>accept 'Hubble telescope'<br>accept 'to find out more about the universe'<br>accept 'navigation'<br>accept 'monitoring the Earth'<br>accept 'searching for meteors <b>or</b> comets' |  |                     |
| <b>c</b><br>4/4d    | 1    | * the Sun ✓   | if more than one box is ticked, award no mark  |  |                     |
| <b>d i</b><br>4/4a  | 1    | * point A marked halfway between 5.00 am and 1.00 pm<br>                               | accept any point within the tolerances shown   |  |                     |
| <b>d ii</b><br>4/4a | 1    | * 4 hours ✓   | if more than one box is ticked, award no mark  |  |                     |

|              |           |   |   |
|--------------|-----------|---|---|
| Tier<br>3–6  | Q No<br>9 |   |   |
| Part         | Mark      | Answer  | Accept  |
| e<br>4/4a    | 1         | <p>* a curve below the printed line at all points</p>  | <p><b>Additional guidance</b></p> <p>ignore arrows<br/>the line must start and finish on the horizon<br/>do <b>not</b> accept a curve which begins or finishes at the same points as the existing curve</p> |
| <b>Total</b> | <b>7</b>  |   |   |

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| Tier<br>3–6<br>5–7 | Q No<br>10<br>1 |   |  |   |
|--------------------|-----------------|---|--|---|
| Part               | Mark            | Answer  | Accept   | Additional guidance   |
| <b>a</b><br>1/2k   | 1               | * 3.5   | accept answers from 3.4 to 3.6   |   |
| <b>b</b><br>2/2m   | 1               | * It increases the time taken to react. ✓   |  | if more than one box is ticked, award no mark   |
| <b>c</b><br>2/2c   | 1               | * small intestine   | accept 'intestine'   | <i>do not accept</i> 'large intestine'  |
| <b>d</b><br>2/2m   | 1               | any <b>one</b> from<br>* liver<br>* kidney<br>* brain<br>* heart  |  |   |
| <b>e</b><br>2/2h   | 1               | any <b>one</b> from<br>* brain damage<br>* low birth weight<br>* premature birth <b>or</b> miscarriage<br><br>* less <b>or</b> not enough oxygen<br>* less <b>or</b> not enough nutrients<br>* build up of carbon dioxide <b>or</b> CO <sub>2</sub> <b>or</b> waste | accept 'kill the foetus'<br><br><br><br><br><br>accept 'not enough food' | 'make the foetus ill' is insufficient<br><br><i>do not accept</i> 'the baby gets no oxygen'<br><i>do not accept</i> 'the baby gets no food'<br>'less blood to foetus' is insufficient |
| <b>Total</b>       | <b>5</b>        |   |  |   |

| Tier 3–6<br>5–7 |      | Q No<br>11<br>2 | Part | Mark | Answer  | Accept   | Additional guidance   |
|-----------------|------|-----------------|------|------|---|--|---|
| <b>a</b>        | 1/2h | 1               |      | 1    | <p>any <b>one</b> from</p> <ul style="list-style-type: none"> <li>* to allow his resting pulse rate to be determined</li> <li>* to compare his pulse before and after drinking the cola</li> <li>* so he would know if it had changed</li> </ul>  | <p>accept 'to get a reading of heart rate when relaxed'</p> <p>accept 'to make sure his heart rate was steady'</p> <p>accept 'to see if there was any change'</p> <p>accept 'so he could find out his normal heart rate'</p> <p>accept 'to get a reliable reading of his pulse rate'</p> <p>accept 'to find the average'</p> | <p>'he wanted to know his heart rate before he drank his cola' is insufficient as this is given in the question</p> |
| <b>b</b>        | 1/2k | 1               |      | 1    | <ul style="list-style-type: none"> <li>* his heart rate went up after he drank some cola</li> </ul>   | <p>accept 'his heart rate <b>or</b> pulse went up'</p> <p>accept 'it shows his heart rate went up'</p> <p>accept 'the graph shows his heart rate changed'</p> <p>accept 'the line goes up <b>or</b> changed'</p> <p>accept 'the points get higher'</p>   |   |
| <b>c</b>        | 1/2o | 1               |      | 1    | <p>any <b>one</b> from</p> <ul style="list-style-type: none"> <li>* Yasmin's conclusion describes how it affected his heart rate while Harry's just says it affected his heart rate</li> <li>* Yasmin's conclusion describes the direction of the change in his heart rate</li> <li>* Yasmin's conclusion describes how his heart rate changed</li> </ul> | <p>accept 'Yasmin is more specific <b>or</b> more detailed'</p> <p>accept 'Harry doesn't say what the effect is'</p> <p>accept 'Harry's conclusion could mean that his heart rate was slower'</p>  |   |

| Tier<br>3–6<br>5–7 | Q No<br>11<br>2 | Part      | Mark     | Answer  | Accept   | Additional guidance   |
|--------------------|-----------------|-----------|----------|---|--|---|
|                    |                 | d<br>1/2d | 1        | <p>any <b>one</b> from</p> <ul style="list-style-type: none"> <li>* drinking fizzy water would be a control</li> <li>* it would enable them to see whether fizziness <b>or</b> sparkling drinks would have an effect</li> <li>* it would allow them to see if carbon dioxide <b>or</b> carbonation has an effect</li> <li>* it would show it was something else in cola that had an effect</li> </ul> | <p>accept 'you would know if it was bubbles that had an effect'</p> <p>accept 'using more <b>or</b> different drinks would give more evidence'</p> | <p>'to see if something else had an effect' is insufficient</p> |
| <b>Total</b>       |                 |           | <b>4</b> |   |  |   |

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| Tier<br>3–6<br>5–7  | Q No<br>12<br>3 |   |                     |   |
|---------------------|-----------------|---|---------------------|---|
| Part                | Mark            | Answer  | Accept              | Additional guidance                           |
| <b>a</b><br>2/3d    | 1               | * root hair   |                     | 'root' is insufficient                        |
| <b>b</b><br>2/5c    | 1               | any <b>one</b> from<br>* they prevent insects <b>or</b> flies from crawling out<br>* insects slide in<br>* they make it difficult for them to crawl out |                     | 'to attract insects' is insufficient          |
| <b>c</b><br>2/2h    | 1               | * the more insects there are <b>or</b> food there is the more bacteria there will be  | accept the converse |   |
| <b>d i</b><br>2/3b  | 1               | * carbon dioxide + <i>water</i> →<br><i>glucose</i> + * oxygen  |                     |   |
| <b>d ii</b><br>2/2d | 1               | * to provide energy ✓   |                     | if more than one box is ticked, award no mark |
| <b>Total</b>        | <b>6</b>        |   |                     |   |



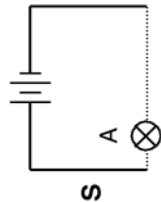
| Tier<br>3–6<br>5–7 |              | Q No<br>13<br>4 | Part     | Mark  | Answer  | Accept   | Additional guidance |
|--------------------|--------------|-----------------|----------|---|---|--|---------------------|
|                    | <b>a i</b>   | 3/3d<br>1/2k    | 1        | * carbon dioxide<br>any <b>one</b> from<br>it took more <b>or</b> most alkali to neutralise it <b>or</b> to<br>change the colour of the indicator back to green | accept 'CO <sub>2</sub> '<br>accept 'it took most drops' <b>or</b> 'it took 160'          | <b>both</b> the answer and the reason are required for<br>the mark |                     |
|                    | <b>a ii</b>  | 3/3d            | 1        | * air<br>it did not change the colour of the indicator <b>or</b><br>the pH of the solution  | accept 'no drops <b>or</b> alkali were needed'<br>accept 'there was no change'            | <b>both</b> the answer and the reason are required for<br>the mark |                     |
|                    | <b>a iii</b> | 3/3e            | 1        | any <b>one</b> from<br>* neutralises it<br>* it raises the pH   | accept 'it makes it less acidic'<br>accept 'it makes it pH 7'<br>accept 'it forms a salt' | <b>do not accept</b> 'makes it more alkaline'                      |                     |
|                    | <b>b</b>     | 3/3a<br>3/1f    | 1<br>1   | * zinc chloride +<br>* hydrogen   |   | answers may be in either order                                     |                     |
|                    | <b>Total</b> |                 | <b>5</b> |   |   |  |                     |

| Tier<br>3–6<br>5–7   | Q No<br>14<br>5 |  |  |  |
|----------------------|-----------------|--|--|--|
| Part                 | Mark            | Answer   | Accept   | Additional guidance  |
| <b>a i</b><br>3/1g   | 1               | * a mixture ✓  |  | if more than one box is ticked, award no mark  |
| <b>a ii</b><br>3/1e  | 1               | * a compound ✓   |  | if more than one box is ticked, award no mark  |
| <b>a iii</b><br>3/1a | 1               | any <b>one</b> from<br>* they are denser than the liquid<br><br>* the liquid is less dense than the solid  | accept 'it is heavier than the liquid <b>or</b> the paint'<br>accept 'the solid particles are more dense <b>or</b> heavier <b>or</b> too heavy'<br>accept 'the solid is denser'<br>accept 'the liquid is less dense' <b>or</b> 'the liquid is lighter' | <b>do not accept</b> 'solid particles are heavy' without a comparison <b>or</b> qualifier eg 'too heavy' |
| <b>b</b><br>3/2b     | 1               | any <b>one</b> from<br>* it is insoluble in water<br>* water is not a solvent for the paint<br>* it dissolves in white spirit<br>* white spirit is a solvent for the paint |  | 'it is waterproof' is insufficient   |
| <b>Total</b>         | <b>4</b>        |  |  |  |

| Tier<br>3–6<br>5–7   |          | Q No<br>15<br>6  |   |   |
|----------------------|----------|--|---|---|
| Part                 | Mark     | Answer   | Accept  | Additional guidance                           |
| <b>a i</b><br>3/2c   | 1        | * B  |   |   |
| <b>a ii</b><br>3/2c  | 1        | * 55   | accept answers from 54 to 56                        |   |
| <b>a iii</b><br>3/2c | 1        | * point A: solid   |   |   |
|                      | 1        | * point D: liquid  |   |   |
| <b>b</b><br>4/5f     | 1        | * conduction ✓   |   | if more than one box is ticked, award no mark |
| <b>c</b><br>3/1a     | 1        | any <b>one</b> from<br>* the boiling point of water is less than that of stearic acid<br>* water could not transfer enough energy<br>* the maximum temperature of water is 100°C<br>* it cannot get hot enough | accept 'the water is not hot enough'                |   |
| <b>Total</b>         | <b>6</b> |  | accept 'stearic acid has a very high boiling point' |   |

| Tier<br>3–6<br>5–7 |              | Q No<br>16<br>7 | Part        | Mark  | Answer                  | Accept | Additional guidance   |
|--------------------|--------------|-----------------|-------------|---|-------------------------|--------|---|
|                    | a i          | 4/5e            | 1           | * A and F   |                         |        | answers may be in either order<br><b>both</b> answers are required for the mark |
|                    | a ii         | 4/5e            | 1           | * A   |                         |        |   |
|                    | a iii        | 4/5e            | 1           | * E   |                         |        |   |
|                    | b i          | 4/2c            | 1           | * gravity <b>or</b> gravitational force                           | accept 'weight'         |        |   |
|                    | b ii         | 4/2d            | 1           | any <b>one</b> from<br>* friction<br>* drag<br>* water resistance | accept 'air resistance' |        |   |
|                    | c            | 4/5e<br>4/5g    | 1<br>1<br>1 | * kinetic<br>* sound<br>* thermal                                 | accept 'heat'           |        | the last two answers may be in either order                                     |
|                    | <b>Total</b> |                 | <b>8</b>    |   |                         |        |   |

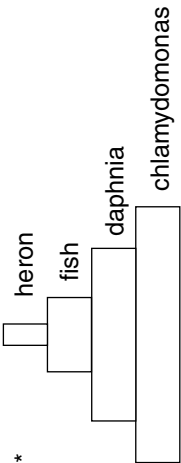
| Tier 3–6<br>5–7 |      | Q No<br>17<br>8 | Part | Mark | Answer  | Accept  | Additional guidance   |
|-----------------|------|-----------------|------|------|---|---|---|
| <b>a</b>        | 4/1a | 1<br>1          |      |      | * one mark for B and C in series<br>* one mark for A in parallel with B and C for example   |   | <b>both</b> marks should only be awarded if the circuit is correct<br><br>award one mark if all three bulbs are drawn in parallel <b>or</b> all in series   |
|                 |      |                 |      |      |   |   |   |
| <b>b</b>        | 4/1b | 1               |      |      | * A any <b>one</b> from<br>* it has more current passing through it<br><br>* A has 3 V across it and B and C have 1.5 V across them<br>* A has twice the voltage of B <b>or</b> C<br><br>* because it is directly connected to the supply |   | <b>both</b> the letter and the reason are required for the mark<br><br>answers should convey the idea that energy <b>or</b> voltage is shared between B and C but A is not sharing energy <b>or</b> voltage |
|                 |      |                 |      |      |   | accept 'the others have less current passing through them'<br>accept 'A has a greater voltage across it'<br>accept 'B and C have less voltage across them'<br>accept 'there is less resistance in the top <b>or</b> A branch of the circuit'<br>accept 'the others are in series' |   |
| <b>c</b>        | 4/1a | 1               |      |      | * a letter S in any part of the circuit before it branches  |   |   |
| <b>Total</b>    |      | <b>4</b>        |      |      |   |   |   |



| Tier<br>3–6<br>5–7 | Q No<br>18<br>9 | Part         | Mark     | Answer  | Accept  | Additional guidance   |
|--------------------|-----------------|--------------|----------|---|---|---|
|                    |                 | a i<br>4/3c  | 1        | * A and C   |   | answers may be in either order<br><b>both</b> answers are required for the mark |
|                    |                 | a ii<br>4/3d | 1        | any <b>one</b> from<br>* B<br>* D   |   |   |
|                    |                 | b<br>4/5g    | 1        | any <b>one</b> from<br>* not all the light is reflected<br>* some of the light is refracted<br>* some of the light is absorbed<br>* light is scattered by the glass | accept 'it splits into two rays' or 'it splits' |   |
|                    |                 | <b>Total</b> | <b>3</b> |   |   |   |

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| Tier 5–7     | Q No 10      | Part     | Mark  | Answer   | Accept  | Additional guidance   |
|--------------|--------------|----------|---|--|---|---|
| a i          | 2/5e         | 1        | <p>*<br/> </p> | <p>any <b>one</b> from<br/>                     * each animal eats lots of the organism below it in the food chain</p>   | <p>accept 'DDT increases up the food chain'<br/>                     accept 'the heron gets all the DDT in the other animals'<br/>                     accept 'the heron is at the top of the food chain'<br/>                     accept 'DDT is not excreted'<br/>                     accept 'DDT remains in the body'<br/>                     accept 'DDT is stored in the body'</p> | <p>four boxes must be drawn, decreasing in width towards the top, and all labels must be correct for the mark</p> |
| b i          | 2/2h<br>2/5f | 1        | <p>* through the placenta</p>   | <p>accept 'through the umbilical cord'<br/>                     accept 'from the mother's blood'</p>   |   |   |
| b ii         | 2/2a<br>2/5f | 1        | <p>* in milk</p>  | <p>accept 'through the mammary glands'<br/>                     accept 'the mother breastfeeds the pup'<br/>                     accept 'the mother feeds the pup herself'</p> |   | <p>'the mother feeds the pup' is insufficient</p>   |
| <b>Total</b> |              | <b>4</b> |   |  |   |   |

| Tier 5–7            | Q No 11  | Mark  | Answer | Accept  | Additional guidance |
|---------------------|----------|---|--------|---|---------------------|
| <b>a i</b><br>1/2j  | 1        | * 1000  |        |   |                     |
| <b>a ii</b><br>2/2j | 3        | any <b>three</b> from<br>* she was using her muscles more<br>* she needed more energy<br>* her rate of respiration increased<br>* more oxygen was used up<br>* more carbon dioxide was produced |        | accept 'she was using her muscles'<br>accept 'more respiration'<br>accept 'more oxygen was needed'<br>accept 'there was more carbon dioxide to remove'                        |                     |
| <b>b i</b><br>1/2j  | 1        | * it became faster  |        | accept for the first two marking points 'her muscles need more energy'  |                     |
| <b>b ii</b><br>1/2j | 1        | any <b>one</b> from<br>* the breaths are closer together<br>* there are more breaths in 10 s  |        | accept 'the waves are closer together'<br>accept 'there are more waves in 10 s'<br>accept 'there are three breaths in the first ten seconds and five in the next ten seconds' |                     |
| <b>Total</b>        | <b>6</b> |   |        |   |                     |



| Tier 5–7                     | Q No 12  | Mark  | Answer   | Accept  | Additional guidance   |
|------------------------------|----------|---|--|---|---|
| <b>a i</b><br>3/1c<br>3/1g   | 1        | * A   |  |   |   |
| <b>a ii</b><br>3/1e<br>3/1g  | 1        | * E   |  |   |   |
| <b>a iii</b><br>3/1c<br>3/1e | 1        | * C   |  |   |   |
| <b>b</b><br>3/1e<br>3/1g     | 1        | any <b>one</b> from<br>* a compound contains two <b>or</b> more elements chemically combined <b>or</b> bonded<br>* a mixture contains two <b>or</b> more elements <b>or</b> compounds <b>or</b> substances not chemically combined <b>or</b> bonded | accept 'a compound contains different elements <b>or</b> atoms of different types joined together' | <i>do not accept</i> 'a compound contains two <b>or</b> more atoms joined together' |   |
| <b>c i</b><br>3/1f           | 1        | any <b>one</b> from<br>* name: oxygen formula: O <sub>2</sub><br>* name: hydrogen formula: H <sub>2</sub><br>* name: nitrogen formula: N <sub>2</sub><br>* name: chlorine formula: Cl <sub>2</sub>  | accept any other element which exists as diatomic molecules in the gaseous state                   | 'a mixture can be separated by physical means'                                      | <b>both</b> the name and formula are required for the mark<br><i>do not accept</i> 'O' <b>or</b> 'H' <b>or</b> 'N' <b>or</b> 'Cl' |
| <b>c ii</b><br>3/1f          | 1        | any <b>one</b> from<br>* name: carbon dioxide formula: CO <sub>2</sub><br>* name: water formula: H <sub>2</sub> O<br>* name: sulphur dioxide formula: SO <sub>2</sub><br>* name: nitrogen dioxide <b>or</b> nitrogen oxide formula: NO <sub>2</sub> | accept any compound with the formula XY <sub>2</sub> , eg magnesium chloride MgCl <sub>2</sub>     | 'a mixture can be separated' is insufficient  | <b>both</b> the name and formula are required for the mark  |
| <b>Total</b>                 | <b>6</b> |   |  |   |   |

| Tier 5–7     | Q No 13      | Mark     | Answer                                   | Accept  | Additional guidance                                |
|--------------|--------------|----------|--|---|--|
| <b>a</b>     | 3/1f         | 1<br>1   | * CO <sub>2</sub> +<br>* CaO             |   | answers may be in either order<br>ignore multiples |
| <b>b i</b>   | 3/2i         | 1        | * sulphur dioxide                        | accept 'SO <sub>2</sub> '<br>accept 'sulphur trioxide'<br>accept 'SO <sub>3</sub> ' |  |
| <b>b ii</b>  | 3/3e<br>3/3g | 1<br>1   | * calcium sulphate +<br>* carbon dioxide | accept 'CaSO <sub>4</sub> '<br>accept 'CO <sub>2</sub> '                            | answers may be in either order                     |
| <b>Total</b> |              | <b>5</b> |  |   |  |

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| Tier 5–7     | Q No 14  | Mark | Answer   | Accept  | Additional guidance   |
|--------------|----------|------|--|---|---|
| 1/2d         | 1        |      | * modified and unmodified plants   | accept 'type of plant'  | <p>markers should read through the whole answer before marking this question</p> <p>'(flowers from) different plants' is insufficient</p> |
| 1/2a         | 1        |      | * the number of days <b>or</b> weeks <b>or</b> months the flowers stayed fresh   | accept 'how long they stayed fresh'   |   |
| 1/2d         | 1        |      | any <b>one</b> from  |   |   |
| 1/2a         |          |      | * modified and unmodified plants should be the same variety  |   |   |
|              |          |      | * conditions under which flowers are kept should be the same   | accept 'amount of sunlight should be the same'<br>accept 'amount of water should be the same' |   |
|              |          |      | * modified and unmodified plants should be the same starting age   | accept 'nutrients added should be the same'   |   |
| 1/2e         | 1        |      | A suitable time span (which will allow comparison) for example<br>* 'until they have all wilted'<br><b>or</b><br>* 'until all ordinary plants have wilted' |   | award a mark for answers of 2 weeks or more   |
| <b>Total</b> | <b>4</b> |      |  |   |   |

| Tier 5–7 | Q No 15 | Part                | Mark     | Answer  | Accept   | Additional guidance                              |
|----------|---------|---------------------|----------|---|--|--|
|          |         | <b>a i</b><br>4/2f  | 1        | * 75<br>* Nm  | accept '50 × 1.5'  | <i>do not accept</i> lower case n                |
|          |         | <b>a ii</b><br>4/2f | 1        | * 750   | accept $\frac{50 \times 1.5}{0.1}$ <b>or</b> '50 × 15'                       |  |
|          |         | <b>b</b><br>4/1f    | 1        | any <b>one</b> from<br>* a current flows in the coil<br>* the coil <b>or</b> the iron core becomes magnetised   | accept the numerical answer to part <b>a i</b> ÷ 0.1                         |  |
|          |         |                     | 1        | any <b>one</b> from<br>* the counterweight is attracted to the coil <b>or</b> core<br><b>or</b> the electromagnet<br>* the electromagnet produces a bigger moment | accept 'there is a magnetic field' <b>or</b> 'the electromagnet switches on' | <i>do not accept</i> 'the core becomes magnetic' |
|          |         | <b>Total</b>        | <b>5</b> |   | accept 'the left-hand side of the barrier moves down'                        | 'the right-hand side moves up' is insufficient   |

| Tier 3–6 | Q No<br>1 | Part         | Mark     | Answer   | Accept            | Additional guidance            |
|----------|-----------|--------------|----------|--|-------------------|--------------------------------|
|          |           | a i<br>4/2b  | 1        | * C  |                   |                                |
|          |           | a ii<br>4/2c | 1        | * B  |                   |                                |
|          |           | b<br>4/2a    | 1        | * 20   |                   |                                |
|          |           | c<br>4/2d    | 1        | any <b>one</b> from<br>* friction<br>* air resistance <b>or</b> drag<br>* reaction | accept 'upthrust' | <b>do not accept</b> 'gravity' |
|          |           | <b>Total</b> | <b>4</b> |  |                   |                                |

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| Tier<br>3–6         | Q No<br>2 | Accept  |  |
|---------------------|-----------|---|--|
| Part                | Mark      | Answer  | Additional guidance  |
| <b>a i</b><br>4/1a  | 1         | * series<br>* all   | answers must be in the correct order<br><b>both</b> answers are required for the mark              |
| <b>a ii</b><br>4/1a | 1         | * parallel<br>* none  | answers must be in the correct order<br><b>both</b> answers are required for the mark              |
| <b>b</b><br>4/3b    | 1         | * they were reflected <b>or</b> scattered                                       | accept 'some light was absorbed or refracted'<br>accept 'they bounced off'                         |
| <b>c</b><br>2/3d    | 1<br>1    | * They absorb water from the soil. ✓<br>* They absorb minerals from the soil. ✓ | if more than two boxes are ticked, deduct one<br>mark for each incorrect tick<br>minimum mark zero |
| <b>Total</b>        | <b>5</b>  |   |  |

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| Tier 3–6            |          | Q No  | Additional guidance   |  |
|---------------------|----------|---|---|--|
| Part                | Mark     | Answer  | Accept  |  |
| <b>a</b><br>1/2c    | 1        | * predictions ✓   |   | if more than one box is ticked, award no mark                            |
| <b>b</b><br>1/2a    | 1        | any <b>one</b> from<br>* to make sure any effect of everyone jumping was detected<br>* to make the effect as large as possible                    | accept 'so the sensor can detect the vibrations'  | 'fair test' is insufficient<br>'to get the best results' is insufficient |
| <b>c i</b><br>1/1b  | 1        | any <b>one</b> from<br>* there are vibrations in recordings A and B only<br>* no vibrations at C  | accept 'there are more <b>or</b> bigger vibrations at A and B'<br>accept 'wider lines in recordings A and B'<br>accept 'bigger amplitude in A and B'<br>accept 'no vibrations far away' |  |
| <b>c ii</b><br>1/2m | 1        | any <b>one</b> from<br>* more people jumped near A<br>* people jumped from a greater height near A<br>* sensor A is nearer the site than sensor B | accept 'fewer jumped at B'<br>accept the converse<br>accept the converse<br>accept 'the sensor is nearer site A than B'<br>accept 'sensor A is closer to the pupils'                    | <b>do not accept</b> 'different numbers of people'                       |
| <b>Total</b>        | <b>4</b> |   |   | 'different sensors' is insufficient                                      |

| Tier 3–6            | Q No<br>4 |  |  |
|---------------------|-----------|--|--|
| Part                | Mark      | Answer   | Accept   |
| <b>a</b><br>3/1h    | 1         | * a magnet   | accept 'an electromagnet'                                    |
| <b>b</b><br>3/2b    | 1         | any <b>one</b> from<br>* they dissolved<br>* they are soluble in water | accept 'they formed a solution'<br>accept 'they are soluble' |
| <b>c i</b><br>3/1a  | 1         | * bubbles formed   |  |
| <b>c ii</b><br>3/1e | 1         | * It turned cloudy. ✓  | if more than one box is ticked, award no mark                |
| <b>Total</b>        | <b>4</b>  |  |  |

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| Tier 3–6     | Q No<br>5 |  |  |
|--------------|-----------|--|--|
| Part         | Mark      | Answer                                 | Accept   |
| a<br>3/1d    | 1         | *<br>copper for the base of a saucepan | It is lighter than air.  |
|              | 1         | *<br>gold for a ring                   | It is a good conductor of heat.  |
|              | 1         | *<br>helium in a balloon               | It is a good conductor of electricity.   |
|              | 1         | *<br>mercury in a thermometer          | It stays shiny because it does <b>not</b> react with oxygen.   |
| b<br>3/1d    | 1         | * helium ✓                             | if more than one line is drawn from any element, award no mark for that element<br>minimum mark zero |
| <b>Total</b> | <b>5</b>  |  | if more than one box is ticked, award no mark  |

| Tier 3–6     | Q No 6       | Mark     | Answer      | Accept  | Additional guidance                           |
|--------------|--------------|----------|-------------|---|---|
| <b>a i</b>   | 3/2a<br>1/2k | 1        | * 4         |   |   |
| <b>a ii</b>  | 3/2a         | 1        | * water     | accept H <sub>2</sub> O                       | answers may be in either order                |
|              |              | 1        | * gas       | accept 'carbon dioxide' or 'CO <sub>2</sub> ' |   |
| <b>b</b>     | 3/2b         | 1        | * solvent ✓ |   | if more than one box is ticked, award no mark |
| <b>Total</b> |              | <b>4</b> |             |   |   |

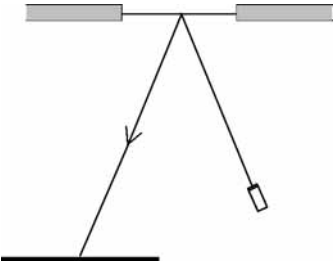
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| Tier 3–6 | Q No<br>7 | Part                | Mark     | Answer   | Accept  | Additional guidance  |
|----------|-----------|---------------------|----------|--|---|--|
|          |           | <b>a</b><br>1/2a    | 1        | * E D A B C  |   | all five letters must be in the correct order                                  |
|          |           | <b>b</b><br>1/2e    | 1        | * to measure volume  | accept 'to make sure they used the same volume of water in each beaker'<br>accept 'to measure amount of water'<br>accept 'to measure the volume of salt or sugar'                   | 'to measure salt or sugar' is insufficient                                     |
|          |           | <b>c</b><br>1/2d    | 1        | any <b>one</b> from<br>* they used the same volume of water  | accept 'they used the same amount of water'<br>accept 'they stirred the same number of times'<br>accept 'they stirred at the same speed'<br>accept 'they stirred for the same time' | 'they stirred it' is insufficient  |
|          |           | <b>d i</b><br>1/2g  | 1        | any <b>one</b> from<br>* you might not get the same mass each time<br>* you will not know how much was added | accept 'you might not get the same amount of salt or sugar'<br>accept 'it is not precise or a measurement'  | accept answers which suggest that using a spatula is not a precise measurement |
|          |           | <b>d ii</b><br>1/2g | 1        | any <b>one</b> from<br>* measure the mass<br>* measure the number of grams                                   | accept 'measure weight' or 'weigh it'<br>accept 'use a balance or scales'<br>accept 'use grams'<br>accept 'use a measuring cylinder'<br>accept 'level it with a knife'              |  |
|          |           | <b>e</b><br>1/2c    | 1        | * from 1–31 inclusive  |   |  |
|          |           | <b>Total</b>        | <b>6</b> |  |   |  |

| Tier 3–6 | Q No 8 | Part                | Mark     | Answer  | Accept   | Additional guidance                           |
|----------|--------|---------------------|----------|---|--|---|
|          |        | <b>a</b><br>2/4b    | 1        | * They produce milk to feed their young. ✓  |  | if more than one box is ticked, award no mark |
|          |        | <b>b</b><br>2/4b    | 1        | any <b>one</b> from<br>* they can fly<br>* they have wings  |  |   |
|          |        | <b>c</b><br>2/5c    | 1        | any <b>one</b> from<br>* it is streamlined<br>* its limbs are like fins <b>or</b> paddles<br>* it has a wide <b>or</b> powerful tail  | accept 'its fur is smooth <b>or</b> fine <b>or</b> slopes backwards'<br>accept 'it does not have legs'<br>accept 'it has flippers' | 'it can swim' is insufficient                 |
|          |        | <b>d</b><br>2/5c    | 1        | any <b>one</b> from<br>* they protect it against predators<br>* they make it difficult for other animals to eat it <b>or</b> catch it | accept 'they protect it'<br>accept 'they stop it being eaten'  |   |
|          |        | <b>e i</b><br>2/5c  | 1        | any <b>one</b> from<br>* it keeps them warm<br>* it traps air   | accept 'it insulates them'<br>accept 'it prevents them getting cold'   | <b>do not accept</b> 'it keeps the cold out'  |
|          |        | <b>e ii</b><br>2/5c | 1        | * foxes <b>or</b> predators cannot see them   | accept 'they cannot be seen'<br>accept 'they are camouflaged'<br>accept 'they are the same colour as the snow'                     |   |
|          |        | <b>Total</b>        | <b>6</b> |   |  |   |

| Tier 3–6 | Q No 9 | Part                     | Mark     | Answer   | Accept  | Additional guidance   |
|----------|--------|--------------------------|----------|--|---|---|
|          |        | <b>a i</b><br>2/4b       | 1        | * grasshopper  |   |   |
|          |        | <b>a ii</b><br>2/5f      | 1        | any <b>one</b> from<br>* they eat the plants<br>* the insects eat them   | accept 'they eat them'  |   |
|          |        | <b>b</b><br>2/5e         | 1        | any <b>one</b> from<br>* <i>predator</i> : partridge <i>prey</i> : grasshopper <b>or</b> snail<br>* <i>predator</i> : fox <i>prey</i> : partridge<br>* <i>predator</i> : stoat <i>prey</i> : partridge |   | <b>both</b> the predator and its prey are required for the mark |
|          |        | <b>c</b><br>2/5e<br>2/3a | 1        | * They make food by photosynthesis. ✓  |   | if more than one box is ticked, award no mark                   |
|          |        | <b>d</b><br>2/5c<br>2/5d | 1        | any <b>one</b> from<br>* they can see predators <b>or</b> foxes <b>or</b> stoats<br>* it keeps them warm   |   |   |
|          |        | <b>e i</b><br>2/5d       | 1        | any <b>one</b> from<br>* fewer will be found by predators<br>* fewer will be eaten   | accept 'they will not be seen' <b>or</b> 'they are camouflaged'<br>accept 'they will not get eaten' |   |
|          |        | <b>e ii</b><br>2/5d      | 1        | any <b>one</b> from<br>* they may be trodden on <b>or</b> damaged<br>* predators can get to them easily  | accept 'they can be found easily'   |   |
|          |        | <b>Total</b>             | <b>7</b> |  |   |   |

| Tier<br>3–6<br>5–7 | Q No<br>10<br>1 | Part                     | Mark     | Answer  | Accept  | Additional guidance  |
|--------------------|-----------------|--------------------------|----------|---|---|--|
|                    |                 | <b>a</b><br>4/3c         | 1<br>1   | <p>* the angles of incidence and reflection must be equal</p> <p>* the ray must be continuous and straight with an arrow in the correct direction</p>  | accept one arrow in the correct direction on either the incident or the reflected ray   | the ray must hit the screen in the middle 2 cm   |
|                    |                 | <b>b i</b><br>4/3g       | 1        | <p>any <b>one</b> from</p> <p>* sound waves travel to the window <b>or</b> glass</p> <p>* vibrations pass through the air</p> <p>* sound waves <b>or</b> vibrations hit the window</p>  | accept 'sound travels to the window'<br>accept 'sound hits the window'  |  |
|                    |                 | <b>b ii</b><br>4/3c      | 1        | <p>* the beam will vibrate <b>or</b> move <b>or</b> jump about</p>  | accept 'scatter' for vibrate<br>accept 'it would go to other places in the room'<br>accept 'it would go in different directions'<br>accept 'it shakes' <b>or</b> 'it wobbles' | <b>do not accept</b> 'it is blurred'<br>'it goes in a different direction' is insufficient |
|                    |                 | <b>c</b><br>4/3j<br>4/3k | 1        | * B ✓   |   | if more than one box is ticked, award no mark  |
|                    |                 | <b>Total</b>             | <b>5</b> |   |   |  |

| Tier<br>3–6<br>5–7       | Q No<br>11<br>2 |  |   |  |
|--------------------------|-----------------|--|---|--|
| Part                     | Mark            | Answer   | Accept  | Additional guidance  |
| <b>a</b><br>4/2b<br>4/1d | 1<br>1          | * gravity<br>* magnetic force <b>or</b> magnetism  | accept 'weight'<br>accept 'repulsion' <b>or</b> 'upthrust'                              | answers may be in either order<br><br><b>do not accept</b> 'air resistance'  |
| <b>b i</b><br>1/2j       | 1               | * 12   |   |  |
| <b>b ii</b><br>1/2k      | 1               | any <b>one</b> from<br>* the paper cup stopped moving<br>* the paper cup reached the bottom magnet                             | accept 'it hit the bottom'<br>accept 'the paper cup could not go any further'           |  |
| <b>c</b><br>4/1d<br>3/1d | 1               | any <b>one</b> from<br>* iron is magnetic<br>* iron nails are attracted to a magnet<br>* there is a magnetic force on the iron | accept 'aluminium is not magnetic'<br>accept 'the rivets are not attracted to a magnet' | <b>do not accept</b> 'aluminium <b>or</b> rivets are less magnetic'<br><b>do not accept</b> 'iron <b>or</b> nails are more magnetic than aluminium <b>or</b> rivets' |
| <b>Total</b>             | <b>5</b>        |  |   |  |

| Tier<br>3–6<br>5–7 | Q No<br>12<br>3 | Part             | Mark | Answer  | Accept   | Additional guidance   |
|--------------------|-----------------|------------------|------|---|--|---|
|                    |                 | <b>a</b><br>1/2d | 2    | any <b>two</b> from<br>* initial temperature of water<br>* exclusion of draughts<br>* volume <b>or</b> mass of water<br>* surface area (of water)<br>* humidity | accept 'same amount of draughts'<br>accept 'amount of water'<br>accept 'shape <b>or</b> size <b>or</b> material of container'<br>accept 'the time it is left for'                    | 'temperature' is insufficient<br>do not accept 'size of room' |
|                    |                 | <b>b</b><br>1/2o | 1    | * they have not collected data about temperature<br>* no data recorded about temperature  | accept 'they did not measure temperature'<br>accept 'no information about temperature'<br>accept 'no temperature'  |   |
|                    |                 | <b>c</b><br>1/2p | 1    | * the line is not straight (converse)<br>* the line should be straight  | accept 'the line is zig-zag'<br>accept 'they joined up all the points'<br>accept 'they didn't go between the points'<br>accept 'the line does not need to go through all the points' |   |
|                    |                 | <b>d</b><br>1/2i | 1    | * 6 points correctly plotted to the nearest half square   |  |   |
|                    |                 | <b>e</b><br>1/2i | 1    | * a straight line of best fit between some of the points  |  |   |



| Tier<br>3–6<br>5–7 | Q No<br>12<br>3 |   |   |                            |
|--------------------|-----------------|---|---|----------------------------|
| <b>Part</b>        | <b>Mark</b>     | <b>Answer</b>   | <b>Accept</b>   | <b>Additional guidance</b> |
| f<br>1/2k          | 1               | <input type="checkbox"/><br><input checked="" type="checkbox"/> room 2<br>and<br>* the points for room 2 are lower than room 1<br>* the container in room 2 reaches 30g in 5 days,<br>room 1 reaches 45g<br>* more water evaporated in the same time<br><br>* the volume goes down more quickly | accept 'there is less water in the container in room 2 than in room 1'<br>accept 'amount of water dropped more in the first three days'<br>accept 'the line for room 2 is steeper'<br><br>accept 'the numbers go down more quickly'<br>accept 'the mass goes down more quickly' |                            |
| <b>Total</b>       | <b>7</b>        |   |   |                            |

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| Tier<br>3–6<br>5–7 |      | Q No<br>13<br>4 | Part     | Mark   | Answer   | Accept  | Additional guidance   |
|--------------------|------|-----------------|----------|--------|--|---|---|
|                    | a i  | 3/3d            | 1        | 1      | * red <b>or</b> pink   | accept 'orange' <b>or</b> 'yellow'                  |   |
|                    | a ii | 3/3d            | 1        | 1      | * any number greater than 0 and smaller than 7   | accept '0'  |   |
|                    | b i  | 3/3e            | 1        | 1      | * carbon dioxide is gas  | accept 'carbon dioxide <b>or</b> a gas is produced' |   |
|                    | b ii | 3/3f            | 1        | 1      | any <b>one</b> from<br>* no more carbon dioxide <b>or</b> gas was produced<br>* the reaction stopped<br>* all the hydrochloric acid was used up<br>* there was an excess of magnesium carbonate <b>or</b> carbonate                      | accept 'the acid had been neutralised'              | <i>do not accept</i> 'all the magnesium carbonate was used up'                                  |
|                    | c    | 3/1e<br>3/3e    | 1<br>1   | 1<br>1 | * a compound ✓<br>* a salt ✓   |   | if more than two boxes are ticked, deduct one mark for each incorrect tick<br>minimum mark zero |
|                    | d    | 2/2b            | 1        | 1      | any <b>one</b> from<br>* without it digestion would stop <b>or</b> slow down<br>* acid is needed for digestion<br>* the enzymes only work in acid conditions <b>or</b> at a low pH<br>* it is needed to kill bacteria <b>or</b> microbes | accept 'to break down food'                         | <i>do not accept</i> 'germs'  |
| <b>Total</b>       |      |                 | <b>7</b> |        |  |   |   |

| Tier<br>3–6<br>5–7 | Q No<br>14<br>5 | Part                | Mark     | Answer   | Accept   | Additional guidance                           |
|--------------------|-----------------|---------------------|----------|--|--|---|
|                    |                 | <b>a i</b><br>2/4b  | 1        | * vertebrates  |  | <i>do not accept 'vertebrae'</i>              |
|                    |                 | <b>a ii</b><br>2/4b | 1        | * reptiles   |  |   |
|                    |                 | <b>b</b><br>2/2e    | 1        | any <b>one</b> from<br>* so that it can bend<br>* to allow movement  |  |   |
|                    |                 | <b>c</b><br>2/2e    | 1        | any <b>one</b> from<br>* to stop the bones rubbing together<br>* to stop bones getting worn down<br>* to cushion the bones | accept 'it reduces friction'<br>accept 'it can be squashed'<br>accept 'it absorbs shock' |   |
|                    |                 | <b>d</b><br>2/2e    | 1        | * <i>the biceps</i> contracts<br><i>the triceps</i> relaxes  |  | <b>both</b> answers are required for the mark |
|                    |                 | <b>Total</b>        | <b>5</b> |  |  |   |

| Tier 3–6<br>5–7     |          | Q No<br>15<br>6   | Additional guidance   |                                   |
|---------------------|----------|---|---|-----------------------------------|
| Part                | Mark     | Answer  | Accept  | Additional guidance               |
| <b>a</b><br>1/2h    | 1        | any <b>one</b> from<br>* a bigger sample<br>* more data are collected in the survey   | accept 'one person could make it up'<br>accept 'one garden may not be typical'  |                                   |
| <b>b</b><br>1/2d    | 2        | any <b>two</b> from<br>* time of year <b>or</b> season<br>* location <b>or</b> gardens<br>* duration of the observation   | accept 'the time' for one mark if 'time of year' <b>or</b> 'season' <b>or</b> 'duration' is not given   | 'the environment' is insufficient |
| <b>c i</b><br>1/2e  | 1        | any <b>one</b> from<br>* they would need to look at the pattern in the data for more than a year<br>* they would need to compare data collected in another year with that available in 2002 | accept 'data from another year <b>or</b> last year'<br>accept 'more data <b>or</b> data from the time when his grandad was young'<br>accept 'data from when his grandad was young is not available' |                                   |
| <b>c ii</b><br>1/1b | 1        | * data would need to show fewer sparrows in 2002 than in earlier years  | accept 'more sparrows would need to be recorded in earlier years than in 2002'  |                                   |
| <b>Total</b>        | <b>5</b> |   |   |                                   |

| Tier<br>3–6<br>5–7 |     | Q No<br>16<br>7 | Part | Mark     | Answer  | Accept   | Additional guidance  |
|--------------------|-----|-----------------|------|----------|---|--|--|
| a                  | i   | 1               | 2/1b | 1        | * C <i>and</i> E  |  | answers may be in any order<br><b>both</b> answers are required for the mark |
|                    | ii  | 1               | 2/1b | 1        | * C   |  |  |
|                    | iii | 1               | 2/1b | 1        | any <b>one</b> from<br>* to trap <b>or</b> absorb light<br>* photosynthesis   | accept 'to make glucose <b>or</b> sugar <b>or</b> starch <b>or</b> carbohydrate <b>or</b> food'  |  |
| b                  | i   | 1               | 2/1c | 1        | * A   |  |  |
|                    | ii  | 1               | 2/1c | 1        | any <b>one</b> from<br>* windpipe<br>* trachea<br>* airways<br>* bronchus<br>* bronchiole<br>* oviduct <b>or</b> fallopian tube | accept 'lungs'   |  |
|                    | iii | 1               | 2/1e | 1        | * to remove mucus   | accept 'to remove bacteria'<br>accept 'to move mucus along'<br>accept 'to move <b>or</b> remove bacteria <b>or</b> dust particles'<br>accept 'to move an ovum <b>or</b> egg along' if the oviduct <b>or</b> fallopian tube is given as the answer to part ii |  |
| c                  |     | 1               | 2/1c | 1        | * B   |  |  |
| <b>Total</b>       |     |                 |      | <b>7</b> |   |  |  |

| Tier 3–6<br>5–7 |      | Q No<br>17<br>8 | Part | Mark | Answer  | Accept   | Additional guidance  |
|-----------------|------|-----------------|------|------|---|--|--|
| <b>a</b>        | 1/1c | 1               |      | 1    | * He observed the environment. ✓  |  | if more than one box is ticked, award no mark  |
| <b>b</b>        | 1/1c | 1               |      | 1    | any <b>one</b> from<br>* data from further away can be collected<br>* data from fainter objects <b>or</b> smaller details can be collected<br>* data is clearer because there is no atmospheric distortion<br>* more information is collected<br>* more detailed <b>or</b> more accurate information<br>* wider spectrum of information including photographs <b>or</b> pictures of planet<br>* other radiation can be detected | accept 'equipment can land on the planet'<br><br>accept 'telescopes can be sited outside Earth's atmosphere' | a mark may be awarded for a description of a specific way information is different or a description of a specific way previous limitations are reduced |
| <b>c</b>        | 1/1a | 1               |      | 1    | any <b>one</b> from<br>* our knowledge is increasing<br>* our knowledge is changing   | accept 'we probably do not know everything about the solar system'   |  |
| <b>d</b>        | 1/1c | 1               |      | 1    | any <b>one</b> from<br>* new evidence which challenges ideas may be collected<br>* there might be a new way of thinking about how the facts fit together<br>* new interpretations of evidence<br>* old ideas do not explain the observation   | accept 'more observations'<br>accept 'new evidence'<br><br>accept 'old ideas do not work <b>or</b> fit data' |  |
| <b>Total</b>    |      | <b>4</b>        |      |      |   |  |  |

| Tier 5–7 | Q No 9 | Part                     | Mark     | Answer   | Accept   | Additional guidance  |
|----------|--------|--------------------------|----------|--|--|--|
|          |        | <b>a i</b><br>4/2a       | 1        | * 12.5 m/s   | accept ' $\frac{400}{32}$ m/s'<br>accept 'metres per second' <b>or</b> 'ms <sup>-1</sup> ' for m/s                               | the unit is required for the mark<br><b>do not accept</b> 'mps'  |
|          |        | <b>a ii</b><br>4/2c      | 1        | * they are equal <b>or</b> the same  | accept 'they are balanced'   |  |
|          |        | <b>b</b><br>4/2d<br>4/2c | 1<br>1   | * the forward force is greater than the backward force<br>any <b>one</b> from<br>* because air resistance <b>or</b> drag is smaller <b>or</b> reduced<br>* because there is a smaller surface area | accept the converse<br>accept 'the forward force is greater' <b>or</b> 'the backward force is smaller'<br>accept 'less friction' | <b>do not accept</b> 'the forward force becomes greater <b>or</b> increases'<br><br>'she is more streamlined' is insufficient as it is given in the question |
|          |        | <b>Total</b>             | <b>4</b> |  |  |  |

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| Tier 5–7            | Q No 10  | Mark   | Answer   | Accept   | Additional guidance |
|---------------------|----------|--|--|--|---------------------|
| <b>a i</b><br>4/4a  | 1        | any <b>one</b> from<br>* the Earth rotates<br><br>* the amount of sunlight varies<br>* the angle of the Sun varies | accept 'the Sun appears to move across the sky'<br>accept 'the Sun is in a different position at different times of day'<br>accept 'different cloud cover' |  |                     |
| <b>a ii</b><br>1/2j | 1        | * 6.0  | accept 'in the middle of the day the energy received is greatest'<br><br>accept any number from 5.8 to 6.2   | <i>do not accept</i> 'in the middle of the day the Sun is hottest <b>or</b> brightest' |                     |
| <b>b i</b><br>4/4a  | 1        | * a graph starting after 6 am and ending before 6 pm   |  |  |                     |
| <b>b ii</b><br>1/2k | 1        | * a line below the existing line and flat <b>or</b> reaching a maximum between 12 noon and 1 pm<br><br>* 15        | accept ' 180 ,<br>12   |  |                     |
| <b>Total</b>        | <b>5</b> |  |  |  |                     |



| Tier 5–7 | Q No 11 | Part         | Mark     | Answer  | Accept     | Additional guidance  |
|----------|---------|--------------|----------|---|------------|--|
|          |         | <b>a</b>     | 1        | * volume or alkali in cm <sup>3</sup> on the x axis and pH of mixture on the y axis |            | pupils can gain credit for correct responses to other parts if the axes are wrongly labelled this mark cannot be awarded for a non-linear scale<br><br><i>do not accept</i> a line drawn from point to point |
|          |         | <b>1/2i</b>  | 1        | * appropriate scales for volume of alkali and pH of mixture                         |            |  |
|          |         | <b>1</b>     | 1        | * 11 points correctly plotted   |            |  |
|          |         | <b>1</b>     | 1        | * smooth curve of best fit  |            |  |
|          |         | <b>b</b>     | 1        | * 9.0   | accept '9' |  |
|          |         | <b>1/2j</b>  |          |   |            |  |
|          |         | <b>Total</b> | <b>5</b> |   |            |  |

| Tier 5–7 | Q No 12 | Part         | Mark     | Answer   | Accept                     | Additional guidance   |
|----------|---------|--------------|----------|--|----------------------------|---|
|          |         | <b>a</b>     | 1        | * magnesium: Mg  |                            |   |
|          |         | <b>3/1c</b>  | 1        | * copper: Cu   |                            |   |
|          |         | <b>b i</b>   | 1        | * copper   |                            | accept 'almost zero' or 'very small'  |
|          |         | <b>b ii</b>  | 1        | * 0  |                            |   |
|          |         | <b>1</b>     | 1        | any <b>one</b> from<br>* two blocks of the same metal have the same reactivity<br>* there is no difference in reactivity | accept 'they are the same' |   |
|          |         | <b>b iii</b> | 1        | * nickel and tin   |                            | answers may be in either order<br><b>both</b> answers are required for the mark |
|          |         | <b>3/3c</b>  |          |  |                            |   |
|          |         | <b>Total</b> | <b>6</b> |  |                            |   |

| Tier 5–7                 | Q No 13  | Mark | Answer   | Accept  | Additional guidance                          |
|--------------------------|----------|------|--|---|--|
| <b>a i</b><br>2/2d       | 1        |      | * football requires more energy than bowling   | accept 'football is more energetic'<br>accept 'you run more in football'<br>accept 'she is using up more kJ'<br>accept 'playing football uses 2260 kJ/hr and bowling uses 1030 kJ/hr'   | <i>do not accept</i> 'football is energetic' |
| <b>a ii</b><br>2/2m      | 2        |      | any <b>two</b> from<br>* alcohol increases the reaction time<br>* alcohol reduces co-ordination<br>* alcohol causes <b>or</b> increases errors of judgement<br>* alcohol reduces concentration | accept 'it slows reactions' <b>or</b> 'it slows the reaction time'<br>accept 'they would feel dizzy'<br>accept 'they would be sleepy <b>or</b> drowsy'<br>accept 'alcohol makes them lose more heat'<br>accept 'it causes blurred vision' | 'it slows them down' is insufficient         |
| <b>b</b><br>2/2b<br>2/2c | 1        |      | any <b>one</b> from<br>* glucose can be absorbed<br>* starch molecules cannot be absorbed<br>* it takes time for starch to be broken down<br>* starch has to be digested <b>or</b> broken down | accept 'glucose does not need to be digested'   |  |
| <b>Total</b>             | <b>4</b> |      |  |   |  |

| Tier 5–7 | Q No 14 | Mark | Answer   | Accept  | Additional guidance   |
|----------|---------|------|--|---|---|
| <b>a</b> | 1/2d    | 1    | * the size <b>or</b> area <b>or</b> dimensions of the plots  | accept 'the amount of land'   |   |
| <b>b</b> | 1/2h    | 1    | any <b>one</b> from<br>* to increase the reliability of the results<br>* to be more certain of his results                       | accept 'to make the results more accurate'<br>accept 'some of the plots could be unusual <b>or</b> different' | 'to find an average' is insufficient  |
| <b>c</b> | 1/2d    | 1    | * the number of plants <b>or</b> grasses <b>and</b> the mass of plants <b>or</b> grass   |   | <b>both</b> answers are required for the mark<br>'amount of plants' is insufficient |
| <b>d</b> | 1/2d    | 1    | any <b>one</b> from<br>* the number of species of grass<br>* different species<br>* type of plant <b>or</b> seed <b>or</b> grass | accept 'species'  |   |

| Tier 5–7                 | Q No 14 | Mark     | Answer   | Accept   | Additional guidance |
|--------------------------|---------|----------|--|--|---------------------|
| <b>e</b><br>1/1c         | 1       |          | any <b>one</b> from<br>* his analysis would allow the effects of soil differences to be controlled or explained<br>* to provide evidence of any difference between soils<br>* the analysis would provide more evidence<br>* to check whether soils were the same or different                                  | accept 'to make sure <b>or</b> so it would be fair'<br><br>accept 'to check whether soils had an effect on growth' |                     |
| <b>f</b><br>2/5d<br>1/2m | 1       |          | any <b>one</b> from<br>* different species have different requirements so they are not competing for the same resources<br>* competition might stimulate more vigorous growth<br>* one species may be better adapted to the plot <b>or</b> conditions<br>* you would get continuous growth throughout the year |  |                     |
| <b>Total</b>             |         | <b>6</b> |  |  |                     |







EARLY YEARS

NATIONAL  
CURRICULUM  
5–16

GCSE

GNVQ

GCE A LEVEL

NVQ

OTHER  
VOCATIONAL  
QUALIFICATIONS

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