

EARLY YEARS

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Sc

KEY STAGE

2

LEVELS

3-5

2005

Science tests

Mark schemes

Tests A and B, levels 3-5

2005



department for
education and skills
creating opportunity, releasing potential, achieving excellence

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Marking the science tests

As in 2004, external markers, employed by the external marking agencies under contract to QCA, will mark the test papers. The markers will follow the mark schemes in this booklet, which is supplied to teachers for information.

This booklet contains the mark schemes for the levels 3–5 tests A and B. Level threshold tables will be posted on the QCA website (www.qca.org.uk/) on Monday 20 June.

General guidance

The structure of the mark schemes

The marking information for each question is set out in the form of tables. The ‘question’ column on the left-hand side of each table provides a quick reference to the question number and question part. The ‘mark’ column gives the number of marks available for each question part.

The ‘requirements’ column may include three types of information:

- a general statement describing what is required for the award of the mark;
- examples of specific creditworthy responses showing correct science;
- examples of creditworthy responses beyond the key stage 2 programme of study.

The ‘allowable answers’ column gives examples of ‘allowable’ creditworthy responses, showing correct science which may not be as clearly expressed.

The ‘additional guidance’ column may include different types of information:

- specific responses which are not creditworthy either because information from the question has been rephrased, or because the responses imply incorrect scientific knowledge;
- answers which are insufficient in themselves to gain credit, but are not incorrect science, and would therefore not lose credit if used with a correct response.

Where **two** marks are available for a question which describes the **relationship between two continuous variables**, the following will apply:

- *two* marks will be awarded for a creditworthy general comparison of the variables in question, eg the *bigger* the grains, the *longer* the sugar takes to dissolve;
- *one* mark will be awarded for a pair of creditworthy specific comparisons, eg big grains dissolve *slowly* and small grains dissolve *fast*;
- *one* mark will be awarded for a single creditworthy comparison, eg the *biggest* grains dissolve *most slowly*.

Applying the mark schemes

The mark schemes give scientifically correct answers to each question as well as providing guidance on, and examples of, other answers which are allowable. In cases of alternative wording or where an answer is drawn rather than written, external markers will exercise their professional judgement.

In order to ensure consistency of marking, the most frequent queries are listed below, with the action the marker will take.

What if...?	Marking procedure
The child gives two or more responses to a particular question part.	<p>a) If a child qualifies a scientifically correct answer with a scientifically incorrect statement, no mark will be awarded for that question part.</p> <p>b) If a child qualifies a scientifically correct answer with an incorrect statement which is not relevant to the context of the question, the latter response is regarded as 'neutral' and the mark will be awarded.</p>
The child has not used ticks to indicate the correct response in a multiple-choice question.	Any unambiguous positive indication of the correct answer will be accepted. Ticks take precedence over any other form of response. Therefore, when ticks and any other sort of response are given together, the boxes with ticks will be assumed to be the child's response. If the correct boxes are left blank, no marks will be awarded.
The child ticks more than the required number of boxes.	One mark will be deducted for each incorrect answer. Negative marks will not be awarded.
In a planning question, no answer is given in the expected place but the correct answer is given in the drafting box.	Where a child has shown understanding of the question, the mark(s) will be given.
The child misspells a word.	<p>a) If it is clear that the child has made a simple error, eg 'tow' for 'two' or 'son' for 'sun', then the incorrect spelling will be accepted and the mark awarded.</p> <p>b) If a child 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.</p> <p>c) 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.</p>

Recording marks awarded

In the grey margin, alongside each question part, there is a mark box for each question part. Depending on the type of response made to each part of each question by the child, the external marker will put one of the following into each box:

- '1' for an acceptable/allowable response;
- '0' for an incorrect response;
- '-' if no response is made.

The number of marks gained on each double page will be written in the box at the bottom of the right-hand page. The total number of marks gained on each paper will be recorded on the front of the test paper, and on the marksheet.

Each paper has the following number of marks available:

- Test A has 40;
- Test B has 40.

The 2005 key stage 2 science tests and mark schemes were developed by the National Foundation for Educational Research (NFER) and the Centre for Research into Primary Science and Technology (CRIPSAT) on behalf of QCA.

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Test A question 1: Pond dipping

		Allowable answers	
1a	3/3c	<p>Award ONE mark for an indication that the pond life is not able to fit through the holes in the net but the water flows through it:</p> <ul style="list-style-type: none"> ■ the pond life is trapped in the net but the water goes through the holes; ■ the plants and animals stay in the net as they are too big to fit through the holes, but the water flows through; ■ the water can go through the holes in the net but the pond life cannot. 	<p>ONE mark may be awarded for a response which describes what happens to either the pond life or the water:</p> <ul style="list-style-type: none"> ■ the pond life is trapped in the net; ■ the water can go through the holes (of the net); ■ it sieves animals/living things (from the water).
1b	2/4b	<p>Award ONE mark for identifying a feature shown in the pictures that could be used to sort the two animals into the same group:</p> <ul style="list-style-type: none"> ■ they both have shells; ■ they do not have legs; ■ they have stalks/antennae on their head. 	<p>ONE mark may be awarded for giving a reason for sorting the animals which cannot be seen by looking at the pictures:</p> <ul style="list-style-type: none"> ■ they move on a slimy foot; ■ they have eyes on the end of stalks; ■ they have the same body (shape).
			<p>Do not give credit for an insufficient response that does not clearly imply the pond life remains in the net or the water goes through:</p> <ul style="list-style-type: none"> ■ it sieves; ■ there are holes in the net. <p>Do not give credit for an insufficient response that restates or repeats the stem of the question:</p> <ul style="list-style-type: none"> ■ the net separates the living things and water.
			<p>Do not give credit for an insufficient response that does not describe a feature but states that the animals belong to the same species:</p> <ul style="list-style-type: none"> ■ they are both snails; ■ they are the same animals. <p>Do not give credit for an insufficient response giving a feature of many animals that would not be sufficient to distinguish a group of snails:</p> <ul style="list-style-type: none"> ■ eyes; ■ body; ■ foot.

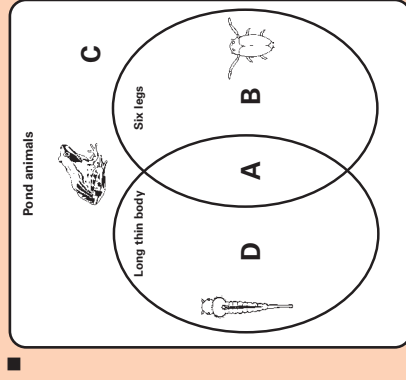
Test A question 1: Pond dipping (continued)

Allowable answers

1c

2/4a,b

Award **TWO** marks for putting **all four** animals in the correct areas of the diagram:



If you are unable to award two marks, award **ONE** mark for sorting any **two** or **three** animals correctly.

2m

or

1m

Test A question 2: Washing day

		Allowable answers	
2a 3/1a	1m	<p>Award ONE mark for an indication that the jumper is heavier because it has absorbed water:</p> <ul style="list-style-type: none"> ■ it has absorbed some water; ■ it has soaked in water. 	
2b 3/2d	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> ■ evaporation. 	<p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> ■ dripping [this will not dry the jumper completely]. <p>Do not give credit for an insufficient response describing the process:</p> <ul style="list-style-type: none"> ■ the water in the jumper turns into a gas.
2c 1/2j	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> ■ 7 hours. 	<p>ONE mark may be awarded for a response indicating that the jumper dries in between 6 and 7 hours exclusively.</p>

Test A question 2: Washing day (continued)

Allowable answers

2d

3/2d
1/2l

Award **ONE** mark for a response indicating an increase in temperature and/or wind:

- it was hotter (the next day);
- the wind was stronger;
- on the first day it was colder and there was less wind.

- ❖ **Give credit** for a correct response that goes beyond the key stage 2 programme of study:
 - it was drier/less humid.

ONE mark may be awarded for:

- the sun was brighter;
- it was sunnier.

Do not give credit for an insufficient response where no clear comparison of the weather types is made:

- it might be windy;
- it could have been sunny;
- it was hot;
- the weather was nicer/better.

Do not give credit for an insufficient response that describes a different method of washing/drying the jumper:

- they hung it out at a different time;
- they hung it in a different place;
- there was less water in it at the start;
- the washing machine was spinning more quickly.

Do not give credit for an insufficient response indicating that the jumper changed during the washing process and therefore dried more quickly:

- it had shrunk;
- it had been washed before so it was smaller;
- it was no longer brand new.

Test A question 3: Magnetic noticeboard

		Allowable answers			
3a 3/1a	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ steel <input checked="" type="checkbox"/> ■ <input type="checkbox"/> 			
3b 1/2c 4/2e	1m	Award ONE mark for labelling the equipment as a forcemeter: <ul style="list-style-type: none"> ■ forcemeter; ■ Newton meter. 	ONE mark may be awarded for: <ul style="list-style-type: none"> ■ spring balance. 	Do not give credit for an insufficient response giving the units of measurement: <ul style="list-style-type: none"> ■ newtons. 	Do not give credit for an insufficient response: <ul style="list-style-type: none"> ■ Newton force measurer.
3c 1/2j	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ (magnet) B. 	ONE mark may be awarded for: <ul style="list-style-type: none"> ■ the second magnet. 	Do not give credit for an insufficient response that does not interpret the data: <ul style="list-style-type: none"> ■ 10. 	
3d 1/2c	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ just before the magnet pulls away from the board 			

Test A question 3: Magnetic noticeboard (continued)

Allowable answers	
3e 1/2g	<p>Award ONE mark for a response indicating that the reliability/accuracy of the test is improved:</p> <ul style="list-style-type: none">■ so she can check her results;■ so her results will be more reliable;■ it is difficult to read the forcemeter accurately;■ to help improve the accuracy.
1m	<p>ONE mark may be awarded for a response indicating that she is checking her measurements/method:</p> <ul style="list-style-type: none">■ she might have read one wrong;■ to check it;■ to make sure you have got it right;■ to check/see if her results are correct/right.
	<p>Do not give credit for an insufficient response implying that there is a correct answer:</p> <ul style="list-style-type: none">■ to get the right answer. <p>Do not give credit for an insufficient response implying that all the results need to be the same:</p> <ul style="list-style-type: none">■ to make it a fair test;■ you might get a different answer;■ the result may change each time;■ the results could be different. <p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none">■ to get an average result [given].

Test A question 4: Bath mat

		Allowable answers	
4a 1/2i	1m	<p>Award ONE mark for all four letters in the correct order:</p> <p>■ <input type="text" value="B"/> <input type="text" value="A"/> <input type="text" value="C"/> <input type="text" value="D"/></p>	Do not give credit for an insufficient response: ■ 8, 11, 13, 16.
4b 4/2c	1m	<p>Award ONE mark for: ■ friction.</p>	Do not give credit for an insufficient response: ■ grip.
4c 1/2i	1m	<p>Award ONE mark for all four letters in the correct order:</p> <p>■ <input type="text" value="D"/> <input type="text" value="A"/> <input type="text" value="C"/> <input type="text" value="B"/></p>	
4d i 3/1a 1/2j	1m	<p>Award ONE mark for: ■ (fabric) D.</p>	

Test A question 4: Bath mat (continued)

Allowable answers

4d ii

1/2j
3/1a

Award **TWO** marks for identifying the **two** reasons (given in any order) why the fabric makes the best bath mat:

NOTE: Only one scoring response may be taken from each category.

The fabric does not slip as easily:

- it was the least slippery;
- it did not slip easily;
- a person would not slip as easily if they were standing on it;
- it has the most friction (with the ramp).

AND

The fabric is the most absorbent:

- this is the most absorbent;
- it absorbed the most water;
- it soaked up more water than the others.

If you are unable to award two marks, award **ONE** mark for a single correct response.

2m

Items 4di and 4dii should be marked independently so marks may be awarded for creditworthy responses to 4dii if the response to 4di is not creditworthy.

ONE mark may be awarded for the following responses given in either category:

The fabric does not slip as easily:

- it had the highest ramp (before it slid).

The fabric is the most absorbent:

- it absorbed lots of water;
- it absorbed all the water.

ONE mark may be awarded for a response that correctly gives information from the table in test 2:

- no water drips off.

Do not award two marks if both responses are from the same category.

Do not give credit for an insufficient response giving an absolute indication that the fabric/person **does not** slip:

- the fabric/it did not slip off;
- you will not slip/you cannot slip;
- you can slip on the other fabrics.

Do not give credit for an insufficient response referring to the time taken for the fabric to slide:

- it takes a long time to slide.

Do not give credit for an insufficient response that reads information from the table in test 1 without interpretation:

- it went up to 16cm high;
- it took 16cm to slide.

Do not give credit for an insufficient response which ambiguously refers to the absorbency of the fabric:

- it soaks up/absorbs water;
- it absorbs most of the water;
- hardly any water drips off; [they all absorb water].

When applying this mark scheme, please also refer to the **General guidance** given on pages 1 and 2.

Test A question 5: Oak tree

		Allowable answers	
5a	2/3d	<p>Award ONE mark for:</p> <p><input type="checkbox"/> <input type="checkbox"/></p> <p>■ root <input checked="" type="checkbox"/></p>	
5b	2/3d	<p>Award ONE mark for:</p> <p>■ <input type="checkbox"/> seed dispersal <input checked="" type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/></p>	
5c	2/5d,e	<p>Award ONE mark for:</p> <p>■ </p>	<p>Do not give credit for an insufficient response:</p> <p>■ </p> <p>Do not give credit for a response that includes incorrect science introducing organisms from different habitats:</p> <p>■ </p>
		<p>ONE mark may be awarded for:</p> <p>■ </p> <p>■ </p> <p>ONE mark may be awarded for an alternative biologically correct woodland food chain which includes a producer and an animal on which the blue tit could feed:</p> <p>■ </p>	

Test A question 5: Oak tree (continued)

<p>5d 2/3a</p>			<p>Allowable answers</p>	
<p>Award ONE mark for one of the following correct responses:</p> <ul style="list-style-type: none"> ■ air; ■ water/moisture/rain; ■ nutrients/minerals. <p>❖ Give credit for a correct response that goes beyond the key stage 2 programme of study:</p> <ul style="list-style-type: none"> ■ oxygen/O₂/O; ■ carbon dioxide/CO₂. 				
<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> ■ warmth/heat; ■ fertilizers. 				
<p>Do not give credit for a response that includes incorrect science:</p> <ul style="list-style-type: none"> ■ temperature; ■ soil. <p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> ■ (Sun) light [given]; ■ nutrition [describes a life process, not what is taken in]; ■ vitamins; ■ (plant) food. 				

Test A question 6: Light sensor

		Allowable answers			
6a 4/3a	1m	Award ONE mark for: <input type="checkbox"/> <input type="checkbox"/> ■ <input type="checkbox"/> computer screen <input checked="" type="checkbox"/>			
6b 1/2i	1m	Award ONE mark for a description of the light level increasing: ■ the light level increased; ■ there was gradually more light; ■ it got lighter/brighter.	ONE mark may be awarded for a response that may either refer to the graph or the light level: ■ it went up/got higher; ■ it went up smoothly/evenly/steadily.	Do not give credit for an insufficient response explicitly referring to the graph line going up rather than the light level: ■ the line went up.	
6c 1/2l 4/3a	1m	Award ONE mark for a description of an event that could result in a sudden increase in the light level: ■ a light was turned on; ■ the Sun came out from behind a cloud; ■ someone pulled the blind up; ■ they moved a lamp next to the sensor.	ONE mark may be awarded for a response indicating that the sudden rise in the graph means the light has got brighter/there is more light, but with no description of what could have caused this: ■ light from the Sun made it brighter; ■ the light suddenly increased; ■ it became brighter (outside); ■ more light came into the classroom.	Do not give credit for an insufficient response which describes an event which increase in light: ■ the Sun shone through the windows; ■ the Sun shone in a different direction; ■ the Sun came up; ■ the Sun moved.	
6d 4/3b 1/2l	1m	Award ONE mark for all three sentences correctly classified: <i>The light source is above the desk. ...True..</i> <i>The light cannot pass through the desk. ...True..</i> <i>There is a shadow underneath the desk. ...True..</i>			

Test A question 6: Light sensor (continued)

	<i>Allowable answers</i>	<i>Additional guidance</i>
6e 4/3b	Award ONE mark for: ■ <i>The sensor reading is lower when it is below the desk because the desk is opaque.</i>	Do not give credit for an insufficient response giving an alternative term for opaque: ■ <i>not see through.</i>

Test A question 7: Building materials

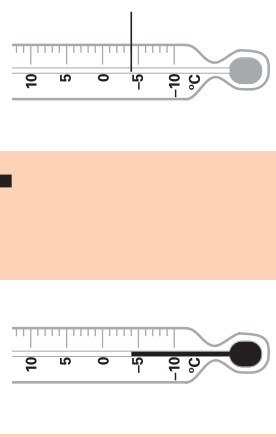
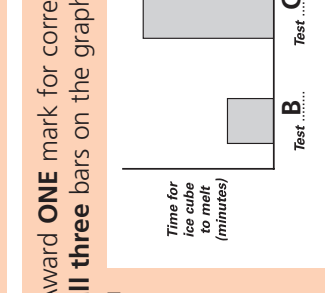
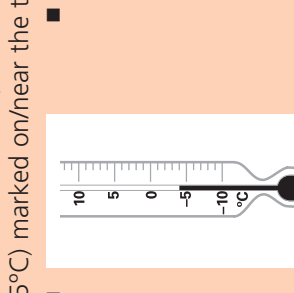
	Allowable answers	
7a 1/2a	<p>Award ONE mark for identifying both the independent variable (IV) and the dependent variable (DV), eg:</p> <ul style="list-style-type: none"> ■ how much water was absorbed by each brick? ■ which brick would absorb the most? ■ how much water each substance absorbed? ■ how is the mass of different bricks affected by water? <p>❖ Give credit for a correct response that goes beyond the key stage 2 programme of study:</p> <ul style="list-style-type: none"> ■ rate of absorption of the bricks. 	<p>ONE mark may be awarded for a response which implies bricks are being compared:</p> <ul style="list-style-type: none"> ■ which one was most absorbent? ■ do different bricks absorb water? ■ which is least permeable? ■ which is most waterproof? ■ which is best at absorbing water? <p>ONE mark may be awarded for reference to 'liquid' rather than water:</p> <ul style="list-style-type: none"> ■ how much liquid each absorbed. <p>ONE mark may be awarded for a response which is not in the form of a question but which identifies a relevant IV and a DV:</p> <ul style="list-style-type: none"> ■ the amount of water held/absorbed by each brick.
7b 1/2d	<p>Award ONE mark for any acceptable factor that describes the IV:</p> <ul style="list-style-type: none"> ■ the type of brick. 	<p>Do not give credit for an insufficient response which makes reference to imported materials:</p> <ul style="list-style-type: none"> ■ glass.
		<p>Do not give credit for an insufficient response which describes a different investigation:</p> <ul style="list-style-type: none"> ■ how much do bricks weigh? ■ is this brick heavy or light? ■ what would happen to the mass when dry and wet? ■ which substance has the largest mass? ■ what dried the fastest? <p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> ■ which is best? <p>Do not give credit for an insufficient response that gives a conclusion:</p> <ul style="list-style-type: none"> ■ the hardest/heaviest bricks hold the most water.

Test A question 7: Building materials (continued)

		Allowable answers	
7c	1/2d	<p>Award TWO marks for two relevant controls for this investigation:</p> <ul style="list-style-type: none"> the volume of water in each container at the start; the length of time the bricks are left in the water; the starting dryness/dampness of bricks. <p>If you are unable to award two marks, award ONE mark for any one correct control.</p>	<p>A mark may be awarded for any of the following responses:</p> <ul style="list-style-type: none"> the amount of water; the container in which they are placed; temperature; the same place; make sure all the bricks are dry; mass/weight of dry bricks; size/height of bricks.
		<p>2m</p> <p>or</p> <p>1m</p>	<p>Do not give credit for an insufficient response suggesting that all factors are kept the same:</p> <ul style="list-style-type: none"> do everything the same. <p>Do not give credit for an insufficient response which is an IV or DV:</p> <ul style="list-style-type: none"> the water left. <p>Do not give credit for a second response that is a repetition or restatement of the first.</p>
7d	1/2c	<p>Award ONE mark for any acceptable alternative DV identified, eg:</p> <ul style="list-style-type: none"> the hardness of bricks; the strength of bricks; the permeability of bricks; the insulating properties of bricks; whether or not bricks are waterproof; time to dry. 	<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> which scratches easily? which breaks most easily? how much water can go through? temperature effects on bricks or water? the mass/weight of the bricks; whether they dissolve or not; how high the water moves up the brick.
		<p>1m</p>	<p>Do not give credit for a response in which the DV is not clearly identified:</p> <ul style="list-style-type: none"> see which brick is best to build with.

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Test A question 8: Melting ice

		Allowable answers			
8a 3/2b,d	1m	Award ONE mark for: <ul style="list-style-type: none"> freeze/freezing/frozen. 	<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> solidifies; becomes solid. 	<p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> solid; frosted. 	
8b 1/2f	1m	Award ONE mark for an unambiguous indication of -4°C (below -3°C and above -5°C) marked on/near the thermometer: 			
8c 1/2h,i	1m	Award ONE mark for correctly labelling all three bars on the graph: 	<p>ONE mark may be awarded for:</p> 	<p>Do not give credit for an insufficient response giving the times taken for the ice to melt in place of identifying letters.</p>	
8d 3/1b 1/2l	1m	Award ONE mark for: <input type="checkbox"/> <input type="checkbox"/> Flour insulates ice. <input checked="" type="checkbox"/>			

When applying this mark scheme, please also refer to the General guidance given on pages 1 and 2.

Test A question 9: At the swimming pool

	9a	1m	Allowable answers	
9a	4/2c	Award ONE mark for an indication that people with wet feet are less likely to slip on rougher tiles: <ul style="list-style-type: none"> there is more friction (on rough tiles); you will not slip as easily (on rough floor tiles); shiny floor tiles are more slippery (than rough floor tiles); rough tiles have more grip. 	ONE mark may be awarded for an absolute response: <ul style="list-style-type: none"> it prevents slipping; you will not slip (on rough tiles); you will slip on a smooth surface; there is friction. 	Do not give credit for an insufficient response that describes what happens on a smooth surface, without explicit reference to a smooth surface [as the subject of the sentence is the rough tiles]: <ul style="list-style-type: none"> they will slip.
9b	4/2d	Award ONE mark for an understanding that Ian floats because there is a force acting upwards from the water: <ul style="list-style-type: none"> the water pushes up on Ian; upthrust from the water pushes against the force pulling him down. <p>❖ Give credit for a correct response that goes beyond the key stage 2 programme of study, indicating that the average density of a body is less than that of water (so the person will float) or that the forces are balanced: <ul style="list-style-type: none"> he is less dense than the water; the forces (of gravity and upthrust) are balanced; the force up and the force down are balanced; buoyancy. </p>	ONE mark may be awarded for: <ul style="list-style-type: none"> there is a force up; because of upthrust; the water holds him up. ONE mark may be awarded for a response indicating that Ian floats because there is air in his lungs/body: <ul style="list-style-type: none"> there is air in his body. 	Do not give credit for an insufficient response: <ul style="list-style-type: none"> because he floats well; Ian is a (good) floater; he is treading water; he is lighter/weights less; water pressure. Do not give credit for an insufficient response: <ul style="list-style-type: none"> the air holds him up; because of air.

Test A question 9: At the swimming pool (continued)

	Allowable answers	Additional guidance
<p>9c</p> <p>1m</p> <p>4/2b,c</p>	<p>Award ONE mark for both:</p> <p>There is more weight. <input checked="" type="checkbox"/></p> <p>There is more friction. <input checked="" type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/></p>	

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Test B question 1: The heart

		Allowable answers	
1a 2/2d		<p>Award ONE mark for an indication that the heartbeat will be faster:</p> <ul style="list-style-type: none"> ■ it pumps more so blood goes around his body faster; ■ his heart rate increases; ■ his heartbeat is faster. <p>❖ Give credit for a correct response that goes beyond the key stage 2 programme of study indicating that the heart pumps faster causing an increase in blood flow:</p> <ul style="list-style-type: none"> ■ more blood is pumped with each beat; ■ it pumps more blood around his body. 	
1b 2/2g		<p>Award ONE mark for both responses correct [in either order]:</p> <ul style="list-style-type: none"> ■ B and C. 	
		<p>ONE mark may be awarded for an implicit reference to the increased rate of Joe's heartbeat:</p> <ul style="list-style-type: none"> ■ it is quicker; ■ it makes it go fast; ■ his heart pumps more. <p>ONE mark may be awarded for a response indicating that a greater quantity of blood flows with each heartbeat.</p>	
		<p>Do not give credit for a response that includes incorrect science implying there is more blood in his body when he exercises:</p> <ul style="list-style-type: none"> ■ there is more blood to be pumped around his body. <p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> ■ his heartbeat is louder [given]; ■ his heartbeat is harder/stronger [ambiguous as to whether this will cause a louder or faster heartbeat]; ■ his heartbeat changed. <p>Do not give credit for an insufficient response that indicates blood will move faster but does not indicate that this is due to an increased heartbeat rate:</p> <ul style="list-style-type: none"> ■ blood is going round the body faster. 	

Test B question 2: Shadows

		Allowable answers			
2a 1/2e	1m	Award ONE mark for identifying the appropriate measuring equipment: <ul style="list-style-type: none"> ■ ruler; ■ metre rule; ■ tape measure. 	<ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ cm <input checked="" type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> 	<ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> 	<ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/>
2b 1/2f	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ measurement stick; ■ metre stick. 			
2c 1/2d	1m	Award ONE mark for identifying the independent variable (IV): <ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ position of the light <input checked="" type="checkbox"/> ■ <input type="checkbox"/> 			
2d 1/2d	1m	Award ONE mark for identifying the dependent variable (DV): <ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ shadow <input checked="" type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> 			
					<p>Do not give credit for an insufficient response which could not be used to quantify distance:</p> <ul style="list-style-type: none"> ■ a piece of string.

Test B question 2: Shadows (continued)

		Allowable answers	Additional guidance
<p>2e 1/2d</p> <p>2m</p> <p>or</p> <p>1m</p>	<p>Award TWO marks for all three ticks correctly placed:</p> <ul style="list-style-type: none"> <input type="checkbox"/> position of the puppet <input checked="" type="checkbox"/> position of the screen <input type="checkbox"/> size of the puppet <p>If you are unable to award two marks, award ONE mark for any two correct.</p>		

Test B question 3: Animals

		Allowable answers		
3a 2/5c	1m	<p>Award ONE mark for a feature of the octopus which helps it to catch its prey:</p> <ul style="list-style-type: none"> ■ it has suckers (to help it catch hold of its prey); ■ its (bendy/flexible/long/many) legs/arms/tentacles; ■ an octopus has eight tentacles with suckers on them. 		
3b 2/5c	1m	<p>Award ONE mark for an indication of camouflage for protection (from predators):</p> <ul style="list-style-type: none"> ■ so its predators cannot see it; ■ so an eel is less likely to see it. ■ it camouflages itself; ■ it cannot be seen; ■ so it can hide from predators (more easily). 	<p>ONE mark may be awarded for a response referring to being caught/eaten rather than to being hidden:</p> <ul style="list-style-type: none"> ■ it is less likely to be eaten; ■ the eel will not eat it. <p>ONE mark may be awarded for a response referring to camouflage reducing the likelihood that the octopus could be hurt by its prey:</p> <ul style="list-style-type: none"> ■ it is camouflaged so it cannot be seen by its prey; ■ the crab might not hurt it. 	<p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> ■ changing colour protects it [given].
3c 2/4a	2m or 1m	<p>Award TWO marks for identifying the three correct animals:</p> <p>terrapijn dogfish dog whelk</p> <p>jellyfish slow worm earthworm</p> <p>If you are unable to award two marks, award ONE mark for identifying any two correct animals.</p>		

Test B question 3: Animals (continued)

<i>Allowable answers</i>	
3d 2/4a	<p>Award TWO marks for an unambiguous indication of any three of the following facts [given in any order]:</p> <ul style="list-style-type: none">■ it lives in water;■ it has a skeleton (inside);■ it has a hard shell;■ it is an animal. <p>If you are unable to award two marks, award ONE mark for any two facts correctly identified.</p>
2m or 1m	<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none">■ it lives in the ocean/sea.

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Test B question 4: Solids, liquids and gases

		Allowable answers	
4a 1/2a	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ <input type="checkbox"/> by observing <input checked="" type="checkbox"/> ■ <input type="checkbox"/> 	
4b 1/1b	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ <input type="checkbox"/> B <input checked="" type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> 	
4c 1/1b	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ <input type="checkbox"/> ■ E <input checked="" type="checkbox"/> 	
4d 1/2k	1m	Award ONE mark for: <ul style="list-style-type: none"> ■ <input type="checkbox"/> do not agree <input checked="" type="checkbox"/> AND recognising that some solids are soft or not hard: <ul style="list-style-type: none"> ■ there are examples of solids which are soft (so all solids cannot be hard); OR for giving an example of a soft solid from the question used to challenge the claim that solids are always hard: <ul style="list-style-type: none"> ■ cotton wool is a solid but it is soft. 	Do not give credit for an insufficient response: <ul style="list-style-type: none"> ■ solids can melt; ■ solids can dissolve.

When applying this mark scheme, please also refer to the General guidance given on pages 1 and 2.

Test B question 5: Electricity

Allowable answers

5a i

3/1c
4/1a

Award **ONE** mark for recognising that electricity does not travel through plastic:
The bulb has not lit because the plastic spoon...

- is an insulator;
- is not a (good) conductor (of electricity);
- stops the electricity flowing;
- does not let electricity through.

1m

ONE mark may be awarded for a response suggesting that the circuit would work if the spoon were metal:
The bulb has not lit because the plastic spoon...

- is not metal.

Do not give credit for an insufficient response:

- is plastic [given];
- stops it going through [ambiguous as to what 'it' refers to].

5a ii

4/1a

Award **ONE** mark for recognising the switch is open causing a break in the circuit:
The bulb has not lit because...

- the switch is open/not closed/off;
- there is a gap/break in the circuit;
- the circuit is incomplete.

1m

ONE mark may be awarded for:
The bulb has not lit because...

- the clip is not attached to the pin;
- the switch is not connected.

Do not give credit for an insufficient response describing the equipment as faulty:

- the switch is not right.

Do not give credit for an insufficient response:

- it is not connected/joined (properly).

5a iii

4/1a

Award **ONE** mark for recognising that (the terminals on) one of the cells is the wrong way round:
The bulb has not lit because...

- one of the cells is the wrong way round;
- the two positives are together.

1m

Do not give credit for an insufficient response that refers to poles on the cell:

- the same poles are facing each other [indicates that electricity is being confused with magnetism].

Do not give credit for an insufficient response:

- the batteries are not connected correctly;
- the equipment is faulty;
- the cells are facing/pointing the same way.

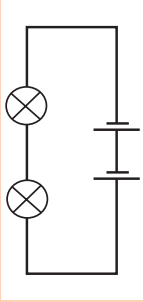
Test B question 5: Electricity (continued)

Allowable answers

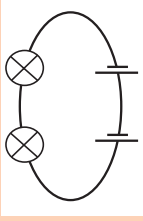
5b

4/1c

Award **ONE** mark for a complete circuit with the symbols correctly drawn [in any order]:



ONE mark may be awarded for a non-rectilinear circuit:



Do not give credit for a response that includes incorrect science:

- circuits containing symbols not given or gaps between components of more than 2mm;
- circuits with extra/fewer components; terminals on the cells facing each other;
- circuits with incorrectly drawn components, eg:



5c

4/1c

Award **TWO** marks for giving **any two** of the following:

- add more batteries;
- use cells with a higher voltage;
- use shorter wires;
- make two separate circuits with two batteries in each.

- ❖ **Give credit** for a correct response that goes beyond the key stage 2 programme of study indicating that wires of less resistance or a parallel circuit could be used:
 - use thicker wires;
 - use wires of less resistance;
 - put the bulbs in a parallel circuit.

If you are unable to award two marks, award **ONE** mark for giving **one** correct response.

Do not give credit for an insufficient response indicating that a bulb may become brighter if the other one is removed:

- take one bulb away;
- have only one bulb.

Do not give credit for an insufficient response:

- use a bigger/different cell [does not indicate an increase in voltage];
- use two cells;
- use a new bulb [both existing bulbs must be brighter];
- use different wires/change the wires;
- use smaller wires [is ambiguous as to whether this is shorter or thinner, the latter of which is incorrect];
- use fewer/less wires [each wire could be longer].

Do not give credit for a second response that is a restatement or repetition of the first.

Test B question 6: Mustard seeds

		Allowable answers	
6a 1/2d	2m	<p>Award TWO marks for any two of the following:</p> <ul style="list-style-type: none"> ■ the type of paper towel in each dish; ■ the amount of paper towel; ■ the same amount of water; ■ the same temperature of water; ■ he should water the plants at the same time; ■ the type of seeds in each dish; ■ the amount of seeds; ■ he must use identical dishes; ■ observe and record the results of each dish after the same length of time; ■ he should keep them all in the dark; ■ the light should be the same. <p>If you are unable to award two marks, award ONE mark for naming just one factor.</p>	<p>Do not give credit for a response that includes incorrect science which suggests that the dependent/independent variables are controlled:</p> <ul style="list-style-type: none"> ■ he keeps the temperature the same [independent variable]; ■ he put them in the same place; ■ do not move the seeds during the test. <p>Do not give credit for a second response that is a restatement or repetition of the first:</p> <ul style="list-style-type: none"> ■ 1. seeds; and ■ 2. number of seeds.
6b 1/2i	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> ■ 12 seeds. 	

Test B question 6: Mustard seeds (continued)

		Allowable answers																	
6c	1/2j	<p>Award ONE mark for an indication that more seeds germinated in the cupboard than in the fridge or shed:</p> <ul style="list-style-type: none"> ■ more seeds germinated in the cupboard (than anywhere else); ■ this place had the highest number of germinated seeds; ■ 39 was the highest amount of seeds to germinate in any place; ■ most seeds germinated there. 																	
6d	2/1c 1/2j	<p>Award ONE mark for correctly classifying all three sentences:</p> <p>Evan's investigation shows that the temperature affected...</p> <table border="0"> <thead> <tr> <th></th> <th>True</th> <th>False</th> <th>Can't tell</th> </tr> </thead> <tbody> <tr> <td>■ the length of the stem.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>■ the germination of the seeds.</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>■ the colour of the seeds.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		True	False	Can't tell	■ the length of the stem.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	■ the germination of the seeds.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■ the colour of the seeds.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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		<p>ONE mark may be awarded for an implicit comparison of the data:</p> <ul style="list-style-type: none"> ■ there were 39 in the cupboard, 24 in the shed and 0 in the fridge. 																	
		<p>Do not give credit for an insufficient response where no comparison is made or no direct evidence is provided:</p> <ul style="list-style-type: none"> ■ 39 seeds germinated in the cupboard; ■ the warmest place was the cupboard; ■ it is the best place for seeds to germinate; ■ the seeds grow/germinate quicker in the cupboard. 																	

Test B question 7: Separating materials

		Allowable answers	
7a 3/3c	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> filtering; filtration. 	<p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> evaporation.
7b 3/3b,c,e	1m	<p>Award ONE mark for explaining that sand remains in the filter and/or the water passes through:</p> <ul style="list-style-type: none"> the water goes through the filter but the sand cannot because it is too big; the holes in the filter paper let the water through, but the sand is too big; only the water can go through the filter; the sand stays in the filter. 	<p>Do not give credit for an insufficient response:</p> <ul style="list-style-type: none"> the sand can be separated because it has large particles [no comparison with water].
7c ia 3/3a	1m	<p>Award ONE mark for naming the process of separation:</p> <ul style="list-style-type: none"> sieving/using a sieve. 	<p>Do not give credit for a response that includes incorrect science describing filtering with paper:</p> <ul style="list-style-type: none"> using filter paper.
		<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> filter. 	
		<p>ONE mark may be awarded for a response that recognises that the sand does not dissolve or that the sand has larger particles than the water (and therefore will not go through the filter with the water):</p> <ul style="list-style-type: none"> because it does not dissolve; the particles of sand are larger than the particles of water. <p>ONE mark may be awarded for a response that describes the water evaporating to leave the sand behind.</p>	
		<p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> sieve. <p>ONE mark may be awarded in 7c ia if sieving is named in part 7c ib and the response to part 7c ia is general or not attempted.</p> <p>ONE mark may be awarded for:</p> <ul style="list-style-type: none"> blowing/air. 	

Test B question 7: Separating materials (continued)

		Allowable answers
7c ib 3/3a	1m	<p>Award ONE mark for a correct description of the sieving process indicating that the flour passes through while the rice stays in the sieve:</p> <ul style="list-style-type: none"> ■ <i>The flour goes through the sieve.</i> ■ <i>The rice stays in the sieve;</i> ■ <i>The flour goes through the holes.</i> ■ <i>The rice is too big.</i>
7c iia 3/1a	1m	<p>Award ONE mark for naming the process of separation:</p> <ul style="list-style-type: none"> ■ using a magnet.
7c iib 3/1a	1m	<p>Award ONE mark for a correct description of the separation indicating that the steel/ nails will be attracted to the magnet and the brass/screws will not:</p> <ul style="list-style-type: none"> ■ <i>The steel/ nails will be attracted to the magnet.</i> ■ <i>The brass screws will not;</i> ■ <i>The steel/ nails will go/stick to the magnet.</i> ■ <i>The brass screws will stay behind.</i>
		<p>Do not give credit for a response that includes incorrect science clearly indicating that a filter is being used:</p> <ul style="list-style-type: none"> ■ <i>The flour stays in the filter;</i> ■ <i>The rice stays in the filter.</i> <p>Do not give credit for an insufficient response that does not describe what happens to both the flour and the rice:</p> <ul style="list-style-type: none"> ■ <i>The flour...</i> ■ <i>The rice stays in the sieve.</i>
		<p>ONE mark may be awarded for the correct description of blowing the flour away:</p> <ul style="list-style-type: none"> ■ <i>The flour gets blown away.</i> ■ <i>The rice stays.</i> <p>ONE mark may be awarded for a correct description of sieving if 7cia is insufficient or incorrect.</p>
		<p>ONE mark may be awarded in 7c iia if a 'magnet' is named in part 7c iib and the response to 7c iia is general or not attempted.</p>
		<p>Do not give credit for an insufficient response that does not describe what happens to both the nails and screws:</p> <ul style="list-style-type: none"> ■ <i>The steel nails will be attracted by the magnet.</i> ■ <i>The brass screws...</i>

Test B question 8: The Earth and light

		Allowable answers	
8a 4/4b 1/2i	1m	<p>Award ONE mark for all three times matched to the correct lengths:</p>	
8b 4/4c 4/4b	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> The Earth spins on its axis. <input checked="" type="checkbox"/> 	
8c 1/1a	1m	<p>Award ONE mark for:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The Moon is a sphere but appears to change shape during the month. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 	

Test B question 8: The Earth and light (continued)

8d

4/3a, c, d

2m

or

1m

Award **TWO** marks for **two arrows** showing the correct path [lines] and direction of light [arrowheads]. The arrows must point from the Sun to the Moon and from the Moon to the person/Earth:



If you are unable to award two marks, award **ONE** mark for a response showing **two lines** (or one continuous reflected line) indicating the correct path:

OR

a response showing **two arrowheads** pointing unambiguously in the correct direction:

Correct lines

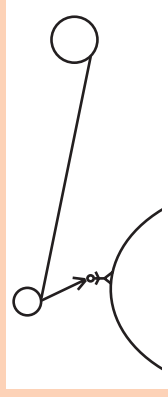


Correct arrows



Allowable answers

TWO marks may be awarded for a response showing one continuous reflected arrow:



Do not give credit for an insufficient response showing only one correct arrow:

