Science

2014 science sampling tests
Mark schemes for selected questions

National curriculum assessments

Marking the science tests

The Standards and Testing Agency (STA) was responsible for the development and delivery of statutory science sampling tests in 2014. STA is an executive agency of the Department for Education (DfE).

This booklet contains the mark schemes for the selected questions released from the 2014 science sampling tests.

The questions were marked by external markers using these mark schemes, which are supplied to teachers for information.

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 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 marks
- examples of specific creditworthy responses demonstrating correct science
- examples of creditworthy responses that are 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 incorrect scientific knowledge is implied
- answers which are insufficient in themselves to gain credit, but are not incorrect science, and would therefore not lose credit if combined with a correct response.

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 exercised their professional judgement.

Key stage 2: additional marking guidance

The following guidance should be read carefully in conjunction with the specific mark scheme for each question.

General guidance

What if?	Marking procedure
The answer is written outside of the answer space.	Credit may be awarded if no answer is given in the designated answer space, but a correct response is written somewhere else and it is unambiguous which question is being answered.
A correct answer has been given and is crossed out and not replaced.	Credit may be given if the pupil has written the correct answer, crossed it out and not replaced it, provided that the response is clearly legible.
The pupil's response does not match closely any of the examples given.	Illustrative examples of pupils' responses to questions are sometimes given in the mark schemes. However, markers should always refer to the guidance given before the illustrative examples and apply their professional judgement as to which code to give. If uncertain, markers should escalate the issue to a more senior colleague.
The pupil gives two or more responses to a particular question.	**a)** If a pupil gives two creditworthy responses, for example one response from the requirements column and one from the allowable answers column, then the response should be deemed creditworthy. **b)** If a pupil gives two non-creditworthy responses, one of which is insufficient and the other is incorrect, then the response should be deemed non-creditworthy. **c)** If a pupil qualifies a scientifically correct answer with a scientifically incorrect statement then the response should be deemed non-creditworthy. **d)** If a pupil 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 response can be marked as creditworthy.

What if?	*Marking procedure*
The pupil misspells a word.	**a)** If it is clear that the pupil has made a simple error, for example 'son' for 'sun' then the incorrect spelling will be accepted and credit can be given. **b)** 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.
The pupil uses the word 'it' in an answer without explicitly making clear what 'it' refers to. For example 'it dissolves faster'.	In these instances markers should refer to the question stem. If it is obvious from the question stem what the 'it' refers to then you can assume that this is what the pupil means. In cases where the meaning of 'it' is ambiguous then credit cannot be awarded and the response should be marked as directed in the mark scheme.

Single tick box questions

What if?	*Marking procedure*
The box is crossed rather than ticked.	This is an acceptable response, in the absence of ticks, as it is an unambiguous indication of the pupil's answer.
The box is circled rather than ticked.	This is an acceptable response, in the absence of ticks, as it is an unambiguous indication of the pupil's answer.
The answer contains a combination of ticks and crosses.	Ticks always take precedence over crosses and other alternative markings used by the pupil to indicate their selection.
The pupil places three crosses and leaves one box blank.	☐ ☒ ☒ ☒ In this case the response should be deemed non-creditworthy.
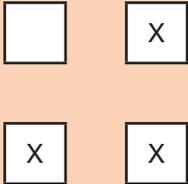
Circling the corrrect answer

| *What if?*	*Marking procedure*
The pupil underlines their answer.	This is an acceptable response as it is an unambiguous indication of the pupil's answer.

Matching questions

| What if?	Marking procedure
Lines are drawn which do not touch the boxes.	Accept lines that do not touch the boxes provided that the intention is clear.
The pupil uses a numbering system instead of drawing lines.	Accept this as an unambiguous way for the pupil to indicate the correct answer.
Multiple lines are drawn to/from the same box.	This type of response will usually be non-creditworthy, although please refer to the mark scheme.

Table completion

What if?	Marking procedure
A pupil indicates their selection using a tick in one row and a cross in another row.	Markers are to treat each row independently, as directed by the mark scheme.

Bar charts

| What if?	Marking procedure
A pupil draws a vertical line from the x-axis to the correct data point instead of plotting a bar, for example: 	These responses should be credited provided they are plotted to the correct data point. Please refer to the mark scheme for the individual question for the tolerance levels permitted on the plotting of the data point.
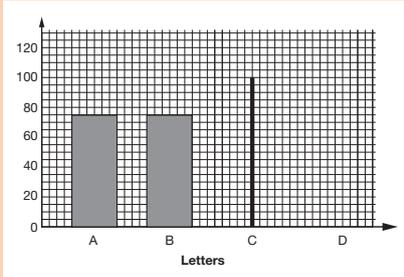
What if?	Marking procedure
A pupil correctly draws a line on the data point but does not draw a bar, e.g. 	These responses should be credited provided they are plotted at the correct data point. Please refer to the mark scheme for the individual question for the tolerance levels permitted on the plotting of the data point.
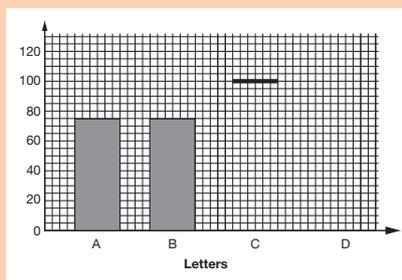
Electrical circuits

| What if?	Marking procedure
A pupil draws a circuit diagram with gaps between the electrical components in the circuit, for example: 	If the gap between components in the circuit is 2 mm or less then credit can be given. If the gap is greater than 2 mm then the response is deemed to be incorrect science and marked accordingly.
A pupil draws a non-rectilinear circuit diagram, for example: 	Provided that the electrical circuit is drawn correctly, non-rectilinear circuit diagrams are acceptable.
A pupil draws the symbol for a light bulb in the wrong orientation, for example: 	This symbol is not considered creditworthy as a representation of a bulb.
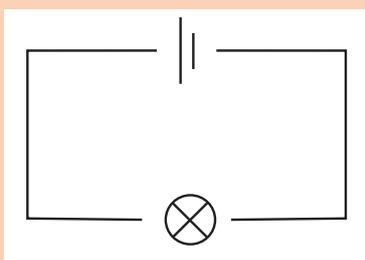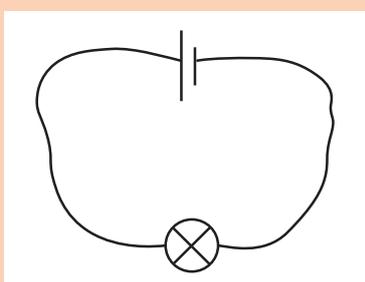
Key scientific terminology

Independent variable (IV) – the variable that is changed in an investigation.

Dependent variable (DV) – the variable that is measured in an investigation.

Control variable (CV) – the variables that are kept the same in an investigation to make the investigation a fair test.

So in an experiment which investigates the time it takes for sugar to dissolve in water at different temperatures, the **independent variable** would be the temperature of the water and the **dependent variable** would be the time taken for the sugar to dissolve. Examples of **control variables** would be the volume of the water used and the mass of sugar used.

Continuous variables – these are variables which can take any value, for example height or weight.

Discrete variables – these are variables which only take certain values from a fixed set, for example sex (male or female).

Anomalous results – a result which does not fit the pattern. In key stage 2 (KS2) pupils often use phrases such as 'the result looked odd' or 'the result looked different to the others' in order to describe an anomalous result.

Accuracy and reliability – these are two words which pupils often confuse and will sometimes use interchangeably:

- Accuracy – measurements are considered accurate if they are close to the 'true value'.

- Reliability – this refers to how similar the results are if you repeat the investigation multiple times. The more similar the results are, the more reliable they are and the greater confidence you can have in them.

Repeatable – a measurement is repeatable if the person doing the investigation repeats the investigation using the same method and equipment and the same results are obtained.

Reproducible – a measurement is reproducible if the investigation is repeated by **another person** and the same results are obtained.

At KS2 it is common that pupils will use the word 'reliable' to mean repeatable or reproducible.

Fair test and fair comparison – this is when only the **independent variable** has been allowed to affect the **dependent variable** and all other variables have been kept the same. A **fair test** has a continuous independent variable, such as height or temperature. A **fair comparison** has a discrete independent variable, such as when comparing different environments or objects.

Other points to note

Anthropomorphisms – responses of this nature are particularly common in questions on plants, for example pupils often refer to plants 'drinking water'. Anthropomorphisms of this nature should be treated as responses containing incorrect science and so should be marked accordingly.

The solar system – markers need to be very careful about marking the words pupils use to describe celestial movements, for example rotate/spin/turn/move. As there are two different types of movement for the Earth (rotation on its axis and its orbit around the Sun) it needs to be clear which type of movement pupils are referring to in their answers.

Magnetism – markers need to remember that a response which does not mention attraction does not automatically imply repulsion. The wording of the response needs to be considered carefully.

Magnets – if pupils refer to the poles as being 'positive' and 'negative' then this is considered to be incorrect science and so should be marked accordingly.

If pupils refer to the poles as 'ends' or 'sides' then this is considered to be an insufficient response as opposed to a response containing incorrect science.

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for **all three** sentences correctly classified: ■ It is a light source. **Sun** ■ It takes 24 hours to spin on its axis. **Earth** ■ Its orbit takes 28 days. **Moon**		
b	2m *or* 1m	Award **TWO** marks for **all four** places matched to the correct times: Place — Time A, B, C, D matched to midnight, midday, 6pm, 3pm If you are unable to award two marks, award **ONE** mark for **any two** or **three** correctly matched.		

Question	Mark	Requirements	Allowable answers	Additional guidance
ai	1m	Award **ONE** mark for: ■ ☐ ☐ ☐ D ✓		***Do not*** *give credit if more than one box has been ticked.*
aii	1m	Award **ONE** mark for the **two** correct reasons from the table why D is the best material for a roof, e.g. ■ it is waterproof ■ it is a good thermal insulator ■ it is strong ■ it isn't damaged by sunlight.	**ONE** mark may be awarded for reasons describing why a property in the table is suitable, e.g. ■ it will keep out the rain ■ it will help keep the hutch warm.	***Do not*** *give credit for a response if the second reason given is a restatement or repetition of the first, e.g.* ■ *waterproof [and]* ■ *it doesn't let the rain in.*
bi	1m	Award **ONE** mark for a response that identifies that material Q is not breakable or an advantage of it being flexible, e.g. ■ it doesn't break ■ it's flexible so could bend round a corner to make a bigger window.	**ONE** mark may be awarded for a response that gives a disadvantage of R rather than an advantage of material Q, e.g. ■ R can break/smash.	
bii	1m	Award **ONE** mark for a response that identifies that material Q is damaged by sunlight, e.g. ■ it can be damaged by sunlight.	**ONE** mark may be awarded for a response that refers to R, e.g. ■ R is not damaged by sunlight.	***Do not*** *give credit for an insufficient response, e.g.* ■ *Q is flexible [this is not necessarily a disadvantage for making a window].*

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for **two** correct boxes ticked: ■ sieve ☑ filter ☐ magnet ☑ candle ☐		
b	3m or	Award **THREE** marks for all three rows of the table correctly ticked: <table><thead><tr><th colspan="3">Process Sam should use</th><th>Cannot separate that material</th></tr><tr><th>filtering</th><th>evaporating</th><th>sieving</th><th></th></tr></thead><tbody><tr><td></td><td>✓</td><td></td><td></td></tr><tr><td></td><td></td><td>✓</td><td></td></tr><tr><td>✓ given</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td>✓</td></tr></tbody></table>		**Do not** give credit for more than one tick given in any row.
	2m or 1m	If you are unable to award three marks, **ONE** mark may be awarded for each correct row of the table.		

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for: ■ metres ✓		*Do not* give credit if more than one box is ticked.
b	2m or 1m	Award **TWO** marks for all **four** statements correctly classified: ■ If you are unable to award two marks, award **ONE** mark for any **three** statements correctly classified.		
c	1m	Award **ONE** mark for describing that the skeleton gives support **or** protection, e.g. ■ the skeleton supports the body ■ it helps protect organs in the body. ❖ **Give credit** for a correct response that goes beyond the KS2 programme of study, indicating that the skeleton produces blood/red blood cells.	Award **ONE** mark for: ■ stability ■ it helps people stay/stand up ■ it stops people collapsing ■ it protects.	*Do not* give credit for a response that gives an insufficient description for support, e.g. ■ *it stops people falling down [they will fall if they trip]* ■ *it gives us shape [people would have a shape regardless]* ■ *it stops people being floppy.* **Do not** give credit for an insufficient response, e.g. ■ *it helps people move [given].*

In question 4b, the statements read:
- Exercise helps to keep your heart healthy. **True**
- Exercise helps to stop people getting overweight. **True**
- People exercise when they walk. **True**
- If people exercise they will not get ill. **False**

Question	Mark	Requirements	Allowable answers	Additional guidance
d	2m	Award **TWO** marks for all **five** tests correctly classified:		

Test	Yes *or* no?
Hold a magnet next to each medal.	**yes**
Put each medal in an electric circuit with a bulb and cell.	**yes**
Drop some water on each medal.	**no**
Weigh each medal.	**yes**
Shine a light on each medal.	**no**

or

1m — If you are unable to award two marks, award **ONE** mark for any **four** tests correctly classified.

Question 5: **Dropping modelling clay**

Question	Mark	Requirements	Allowable answers	Additional guidance
a	*1m*	Award **ONE** mark for: ■ ☐ Clay is soft and flexible. ✓ ☐ ☐		*Do not* give credit if more than one box has been ticked.
b	*1m*	Award **ONE** mark for correctly naming the ball.		*Do not* give credit for an insufficient response: ■ 0.5
c	*1m*	Award **ONE** mark for: ☐ ☐ ■ They fell quickly through the syrup. ✓ ☐		*Do not* give credit if more than one box has been ticked.
d	*1m*	Award **ONE** mark for an arrow pointing vertically upwards anywhere on the diagram, e.g.	**ONE** mark may be awarded for an arrow pointing upwards within 45° (exclusive) of the **vertical**, e.g.	*Do not* give credit for a response that includes *incorrect science*, showing an arrow pointing upwards within 45° (inclusive) of the **horizontal**, e.g. *Do not* give credit for a response that includes *incorrect science*, showing an arrow pointing downwards. *Do not* give credit for an insufficient response where a line, rather than an arrow, is drawn.
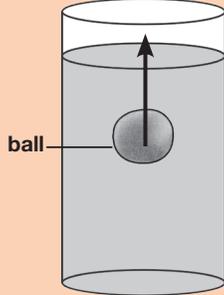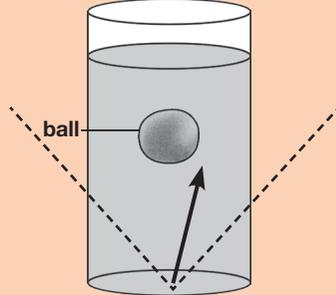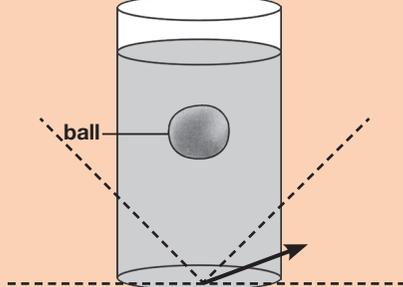
Question 6: **Sound**

Question	Mark	Requirements	Allowable answers	Additional guidance
a	**1m**	Award **ONE** mark for an indication that the elastic band vibrates, e.g. ■ the (elastic) band(s).	**ONE** mark may be awarded for: ■ rubber ■ elastic.	*Do not give credit for a response that includes incorrect science, stating that other parts of the instrument vibrate to make the sound, e.g.* ■ *pencil* ■ *pencil holder.* *Do not give credit for an incorrect response that includes a part not presented in the photograph, e.g.* ■ *string.*
b	**1m**	Award **ONE** mark for a response indicating that sound travels through the air, e.g. ■ air ■ gas ■ (the) atmosphere.		*Do not give credit for a response that includes incorrect science:* ■ *air waves.* *Do not give credit for an insufficient response giving a solid object the sound may travel through, e.g.* ■ *floor* ■ *walls* ■ *table.* *Do not give credit for an insufficient response referring to how sound travels, e.g.* ■ *vibrations* ■ *(sound) waves.* *Do not give credit for an insufficient response referring to what else sound may travel through, e.g.* ■ *wind* ■ *musical instrument [given]* ■ *ear (drum) [given]* ■ *the pencil holder* ■ *the wood* ■ *the holes for the pencils.*

Question	Mark	Requirements	Allowable answers	Additional guidance
c	1m	Award **ONE** mark for a response indicating the pitch of the sound gets lower, e.g. *A thicker elastic band makes the sound...* ■ lower/deeper.		***Do not*** *give credit for a response that includes* <u>*incorrect science*</u>*, suggesting the volume of the sound changes, e.g.* *A thicker elastic band makes the sound...* ■ *louder* ■ *softer.* ***Do not*** *give credit for a response that includes* <u>*incorrect science*</u> *suggesting the pitch gets higher.* ***Do not*** *give credit for an insufficient response referring to a change in pitch (but not specifying how it changes), e.g.* ■ *have a different pitch.*
d	1m	Award **ONE** mark for: ☐ ■ Pluck the elastic band harder. ☑ ☐ ☐ ☐		***Do not*** *give credit if more than one box has been ticked.*
e	1m	Award **ONE** mark for: ☐ ☐ ☐ ■ Move the pencils further apart. ☑ ☐		***Do not*** *give credit if more than one box has been ticked.*

Question 7: **Candles burning**

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for an understanding that the sand tray reduces the risk of fire or getting burned, e.g. ■ to prevent a fire ■ the sand won't burn/catch fire ■ so he will not be burned. Award **ONE** mark for recognising a benefit for the experiment, e.g. ■ to form a seal.	**ONE** mark may be awarded for responses identifying that the sand will support the candle, e.g. ■ to stop the candle falling over.	*Do not* give credit for an insufficient response that implies the sand will help the candles go out or stop them burning, e.g. ■ *to see if the candles go out more quickly* ■ *to stop the candles burning.* *Do not* give credit for an insufficient response, e.g. ■ *to be safe.*
b	1m	Award **ONE** mark for an indication that Hamza needs to see the candle during the experiment, e.g. ■ he needs to watch the candle ■ to see when it (the candle) goes out ['it' clearly implies the pupil is referring to the candle].	**ONE** mark may be awarded for: ■ to see what happens.	*Do not* give credit for an insufficient response identifying what transparent means without stating why this is important for the experiment, e.g. ■ *to see through it.* *Do not* give credit for an insufficient response where a pupil has referred to a different property of the beakers, e.g. ■ *so they do not melt* ■ *to stop the candles from falling over* ■ *so the beakers do not catch fire.* *Do not* give credit for an insufficient response, e.g. ■ *to time when it goes out [no reference to seeing]* ■ *so he won't touch a hot beaker.*

Question 7: **Candles burning**

Question	Mark	Requirements	Allowable answers	Additional guidance
c	*1m*	Award **ONE** mark for recognising that the time of burning is proportional to the amount of air/gas in the beaker, e.g. ■ there is more air/gas in beaker A ■ there is less air/gas in beaker B. ❖ **Give credit** for responses that go beyond the KS2 programme of study by referring to oxygen in place of gas or air, e.g. ■ there is more oxygen in beaker A ■ it has less oxygen.	**ONE** mark may be awarded for: ■ the candle with a lot of air took a long time to go out ■ the gas ran out first in B ■ it has less air/gas [B implied from question cue]. **ONE** mark may be awarded for a response that indicates the gas ran out but does not explicitly state that it ran out first, e.g. ■ the gas ran out (in beaker B).	*Do not* give credit for an insufficient response that only refers to the size of a beaker and does not link this to the amount of gas, e.g. ■ *because beaker B/it is smaller* ■ *A is bigger than B* ■ *beaker B/it has less space.* *Do not* give credit for an insufficient response, e.g. ■ *the candle in the big beaker took longer to go out [given].*
d	*1m*	Award **ONE** mark for an answer in the range 25–26 (inclusive).		
e	*1m*	Award **ONE** mark for a response indicating that the test should be repeated, e.g. ■ repeat the test/it again ■ do the test/it 3 times ■ try the test/it again.		*Do not* give credit for an insufficient response referring to checking rather than repeating, e.g. ■ *check the results/it/the test/them (again) [given].* *Do not* give credit for a response that includes incorrect science referring to fair testing, e.g. ■ *make the test fair* ■ *use the same size candles.*

Question	Mark	Requirements	Allowable answers	Additional guidance
f	1m	Award **ONE** mark for all **three** statements in the table correctly classified:		

Statement	Melting	Burning
A new material is made.		✓
It is a reversible change.	✓	
A solid changes to a liquid.	✓	

Question	Mark	Requirements	Allowable answers	Additional guidance
ai	*1m*	Award **ONE** mark for correctly identifying both materials: bicarbonate of soda vinegar **Solid** .... **Liquid**		
aii	*1m*	Award **ONE** mark for an indication that a gas is produced: ■ gas. ❖ **Give credit** for a correct response that goes beyond the KS2 programme of study, naming the gas as carbon dioxide or indicating that a salt and/or water is/are produced, e.g. ■ CO_2 ■ salt and water are made ■ water is made.	**ONE** mark may be awarded for an indication that bubbles are produced, e.g. ■ bubbles ■ froth.	***Do not*** *give credit for a response that includes* <u>*incorrect science,*</u> *e.g.* ■ *oxygen* ■ *air.* ***Do not*** *give credit for an insufficient response:* ■ *fizzy/fizziness.*
b	*1m*	Award **ONE** mark for the **two** correct boxes ticked: ■ use the same amount of vinegar ✓ use the same rocket ✓ ☐ ☐		
c	*1m*	Award **ONE** mark for: ■ 1.25	**ONE** mark may be awarded for any other response from 1.20–1.30 (inclusive).	

Question	Mark	Requirements	Allowable answers	Additional guidance
d	**1m**	Award **ONE** mark for a response using evidence from the graph that proves Layla's statement is false, e.g. ■ the rocket travelled the same distance when 2g and 2.5g were used ■ after 2g the rocket did not travel any further ■ the rocket travelled 7.5m for two amounts of bicarbonate of soda.	**ONE** mark may be awarded for a response that clearly shows Layla's statement is false from the graph, but does not identify exact points from the x-axis, e.g. ■ after a certain quantity of bicarbonate of soda has been used, the rocket does not travel any further ■ for two amounts of bicarbonate of soda, the rocket travelled the same distance. **ONE** mark may be awarded for a response that clearly shows Layla's statement is false by referring to the distance plateauing, e.g. ■ the distance (the rocket travels) levels off.	***Do not*** *give credit for an insufficient response that does not interpret the results/graph line, e.g.* ■ *the graph line levels off.* ***Do not*** *give credit for an insufficient response that does not explicitly describe the dependent variable (the distance), e.g.* ■ *for 2.0g and 2.5g, it stays the same* ■ *for 2.0g and 2.5g, it went the same height [ambiguous as could refer to the height of the graph or the height of the rocket itself]* ■ *after a certain amount of bicarbonate it stays the same.*

Question	Mark	Requirements	Allowable answers	Additional guidance
a	**2m** **or** **1m**	Award **TWO** marks for **all three** correct boxes ticked: If you are unable to award two marks, award **ONE** mark for correctly ticking **two** boxes.		
b	**1m**	Award **ONE** mark for naming a control variable that makes Sue's investigation a fair test, e.g. ■ the (same) ramp/car ■ the height/slope/length of the ramp ■ (height/size of) the box ■ the position on the ramp the car started at ■ how the car was released/let go ■ where she measures from.	**ONE** mark may be awarded for a response suggesting that the same force should be used to push all the cars down the ramp.	***Do not*** *give credit for an insufficient response naming measuring equipment on which the calibration will vary very little, e.g.* ■ *ruler.*
ci	**1m**	Award **ONE** mark for identifying the tiles.		
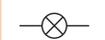
Question	Mark	Requirements	Allowable answers	Additional guidance
cii	*1m*	Award **ONE** mark for an explanation, indicating that one of the results for the tiles was a lot lower than the other two results for the tiles **or** that the tiles' results are <u>very</u> different to each other, e.g. ■ the second result for the tiles was much lower than the others ■ 72cm is much shorter than 105cm and 107cm ■ two of the results are very similar, but the other result is not ■ the results for tiles are too different (to each other) ■ the results for tiles have too big a range. Award **ONE** mark for a creditworthy explanation that does not refer to the results for the tiles, but the pupil gave 'tile' as their response to ci so it is clear that it is this result they are referring to, e.g. ■ the second result is much smaller ■ the difference between the second try and the other two tries is very large.	**ONE** mark may be awarded for a response indicating there is an odd result for tiles, e.g. ■ one of the results for the tiles looks wrong.	***Do not*** *give credit for an insufficient response, implying that the results for tiles are different to the results of other surfaces* ***or*** *with no indication that the size of difference is too big, e.g.* ■ *the tiles' results are different* ■ *the results (for tiles) are all different* ■ *it only went 72cm on its second go.* ***Do not*** *give credit for an insufficient response that repeats the results for the tiles without interpretation, e.g.* ■ *it started at 105cm, and then was 72cm, and then it went to 105cm.* ***Do not*** *give credit for an insufficient response that is unclear, e.g.* ■ *it is much smaller [not clear what 'it' refers to].*
d	*1m*	Award **ONE** mark for: ■ ☐ ☑ carpet ☐ ☐		***Do not*** *give credit if more than one box has been ticked.*

Question 10: **Parachutes**

Question	Mark	Requirements	Allowable answers	Additional guidance
ai	**1m**	Award **ONE** mark for: ■ air resistance.	**ONE** mark may be awarded for: ■ friction ■ drag.	**Do not** give credit for an insufficient response, e.g. ■ upthrust ■ resistance ■ an upward push.
aii	**1m**	Award **ONE** mark for: ■ gravity.	**ONE** mark may be awarded for: ■ gravitational attraction. **ONE** mark may be awarded for: ■ weight.	
b	**1m**	Award **ONE** mark for: ■ It makes the parachute fall slower. ✓		**Do not** give credit if more than one box has been ticked.

Question	Mark	Requirements	Allowable answers	Additional guidance
c	2m or 1m	Award **TWO** marks for the table completed correctly: (see table below) If you are unable to award two marks, award **ONE** mark for correctly completing **any four** rows of the table.		**Do not give** credit for a row where more than one box has been ticked.
d	1m	Award **ONE** mark for 2.9 circled (for netting).		**Do not** give credit for an insufficient response in which 'netting' or 'test 1' is circled.
e	1m	Award **ONE** mark for a prediction that is greater than 0 but less than 2.4 seconds (0–2.4 exclusive), e.g. ■ 1.5 *seconds.*		**Do not** give credit for an incorrect response giving 2.4 or greater.

Table for part c:

Variable	Variable to be changed	Variable to be measured	Variable to be kept the same
height of drop			✓
mass of modelling clay			✓
size of parachute			✓
material of parachute	✓		
time taken to fall to the ground		✓	

Question	Mark	Requirements	Allowable answers	Additional guidance

a	**2m**
	
	or
	
	1m
		Award **TWO** marks for **all three** symbols correctly named:
		
		Circuit symbol **Name of part**
		
		       switch
		
		       buzzer [given]
		
		       bulb/lamp
		
		       cell/battery
		
		If you are unable to award two marks, award **ONE** mark for **any two** symbols correctly named.
				Do not *give credit for any other electrical component named.*
				
				Do not *give credit for insufficiently naming the bulb:*
				■ *light.*
				
				Do not *give credit for insufficiently naming the switch:*
				■ *gate.*

bi	**1m**	Award **ONE** mark for an indication that the switch must be closed/the circuit is closed, e.g. ■ close the switch ■ check if the switch is closed ■ complete/close the circuit.	**ONE** mark may be awarded for: ■ turn the switch on ■ connect the switch. **ONE** mark may be awarded for referring to the name given to the switch in part (a) if incorrect/insufficient, e.g. ■ close the gate [if the switch symbol was referred to as 'gate' in a].	***Do not*** *give credit for an insufficient response, e.g.* ■ *check the circuit is joined up/complete [not enough to check]* ■ *connect the circuit.* ***Do not*** *give credit for an incorrect response where the switch is named incorrectly if this is not the name given to the circuit symbol in part (a), e.g.* ■ *close the gate.*

Question	Mark	Requirements	Allowable answers	Additional guidance
bii	2m or 1m	Award up to **TWO** marks for giving **any two** correct responses as indicated below. Award **ONE** mark for a correct response that refers to adding cells/batteries or increasing the number of cells/batteries, e.g. ■ add a battery. Award **ONE** mark for a correct response that refers to reducing the number of bulbs/lamps, e.g. ■ take away one/both of the lamps/ bulbs. ❖ **Give credit** for a correct response that goes beyond the KS2 programme of study, e.g. ■ increase the voltage ■ use a higher volt battery. If you are unable to award two marks, award **ONE** mark for **any one** correct response.	**ONE** mark may be awarded for a reference to decreasing the length of wire in the circuit, e.g. ■ use shorter wires.	***Do not*** *give credit for an insufficient response implying they will replace the battery with a bigger one, e.g.* ■ *use a bigger battery.* ***Do not*** *give credit for an insufficient response that refers to increasing the power, e.g.* ■ *add more power.* ***Do not*** *give credit for an insufficient response that contradicts the question stem, e.g.* ■ *take away the buzzer.* ***Do not*** *give credit for an insufficient response, e.g.* ■ *make the circuit smaller.* ***Do not*** *give credit for a second response that is a repetition or restatement of the first, e.g.* ■ *1. remove a bulb* *2. remove another bulb.*

Question	Mark	Requirements	Allowable answers	Additional guidance
a	*1m*	Award **ONE** mark for the correct fruit given for **all three** objects in space: 	Object in space	Sun	Earth	Moon	 	Which fruit should be used for the model?	**melon**	**orange**	**cherry**			
bi	*1m*	Award **ONE** mark for: ☐ ☐ ■ lunch break: 12.00 – 1.00 pm ☑ ☐ ☐		***Do not*** give credit if more than one box has been ticked.
bii	*1m*	Award **ONE** mark for: ■ the spin of the Earth ☑ ☐ ☐ ☐		***Do not*** give credit if more than one box has been ticked.

Question	Mark	Requirements	Allowable answers	Additional guidance
ci	1m	Award **ONE** mark for completing '***Time movement takes***' column correctly: 	Movement in space	Time movement takes
---	---
Earth orbits the Sun	365 days
Earth spins once on its axis	**1 day/24 hours**
....	28 days		**ONE** mark may be awarded for implying 1 day (no unit given) since the other two are in days: | Movement in space	Time movement takes
---	---
Earth orbits the Sun	365 days
Earth spins once on its axis	**1**
....	28 days		***Do not*** give credit for an insufficient response in the '***Time movement takes***' column: • *24*
cii	1m	Award **ONE** mark for completing the '***Movement in space***' column correctly: 	Movement in space	Time movement takes
---	---
Earth orbits the Sun	365 days
Earth spins once on its axis	
Moon orbits the Earth	28 days	 ❖ **Give credit** for a correct response that goes beyond the KS2 programme of study indicating that the Moon spins (on its axis), e.g. ■ *the Moon rotates/spins (on its axis).*	**ONE** mark may be awarded for a response in the '***Movement in space***' column which implies the Moon orbits the Earth, e.g. ■ Moon goes around the Earth ■ Moon rotates around the Earth.	***Do not*** give credit for a response that includes <u>incorrect science</u> referring to other movements in space, e.g. ■ *the Sun rotates on its axis* ■ *Mars orbits the Sun.* ***Do not*** give credit for: ■ *the Moon orbits.* ***Do not*** give credit for an insufficient response in the '***Movement in space***' column, e.g. ■ *the Moon (and the Earth)* ■ *full Moon* ■ *lunar month.*

Question	Mark	Requirements	Allowable answers	Additional guidance
a	2m or 1m	Award **TWO** marks for correctly completing the key, e.g. If you are unable to award **TWO** marks, award **ONE** mark for correctly completing any four or five boxes in the key.	Credit may be awarded for any acceptable groupings for the Living and Non-living things, e.g. ■ Living: producer and consumer ■ Non-living: (solid and) not a solid ■ Non-living: (solid and) wet/runny. Credit may be awarded for naming a specific type of tree/plant, e.g. ■ oak. Credit may be awarded for 'stone' used instead of 'rock'. Credit may be awarded for a specific type of rock, e.g. ■ limestone.	**Do not** give credit for an insufficient answer, e.g. ■ *Non-living: (solid and) flowing [could also refer to gases]* ■ *Non-living: (solid and) water.*
b	1m	Award **ONE** mark for correctly classifying each reason in the table:		

Award **ONE** mark for correctly classifying each reason in the table:

Reason	Yes or no?
to sort things into groups	**yes**
to show feeding relationships	**no**
to help identify things	**yes**

Question	Mark	Requirements	Allowable answers	Additional guidance
c	*1m*	Award **ONE** mark for correctly matching each animal skull to what the animal eats: mainly plants meat and plants mainly meat		
d	*1m*	Award **ONE** mark for: ■ molar.	**ONE** mark may be awarded for: ■ pre-molar.	***Do not*** *give credit for naming an incorrect tooth type, e.g.* ■ *incisor/canine.*
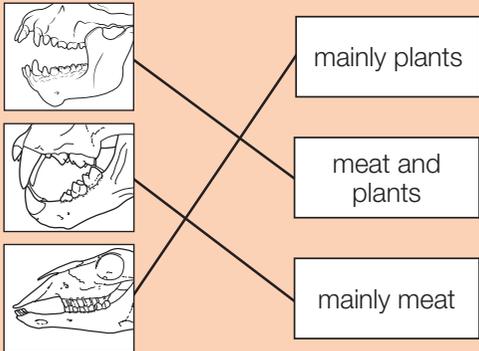
Question 14: **Pulse rate**

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for **all three** sentences completed correctly: ■ *The **heart** pumps blood around the body.* ■ *The **vessels** carry blood around the body.* ■ *The **ribs** protect the heart.*		
b	1m	Award **ONE** mark for: ☐ ☐ ■ stopwatch ☑ ☐		***Do not*** *give credit if more than one box is ticked.*
c	1m	Award **ONE** mark for all **three** statements classified correctly: ■ *Different types of exercise can affect pulse rate by different amounts.* **True** ■ *Different people can have different resting pulse rates.* **True** ■ *A high pulse rate means the heart is beating fast.* **True**		
d	1m	Award **ONE** mark for both pulse rates within the acceptable ranges: **After running for 10 minutes:** ■ 95–190 (inclusive). **After resting for 20 minutes:** ■ 90	**ONE** mark may be awarded for the correct accepted range given in '*after running for 10 minutes*' **and** for: **After resting for 20 minutes:** ■ 85–95 (inclusive) [95 may not be accepted if given as the 'after running' rate].	***Do not*** *give credit for a response that includes* <u>*incorrect science*</u> *in which the 'after resting' rate given is the same or greater than the 'after running' rate.*

Question	Mark	Requirements	Allowable answers	Additional guidance
e	2m	Award **TWO** marks for the correct **three** questions ticked:		***Deduct one mark*** for each incorrect question ticked.
		Where is the heart found in the body? ☐		
		How does age affect a person's heart rate? ☑		
		How does the heart work? ☐		
	or	What does the heart look like? ☐		
		Do tall people have faster pulse rates than short people? ☑		
		Do people who exercise regularly eat more food than people who do not exercise? ☑		
	1m	If you are unable to award two marks, **ONE** mark may be awarded for any **two** questions correctly ticked.		

Question	Mark	Requirements	Allowable answers	Additional guidance
ai	*1m*	Award **ONE** mark for naming a form of precipitation, e.g. ■ rain ■ snow ■ hail. ✧ **Give credit** for a correct response that goes beyond the KS2 programme of study: ■ precipitation.		*Do not give credit for <u>incorrect science</u>, e.g.* ■ *condensation.*
aii	*1m*	Award **ONE** mark for naming gravity.	**ONE** mark may be awarded for naming gravitational attraction. **ONE** mark may be awarded for naming weight.	*Do not give credit for an insufficient response, e.g.* ■ *downward pull.*
b	*1m*	Award **ONE** mark for a response naming condensation.		*Do not give credit for a response that includes <u>incorrect science</u> naming evaporation.*

Question	Mark	Requirements	Allowable answers	Additional guidance
c	1m	Award **ONE** mark for **two** arrows: one arrow pointing from the Sun to a cloud and one arrow from the same cloud into space (the reflected arrow points away from the Earth when extended in the direction it is pointing), e.g. Earth	**ONE** mark may be awarded for one continuous arrow from the Sun to a cloud and from the same cloud into space, e.g. Earth	*Do not* give credit for an insufficient response giving only one non-reflected/reflected arrow, e.g. Earth *Do not* give credit for two correct lines if no arrowheads are given, e.g. Earth
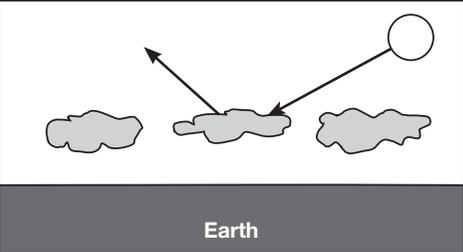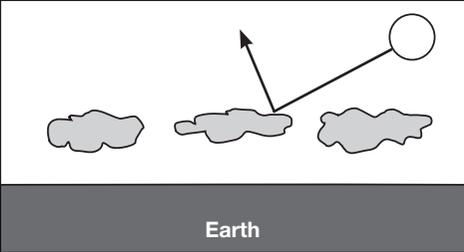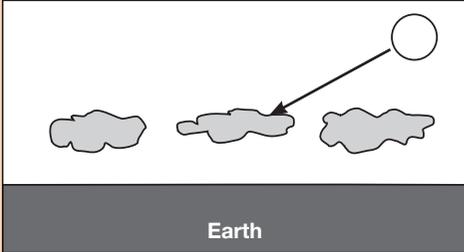
Question	Mark	Requirements	Allowable answers	Additional guidance
d	*1m*	Award **ONE** mark for **two** correct boxes ticked: ■ Turn off electric lights when they are not needed. ☑ ■ Use public transport instead of cars. ☑		
e	*1m*	Award **ONE** mark for: ☐ ☐ ■ translucent ☑ ☐		***Do not*** *give credit if more than one box has been ticked.*

Question	Mark	Requirements	Allowable answers	Additional guidance
a	1m	Award **ONE** mark for the correct number written in each box: ■ a root grows **1** a flower grows **4** ■ a stem grows **2** leaves grow **3**		*Do not* give credit for any other number given.
b	1m	Award **ONE** mark for the **two** correct boxes ticked: ■ ☐ water ✓ ☐ warmth ✓		
c	1m	Award **ONE** mark for **two** correct boxes ticked: ■ to collect new evidence ✓ to reach a conclusion ✓ ☐ ☐		
d	1m	Award **ONE** mark for a response recognising that there is air beneath the clear plastic with the seeds, e.g. ■ because there is still air around the seeds ■ it is impossible to get out all of the air from under the clear plastic.	**ONE** mark may be awarded for: ■ air is inside (already).	*Do not* give credit for an insufficient response that repeats information already given in the question stem that no air can get in, e.g. ■ *air cannot get in (through the clear plastic).* *Do not* give credit for a response that includes <u>incorrect science</u>, indicating that there is no air in the dish under the clear plastic, e.g. ■ *because there is no air in the dish.*

Question 17: **Rock salt**

Question	Mark	Requirements	Allowable answers	Additional guidance
a	*1m*	Award **ONE** mark for: ■ dissolving ■ it dissolves. ❖ **Give credit** for a correct response that goes beyond the KS2 programme of study: ■ (it forms a) solution.		***Do not*** *give credit for an insufficient response indicating the salt is no longer apparent, e.g.* ■ *it disappeared.*
b	*1m*	Award **ONE** mark for responses identifying that you should dissolve the salt again (in water), e.g. ■ the salt will dissolve again if you put water back in ■ dissolve it again. Award **ONE** mark for responses that recognise that water needs to be added to the salt, e.g. ■ add some water (and stir the mixture).	**ONE** mark may be awarded for: ■ put them back together again ■ put the salt in water.	***Do not*** *give credit for an incorrect response implying that you still have salty water and should add more salt, e.g.* ■ *add more salt to the water.*
c	*1m*	Award **ONE** mark for an indication that the rate of evaporation will increase, e.g. ■ the water will evaporate more quickly ■ heating will speed up the evaporation ■ it will be faster.	**ONE** mark may be awarded for responses that refer to the salt forming more quickly, e.g. ■ the salt forms more quickly/sooner.	***Do not*** *give credit for an insufficient response relating to the amount of evaporation, e.g.* ■ *it will evaporate more.* ***Do not*** *give credit for an insufficient response referring to dissolving, e.g.* ■ *it makes it dissolve quicker.*

Question	Mark	Requirements	Allowable answers	Additional guidance
d	1m	Award **ONE** mark for the correct number given in each box to show the sequence for separating salt from rock salt: **2** Add water and stir **4** Leave to evaporate **3** Filter **1** Break the muddy rock salt		
e	1m	Award **ONE** mark for identifying a method which would increase Oliver's safety from bits of flying rock, e.g. ■ Oliver should put on safety glasses/goggles ■ Oliver should wear gloves/safety clothes/protection ■ he should put the rock salt in a bag ■ he should put a cloth over the rock salt (before breaking it).	**ONE** mark may be awarded for: ■ he should wear a mask. **ONE** mark may be awarded for asking an adult to do it, e.g. ■ he should get a teacher to do it.	**Do not** give credit for an insufficient response, e.g. ■ *stand (well) back* ■ *tie his hair back* ■ *wearing glasses* ■ *break it in a container* ■ *break the rock gently [will not control where the flying pieces go].*
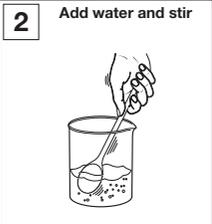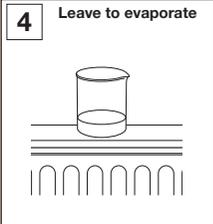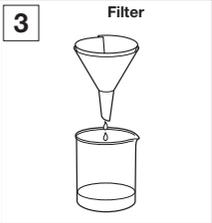
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