Science Mark Scheme

Test B

2004

1. (a) Award **ONE** mark for: 1

- ☐ ☐
- ☐ new materials made by burning ☑

(b) Award **ONE** mark for describing a safety precaution that is shown in the picture: 1

- she is using tongs;
- the metal dish stops fire spreading;
- the tray and sand (do not burn);
- the short/small candle/nightlight is less likely to fall over;
- she uses a safe flame;
- there is sand around the candle.

Allow:

- use soil in the dish [in place of sand];
- sand/(metal) dish/tongs.

***Do not** give credit for an insufficient response indicating an alternative method of keeping safe that is not shown in the picture:*

- *she wears goggles;*
- *the teacher does the experiment.*

(c) Award **ONE** mark for correctly completing the table: 1

Material	***Does it burn?***	***Is the change reversible?***
wood	yes	**No**
bread	yes	**No**

(d) Award **TWO** marks for correctly identifying the **only two** materials that will burn: 2

- cardboard [*given*] ☑ cotton wool ☑
  ☐ ☐

or

- newspaper ☑ ☐

If you are unable to award two marks, award **ONE** mark for correctly identifying **one** of the materials.

[5]

2. (a) Award **ONE** mark for an awareness that light reflects off a shiny surface: 1

- the metal/crown reflects the light;
- light bounces on/off the metal/crown;
- it acts like a mirror.

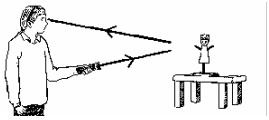
Allow:

- light reflects on/off the metal/crown;
- it reflects/is a reflection;
- the light is scattering off the metal crown.

***Do not** give credit for an insufficient response:*

- *because the metal/crown is shiny;*
- *because the light is shining on it [restatement of the stem];*
- *the light reflects on to the crown [implies light is reflected from another surface on to the crown but not off it again].*

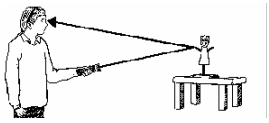
(b) Award **TWO** marks for **two** arrows showing the correct path [lines] and direction of light [arrowheads]. The arrows must point from the torch to the crown/puppet and from the crown/puppet to Emma's eyes/head: 2

- 

or

Allow:

a response showing one continuous reflected arrow:

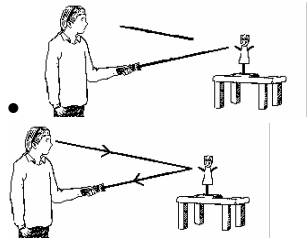
- 

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: 1

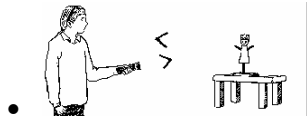
OR

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

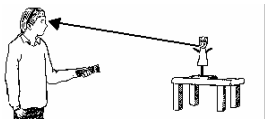
Correct lines

- 

Correct arrowheads

- 

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

- 

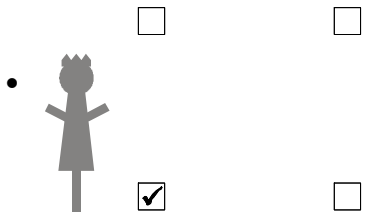
(c) Award **ONE** mark for an awareness that the puppet is made from materials that light cannot pass through. The response must make reference to blocked light or opacity: 1

- the (material of the) puppet is opaque;
- the light cannot pass through the puppet;
- the puppet stops/blocks the light;
- the light cannot get to the wall behind because the puppet is in the way;
- the light is blocked.

Do not *give credit for an insufficient response that does not explain shadow formation:*

- *light goes round the puppet;*
- *light travels in straight lines;*
- *light cannot get past the puppet [it passes on either side];*
- *the puppet is solid [a solid object can be transparent];*
- *the puppet is in the way of the light [does not necessarily mean it is blocking the light];*
- *light cannot get behind the puppet;*
- *light cannot get to the wall [do not say why].*

(d) Award **ONE** mark for: 1



[5]

3. (a) Award **ONE** mark for: 1

- stem.

Allow:

- stalk.

Do not *give credit for an insufficient response:*

- *roots;*
- *shoot.*

(b) Award **ONE** mark for predicting that the flowers would turn red: 1

- the (bunch of) flowers would turn red/pink;
- it would turn red/pink.

Allow:

- the plant turns red;
- the flowers change colour;
- the red dye would travel up the stem(s) to the flower(s).

Do not *give credit for an insufficient response indicating that the flowers themselves have been dipped in dye:*

- *there would be drops of dye on the flowers.*

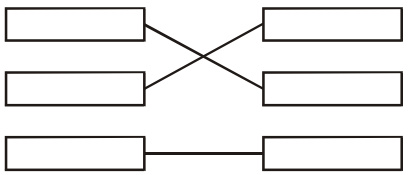
Do not *give credit for an insufficient response:*

- *half the flower(s) changed colour;*
- *the flowers turned blue.*

(c) Award **ONE** mark for: 1

- reproduction ☑ ☐ ☐ ☐

(d) Award **ONE** mark for matching **all three** flower parts to their correct function: 1



[4]

4. (a) Award **ONE** mark for an indication that the arrows are pointing in the opposite direction: 1

- the arrows are the wrong way round;
- the arrows should be pointing from left to right;
- the order of the pictures is reversed;
- this food chain shows that the bird eats the cat.

Give credit for a correct response that goes beyond the key stage 2 programme of study:

- the energy flow in the food chain is reversed.

(b) Award **TWO** marks for **all three** rows correctly ticked: 2

or

Allow:

- a response for the bird where both predator and prey boxes (with or without the 'both' box) are ticked.

Animal	*Predator*	*Prey*	*Both*
caterpillar		✓	
bird			✓
cat	✓		

If you are unable to award two marks, award **ONE** mark for **any two** rows correctly ticked. 1

(c) Award **ONE** mark for:

- ☐ ☐
- ☐ producer ☑

***Do not** give credit for an insufficient response:*

- *the arrows;*
- *they got the arrows wrong [does not identify the mistake];*
- *it is the wrong way round [does not imply just the arrows].*

(d) (i) Award **ONE** mark for a question about a feature or habitat in the table for which the answer is 'yes' for a spider and 'no' for a duck: 1

- was it in the grass?
- does it have eight legs?
- is it wingless?

Allow:

a question based on a feature or behaviour not given in the table, for which the answer is 'yes' for a spider and 'no' for a duck:

- does it make a web?

***Do not** give credit for an insufficient response:*

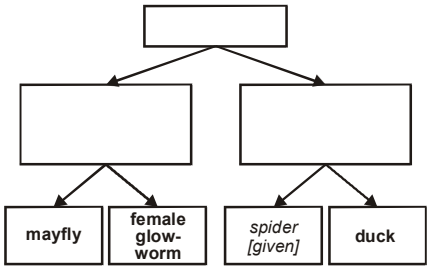
- *where did they find it? [cannot be answered 'yes' or 'no'].*

***Do not** give credit for an insufficient response giving a question about a relative term such as size:*

- *does it have long legs?*
- *is it a little animal?*

***Do not** give credit to a question for which the 'yes' answer is duck.*

(ii) Award **ONE** mark for **all three** animals entered correctly: 1



***Do not** give credit for a response that includes animals other than those given in this question, Nature walk.*

[6]

5. (a) Award **ONE** mark for indicating the mistake Luis has made, or conversely, indicating how he should take the temperature of the water: 1

- the thermometer is out of the water;
- put the thermometer in the water;
- leave the thermometer in the water while taking the reading.

Allow:

- he has taken it out;
- he did not leave the thermometer in.

Do not *give credit for an insufficient response indicating he has removed the thermometer too soon:*

- *he has not left it long enough.*

Do not *give credit for an insufficient response:*

- *he should look carefully*
- *not enough water.*

(b) Award **ONE** mark for recognition of the independent variable, eg: 1

- the temperature of (water).

Allow:

- heat of water;
- the warmth of the water.

Do not *give credit for an insufficient response which does not clearly describe the independent variable:*

- *water.*

Do not *give credit for a response that includes incorrect science which redefines the independent variable:*

- *amount of water.*

(c) Award **ONE** mark for an awareness of one of the factors to be controlled: 1

- volume of water;
- amount/kind of water;
- amount of sugar;
- type/size of sugar grain;
- how he stirs;
- how sugar is added.

Allow:

- sugar;
- containers.

Do not *give credit for an insufficient response which is ambiguous:*

- *keep the water the same.*

Do not *give credit for measurement strategies which would improve accuracy:*

- *keep the thermometer in water.*

(d) Award **ONE** mark for: 1

- 40ºC.

***Do not** give credit for:*

- *12ºC.*

(e) Award **ONE** mark for: 1

- Yes ☑ ☐

and

an indication of how the evidence of temperature and time support the prediction, eg:

- the time to dissolve gets less as the temperature increases;
- at the hottest temperature the time is less;
- when the temperature was 60ºC the sugar dissolved more quickly;
- at 30ºC it takes more time to dissolve than at 60ºC.

Allow:

- it is quickest at 60ºC;
- the three tests show that the sugar dissolves more quickly when the water is hotter.

Allow:

if neither box is ticked, but the creditworthy explanation indicates that Jack's prediction is supported by the evidence, the mark may be awarded.

***Do not** give credit if the 'no' box is ticked.*

***Do not** give credit for an insufficient response which restates the time variable:*

- *it dissolves more easily.*

***Do not** give credit for an insufficient response which does not specify the time variable:*

- *the hotter the temperature, the smaller the numbers.*

***Do not** give credit for an insufficient response which reads off one set of data without any comparison:*

- *because the temperature was 60ºC and it took 10 minutes to dissolve;*
- *it's quick at 60ºC.*

[5]

6. (a) Award **ONE** mark for **both** correct: 1

The change is non-reversible. True

The bubbles evaporate. False

(b) Award **ONE** mark for **all three** materials correctly classified: 1

Material	*Solid, liquid or gas?*
inside the bubble	**gas**
vinegar	**liquid**
chalk rock	**solid**

(c) Award **ONE** mark for: 1

- limestone;
- pumice.

Allow:

- chalk.

[3]

7. (a) (i) Award **ONE** mark for: 1

- circuit 2

☐ ☑ ☐ ☐

(ii) Award **ONE** mark for an indication that this circuit has the least components in it (to the power supply) **or** that it has the least number of components compared to the other circuits: 1

- all the other circuits have more components/things;
- there are fewer components/things (compared to the number of cells).

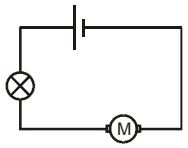
Allow:

- the battery/cell has to power only one component/bulb/thing;
- the bulb does not have to share the electricity from the battery;
- there is more electricity for each component;
- there is just/only one bulb in the circuit.

***Do not** give credit for an ambiguous response:*

- *there is one bulb in the circuit [circuit 3 also has one bulb].*

(b) Award **ONE** mark for: 1

- 

☑ ☐ ☐ ☐

(c) Award **ONE** mark for indicating that the bulbs will be brighter: 1

The bulbs will...

- get brighter.

Allow:

The bulbs will...

- get lighter;
- blow.

Allow:

- an absolute response:

The bulbs will...

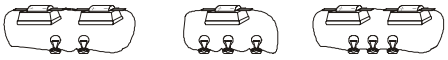
- be bright.

***Do not** give credit for an insufficient response:*

The bulbs will...

- *light (up).*

(d) Award **ONE** mark for **all three** circuits correctly identified: 1



circuit **C** *circuit* **A** *circuit* **B**

[5]

8. (a) Award **ONE** mark for: 1

- 3.

(b) Award **ONE** mark for an indication that measurements of time in the light and dark were compared: 1

- she planned to compare how long the shrimp was in the light and the dark;
- time in light or dark.

Allow:

- the time they spent in each.

***Do not** give credit for a response which redefines the dependent variable:*

- *how many times the shrimp went into the light;*
- *how many were in the light.*

(c) Award **ONE** mark for an indication that Rebecca would subtract the number in the light from the total: 1

- she would count how many were in the light and take these away from 10;
- by taking the number of shrimps in the light from 10;
- count the number you can see in the light and take it from the total.

Allow:

- compare the number in the light and the number out of sight in the dark;
- step 4;
- she counted how many were in the light and assumed the rest were in the dark.

Allow:

a response which suggests awareness of the process:

- by taking the number in the light from 5.

Do not *give credit for a response which uses incorrect reasoning:*

- *she took how many were in the light from how many in the dark.*

Do not *give credit for an insufficient response which refers to light:*

- *count how many were in the light.*

(d) Award **ONE** mark for either of the following correct responses: 1

EITHER

- Amy's ☑ ☐

and

a relevant criterion used to compare the two investigations clearly stating why Amy's is the better plan:

- gives the shrimp more time to move;
- Rebecca did not record her measurements;
- gives it more time to decide whether it likes light or dark;
- with 10 in a bowl it would be harder to count them.

OR

- ☐ Rebecca's ☑

and

a relevant criterion used to compare the two investigations clearly stating why Rebecca's is the better plan:

- one shrimp might like the dark, if you have more some might like the dark and some might like the light;
- because in Rebecca's you don't have to look at the dish all the time just every 10 seconds;
- less chance of a mistake because it has more brine shrimps.

Do not *give credit for an insufficient response which fails to make the criteria clear:*

- *it was quicker/easier/better.*

Do not *give credit for an insufficient response that falls short of explaining why the plan is better:*

- *Amy's* ☑ ☐

and

- *she takes more time.*

OR

- ☐ *Rebecca's* ☑

and

- *she has more shrimps.*

***Do not** give credit for a conclusion or an explanation of how a conclusion might be drawn from the results:*

- ☐ *Rebecca's* ☑

and

- *if there were 6 in one and 4 in another you would know how many they liked best.*

[4]

9. (a) Award **ONE** mark for: 1

	☐	☐
• water evaporating	☑	☐

(b) Award **ONE** mark for **both** statements correctly classified: 1

	True	False
• from water produced by condensation	☑	☐
from water vapour in the air	☑	☐

(c) Award **ONE** mark for an understanding that rain water is not salty because only the water evaporates and the salt does not: 1

- water evaporates but salt does not;
- only water evaporates;
- salt does not evaporate with the water.

***Do not** give credit for an insufficient response:*

- *the (sea) water evaporates [does not indicate what happens to the salt].*

[3]