

Science Paper A

Mark Scheme

2006

0 min

0 marks

1. (a) Award **TWO** marks for **all four** statements correctly classified: 2
The pictures show that as the corn pops, it...
- | | True | False |
|---|-------------------------------------|-------------------------------------|
| <i>gets bigger.</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| or <i>changes to a darker colour</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <i>changes shape.</i> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <i>gets smoother.</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
- If you are unable to award two marks, award **ONE** mark for **any two** or **three** statements correctly classified. 1
- (b) Award **ONE** mark for: 1
Sasha should measure the...
- | | | |
|--------------------------|--------------|-------------------------------------|
| <input type="checkbox"/> | temperature. | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | | <input type="checkbox"/> |
- (c) Award **ONE** mark for: 1
- | | | |
|--------------------------|-------------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | |
| heat | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
- (d) Award **ONE** mark for identifying/ describing a non-reversible change where a new material is produced, eg: 1
- (wood/paper/candle) burning;
 - egg being boiled;
 - mixing vinegar and bicarbonate of soda;
 - cooking a cake/biscuits;
 - making a cake;
 - boiling rice/spaghetti;
 - making paper from wood/trees.
- ◆ **Give credit** for a correct response that goes beyond the key stage 2 programme of study which names a chemical change:

- combustion;
- corrosion/rusting;
- respiration/photosynthesis.

ONE mark may be awarded for identifying a biological non-reversible change:

- an apple decaying/going rotten;
- a seed growing into a plant.

ONE mark may be awarded for a response identifying a material and what it changes into:

- changing bread into toast;
- paper to ashes;
- a grape turning into a raisin;
- milk turning into cheese;
- changing sand to glass.

Do not give credit for an insufficient response:

- heating food [heating may not result in an irreversible change];
- boiling.

Do not give credit for an insufficient response explicitly relating to popcorn:

- the popcorn cannot change back to seeds again.

Do not give credit for an insufficient response naming a non-reversible physical process in which the material is not changed:

- breaking a cup/glass;
- dropping an egg;
- ripping paper;
- popping a balloon.

Do not give credit for an insufficient response identifying a new material without identifying the change:

- a cake is non-reversible;
- candle [the wax burns and melts]
- chips;
- toast.

[5]

2. (a) Award **ONE** mark for: 1
- The force from the water pushing the boat up.
-
- (b) Award **ONE** mark for recognising that the larger lump of modelling clay makes boat 2 sit lower in the water or that boat 2 is heavier: 1
- boat 2 has more clay;

- the lump of clay in boat 2 is bigger/ heavier;
- the clay makes it heavier;
- the heavier the boat, the lower it sinks;
- it is heavier/weights more;
- there is more force (pulling/pushing) down.

ONE mark may be awarded for an absolute response implying that boat 2 has more modelling clay than boat 1:

- boat 2 has a lot of clay;
- boat 2 is heavy.

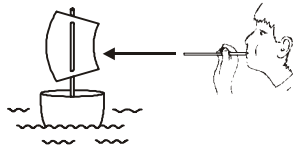
Do not give credit for an insufficient response:

- the clay is weighing down the boat;
- boat 2 floats lower because of the modelling clay;
- there is a force.

- (c) Award **ONE** mark for a horizontal arrow pointing left drawn **anywhere** on the picture:

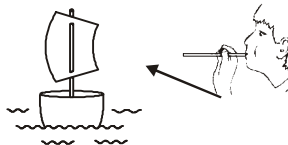
1

■



ONE mark may be awarded for an arrow pointing left that is within 45° of the horizontal:

■



Do not give credit for an insufficient response where a line is drawn from the straw to the sail with no arrowhead.

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

1

- friction.

ONE mark may be awarded for:

- air resistance;
- water resistance;
- drag.

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

- *gravity/weight.*

Do not give credit for an insufficient response describing friction:

- *(the force from the) air/water/wind.*

(e) Award **ONE** mark for a response indicating that the big sail will have a greater pushing/blowing force on it:

1

- the force on the big sail is larger;
- there is more sail for the blowing force to act on;
- there is a bigger force because it has more sail to push;
- the small sail will not get as much pushing force so it will be slower.

ONE mark may be awarded for a response indicating that the big sail catches or traps more air/wind, pushing it along (faster/further):

- *the bigger sail catches more wind and is pushed faster;*
- *more air will collect in the big sail to push it along.*

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

- *air resistance makes the boat go faster.*

Do not give credit for an insufficient response where the forces on the sail have not been described:

- *the bigger the sail, the faster the boat [this is a consequence of a bigger force, not a description of the force];*
- *the big sail will catch the wind better;*
- *a bigger sail will catch more wind;*
- *the small sail does not get as much wind;*
- *the wind will blow the bigger sail faster [given].*

[5]

3. (a) Award **ONE** mark for all four animals correctly placed: 1

Name	Legs	Wings	Antennae
butterfly	6	4	2
hoverfly	6	2	2
ant	6	0	2
spider	8	0	0

Do not give credit for an insufficient response that replaces 'butterfly' or 'hoverfly' with 'fly'.

- (b) Award **ONE** mark for: 1
- in the place where
 they were found

- (c) Award **ONE** mark for correctly naming **both** animals: 1
- (i) dragonfly; **and**
 - (ii) housefly;
 - [in that order].

Do not give credit for an insufficient response for naming either insect as 'fly'.

- (d) Award **ONE** mark for **both** boxes ticked: 1
- has a long thin tail
 has 4 wings

[4]

4. (a) Award **ONE** mark for: 1
- a pulling force
 towards the Earth

- (b) Award **ONE** mark for an indication that Newton needed evidence to support his ideas or so that he could be more certain of his ideas: 1
- to gather evidence to support (or reject) his ideas;
 - to see if his ideas were supported by his results/investigations;
 - to see if his predictions were correct;
 - to find out if other things fall from the same force;
 - if he said anything without investigating it, other people may find something different.

ONE mark may be awarded for a response that implies he would know if his ideas were true:

- *to see whether his ideas were right/wrong;*
- *to see if it/his idea works/is true;*
- *to check his ideas;*
- *to know (for sure) which force causes the apple to fall;*
- *if he just guessed he may be wrong;*
- *so he could know why the apple fell on his head;*
- *if he did not test, he would not know what happened.*

Do not give credit for an insufficient response:

- *to test his ideas [given];*
- *to make sure;*
- *to see if his results are true;*
- *to check his results;*
[these responses imply an investigation has already been carried out];
- *to see if he had the right/correct answer [implies results for his ideas have been determined previously];*
- *to make it a fair test;*
- *to make it accurate;*
- *to see if the investigation worked.*

- (c) Award **ONE** mark for recognising that gravitational force is responsible for keeping the Earth in orbit: 1
- gravity.

ONE mark may be awarded for:

- *weight.*

Do not give credit for an insufficient response describing gravitational force:

- *a pulling force towards the Earth.*

- (d) Award **ONE** mark for a response giving a time period equivalent to a year: 1
- 1 year;
 - 52 weeks;
 - 365-366 days [inclusive].

Do not give credit for an insufficient response that gives no units or uses inappropriate units:

- 365;
- 52 days.

- (e) Award **ONE** mark for a response that clearly describes the Earth spinning 1

on its axis to cause day and night:

- it rotates;
- it spins (on its axis);
- it turns on its axis.

ONE mark may be awarded for:

- *it revolves;*
- *(it moves) on its axis.*

Do not give credit for an insufficient response implying night and day are caused by the Earth orbiting the Sun:

- *it turns around the Sun;*
- *it orbits.*

Do not give credit for an insufficient response:

- *it turns;*
- *it goes (a)round;*
- *during the day, the Earth is facing the Sun, at night the Earth is facing away from the Sun/facing the Moon.*

[5]

5. (a) Award **ONE** mark for an indication **either** that the trunk transports water/nutrients or that the trunk supports the tree: 1

- the trunk carries/moves water and nutrients (from the roots to the leaves);
- the trunk supports the tree/leaves/ branches;
- the trunk holds the tree upright.

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

- it carries food to the roots/parts of the plant that are growing;
- the trunk/it stores water.

ONE mark may be awarded for a response indicating a supporting function of the trunk/stem which works in conjunction with the roots:

- *to keep/hold it up;*
- *to stand up (straight);*
- *to keep it stable/steady;*
- *to stop the tree blowing over.*

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

- *it absorbs/takes in/sucks up water/nutrients from the soil;*
- *to anchor the tree;*
[these responses refer to functions of the roots];
- *it feeds the tree.*

(b) Award **ONE** mark for naming leaves:

1

- (the) leaf.

ONE mark may be awarded for a response indicating a green part:

- *green twig/branch/stalk.*

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

- *roots;*
- *flowers.*

Do not give credit for an insufficient response:

- *the stem/stalk/trunk*
[the stem can only photosynthesise if it is green].

(c) Award **ONE** mark for a response indicating that less light is available or that the tree may not have leaves (for the production of new materials for growth) **or** that water and/or nutrients may be less accessible to the tree (as the ground is more likely to be frozen):

1

- (the hours of daylight are shorter so) there is less light/sunshine;
- the (sun)light is not as intense/strong;
- the tree has lost its leaves (so it cannot make new material for growth);
- trees cannot get the nutrients (out of the ground);
- there is less water because it is frozen;
- the tree cannot make enough food (to grow).
- ◆ **Give credit for a correct response that goes beyond the key stage 2 programme of study:**
- there is less photosynthesis;
- there is less light/water taken in (by the tree) for photosynthesis.

ONE mark may be awarded for a response referring to the Sun rather than to light:

- *the Sun does not get so high in the sky;*
- *there is less Sun (in winter).*

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

- trees die in winter;
- trees get less food from the Sun.

Do not give credit for an insufficient response implying there is complete darkness during winter:

- there is no sunlight/Sun;
- trees need light to grow.

Do not give credit for an insufficient response:

- there is less heat;
- it is cold;
[given];
- there is less water/nutrients;
- (trees get) less food.

- (d) (i) Award **ONE** mark for: 1
- Norway maple.

ONE mark may be awarded for an unambiguous indication of the correct tree:

- Norway/maple.

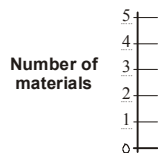
- (ii) Award **ONE** mark for: 1
- Alder buckthorn.

ONE mark may be awarded for an unambiguous indication of the correct tree:

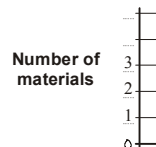
- Alder/buckthorn.

[5]

6. (a) (i) Award **ONE** mark for 1 to 5 marked on the vertical or y axis: 1

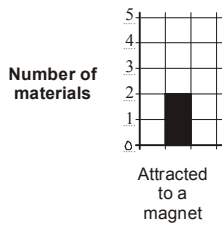


ONE mark may be awarded for a sequence of 1, 2, 3, or 1, 2, 3, 4 correctly placed:

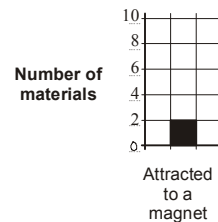
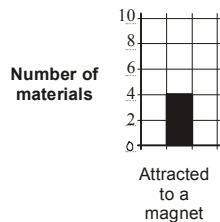


- (ii) Award **ONE** mark for a bar drawn to '2' on the chart above 'Attracted to a magnet':

1



***ONE** mark may be awarded for 2 squares shaded if the scale is incorrect/missing or for a bar drawn consistently with an incorrect scale:*



- (b) Award **ONE** mark for a response recognising that the results are not referred to or interpreted:

1

- she has not talked about what she has found out/what happened/her results;
- it does not give reasons/an explanation.

***ONE** mark may be awarded for a response which implies that there is not enough information **or** recognises that 'good' is not defined:*

- *it does not tell you anything;*
- *it needs to tell you more about the results;*
- *it has not got enough detail;*
- *we need more information;*
- *it does not tell us why it is good;*
- *she needs to explain 'good'.*

***Do not** give credit for an insufficient response which refers to a prediction or method, or which presents a conclusion:*

- *she does not say what was supposed to happen;*
- *she has not talked about what she did;*
- *it does not describe the investigation;*
- *metals were attracted to the magnet.*

Do not give credit for an insufficient response:

- it does not tell you her conclusion;
- she is just saying it is good;
- she does not use scientific words;
- it does not say why it is attracted to the materials.

(c) Award **TWO** marks for all five observations correctly classified:

2

Observation	<i>Supports Ali's and Jane's ideas</i>	<i>Supports only Jane's idea</i>	<i>Does not support either idea</i>
<i>The iron nail is attracted to the magnet.</i>	✓		
<i>The steel clip is attracted to the magnet.</i>	✓		
<i>The metal coin is not attracted to the magnet</i>		✓	
<i>The modelling clay is not attracted to the magnet.</i>			✓
<i>The chocolate is not attracted to the magnet</i>			✓

or

If you are unable to award two marks, award **ONE** mark for **any three or four** correct observations.

1

(d) Award **ONE** mark for an indication that the suggested change would give a different investigation:

1

- they only want to know if the material is attracted or not;
- they were not testing the strength of the magnets;
- it was not what they were testing.

ONE mark may be awarded for a response suggesting measurement is not needed for their investigation:

- how far it moves does not matter;
- it would not make any difference;
- it has nothing to do with the test.

ONE mark may be awarded for a response recognising that only some of the materials are magnetic:

- if it is not attracted to the magnet it will not move;
- only steel/iron will attract the magnet;
- chocolate would never move;
- some materials were not magnetic.

Do not give credit for a response that includes incorrect science which is not supported by the results of the investigation:

- *the materials all move the same distance;*
- *all the materials attract so it will not work;*
- *some metals repel magnets.*

Do not give credit for an insufficient response:

- *measuring would not help;*
- *it is easier to see.*

[6]

7. (a) (i) Award **ONE** mark for a response that names or describes **evaporation:** 1
- the (hot) water evaporates;
 - it changes into water vapour;
 - it evaporates.
- (ii) Award **ONE** mark for a response that names or describes **condensation:** 1
- the water vapour condenses into liquid;
 - the (cold) plate causes the evaporated water to condense;
 - the water vapour turns back into liquid;
 - it condenses.

ONE mark may be awarded for:

- *it evaporates/changes into steam.*

ONE mark may be awarded if evaporation is the only process named or described.

ONE mark may be awarded for:

- *the steam condenses/changes into water.*

ONE mark may be awarded if condensation is the only process named or described.

Do not give credit in both a)i) and a)ii) for a response that includes incorrect science indicating that the water comes from the melting ice:

- *water from the melting ice cubes drips through/underneath the plate.*

Do not give credit in **either a)i) or a)ii)** for a response that includes incorrect science despite using the words evaporation and/or condensation:

- the gas evaporates and then condenses so that liquid forms under the plate [mark for a)i) only cannot be awarded];
- the water condenses because of the heat and turns into water vapour [mark for a)ii) cannot be awarded];
- the heat touches the cold plate and condenses [mark for a)ii) cannot be awarded].

Do not give credit in **either a)i) or a)ii)** for a response that includes incorrect science where steam is referred to as a liquid:

- the steam evaporates [mark for a)i) cannot be awarded];
- the gas cools and changes into steam on the bottom of the plate [mark for a)ii) cannot be awarded].

Do not give credit for an insufficient response:

- hot air condenses on the plate [there is likely to be water vapour in the air, but this needs to be explicit].

- (b) Award **ONE** mark for labelling the horizontal axis with time **and** giving minutes as the unit of measurement: 1

- time (in) mins.

ONE mark may be awarded for:

- minutes;
- how long it takes in minutes.

Do not give credit for a response that includes incorrect science giving the units of time as anything other than minutes:

- time (seconds);
- hours;
- seconds;
- time (m) ['m' is the unit of measurement for metres].

Do not give credit for an insufficient response:

- time [does not give units];
- how long [does not give units and could refer to length].

- (c) Award **ONE** mark for an explanation that salt increases the rate of melting: 1
- salt makes ice melt quicker;
 - ice melts more quickly when salt is added.

ONE mark may be awarded for:

- *the water comes through the funnel faster when he adds salt;*
- *salt melts the ice better;*
- *ice melts easier with salt.*

Do not give credit for an insufficient response:

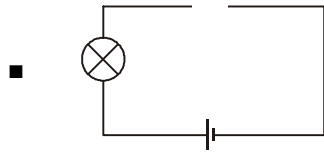
- *water melts quicker with salt;*
- *the salt melts the ice quickly [the ice melts without salt as well];*
- *ice melts without salt;*
- *salt affects the rate at which ice melts; [these responses do not describe the effect of adding salt].*

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

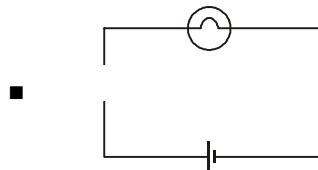
He did not try different amounts of salt.

[5]

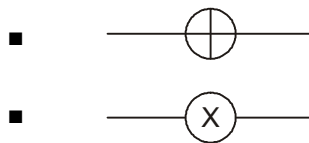
8. (a) (i) Award **ONE** mark for a correctly drawn symbol for a light bulb in either position in the circuit: 1



ONE mark may be awarded for an obsolete symbol for the bulb:

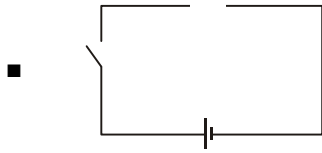


Do not give credit for a response that includes incorrect science where a bulb symbol has been incorrectly drawn in the circuit:

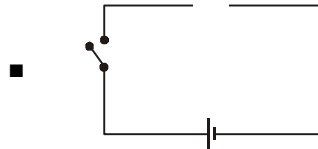


- (ii) Award **ONE** mark for a correctly drawn symbol for a switch in either position in the circuit:

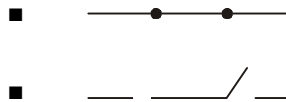
1



ONE mark may be awarded for an obsolete symbol for the switch:



Do not give credit for a response that includes incorrect science where a switch symbol has been incorrectly drawn in the circuit:



- (b) Award **ONE** mark for naming **one** of the following properties:

1

- (electrical) conductor;
- flexible.

ONE mark may be awarded for a description of a property:

- it is easy to cut;
- electricity goes through metal.

ONE mark may be awarded for a response indicating that the foil needs to be rigid enough to stay against the roof of the tunnel:

- it is a bit rigid so that it can stand up (to touch the tunnel).

Do not give credit for an insufficient response:

- it is metal/aluminium;
- the foil is rigid [implies no flexibility and offers no explanation].

- (c) Award **ONE** mark for an understanding that the bulb does not light up because there is a break in the circuit:

1

- *The circuit* is not complete;
- *The circuit* has a gap in it.

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

- *The circuit is open;*
- *The circuit has no current flowing.*

ONE mark may be awarded for:

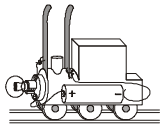
- *The circuit is broken;*
- *The circuit is not completely joined up;*
- *The circuit is not connected (properly);*
- *The circuit is switched off.*

Do not give credit for an insufficient response:

- *The circuit does not have enough electricity/energy;*
- *The circuit needs both foil strips to touch;*
- *The circuit has only one foil strip touching; [given].*

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

1



[5]