



**General Certificate of Secondary Education
January 2011**

Additional Applied Science

AASC/2F

Science at Work

Unit 2

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

- 2.1** In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Question 1

Question	Answers	Extra information	Mark
1(a)(i)	milk		1
	cheese		1
1(a)(ii)	to repair body tissues		1
1(b)	protein – when mixed with sodium hydroxide and copper sulfate (Biuret test), turns purple		1
	glucose – when heated with Benedict's solution, turns orange		1
	starch – when mixed with iodine, turns a blue / black colour		1
1(c)(i)	intensive / battery	allow factory farming	1
1(c)(ii)	any two from: <ul style="list-style-type: none"> • temperature • light • humidity • ventilation 	allow food / water / drinking or how much they can eat or eating habits or chemicals / additives in food do not accept hormones in food ignore antibiotics ignore reference to space	2

Question 1 continues on the next page

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Question 1 continued

Question	Answers	Extra information	Mark
1(c)(iii)	more of their energy is put into producing eggs		1
1(c)(iv)	<p>any two from:</p> <ul style="list-style-type: none"> • easier to collect (eggs) • cheap(er) (to produce eggs) • less manpower needed • more hens can be kept / more eggs produced <u>in a smaller space</u> • less attack from predators / better protection / safer 	<p>do not accept eggs made quicker</p> <p>do not accept reference to disease</p> <p>ignore easier to care for</p>	2
Total			12

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Question 2

Question	Answers	Extra information	Mark
2(a)	aluminium – low density		1
	ceramic – high melting point		1
	polymer – flexible		1
2(b)(i)	composite		1
2(b)(ii)	<p>any two from:</p> <ul style="list-style-type: none"> • flexible • strong • light(weight) / low density • will not break down in the environment / durable / hard wearing / does not corrode • can be moulded / shaped (easily) • does not absorb water / waterproof 	<p>ignore hard / tough</p> <p>ignore it floats</p> <p>do not accept it does not rust</p> <p>accept can be coloured</p> <p>do not accept transparency</p> <p>ignore cost</p> <p>ignore reference to melting point</p>	2
2(c)(i)	cotton	allow silk	1
2(c)(ii)	nylon		1
Total			8

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Question 3

Question	Answers	Extra information	Mark
3(a)	any two from: <ul style="list-style-type: none"> prevent contamination preserve evidence restrict access 	ignore references to health and safety	2
3(b)(i)	any one from: <ul style="list-style-type: none"> tweezers / forceps sticky tape 	do not accept scalpel / dust pan and brush / Hoover ignore tongs ignore gloves	1
3(b)(ii)	put it in a bag / container seal or label (the bag / container)	allow paper bag	1 1
3(b)(iii)	3, 2, 1, 4	all in correct order for 3 marks 2–3 in correct order for 2 marks 1 in correct order for 1 mark	3
3(c)(i)	any two from: <ul style="list-style-type: none"> size colour shape texture / ridges pattern / lines / marks 	ignore species / type ignore detail	2

AASC/2F**Question 3 continued**

Question	Answers	Extra information	Mark
3(c)(ii)	no any one from: <ul style="list-style-type: none">• could have picked the seed up from somewhere else• could have been at the crime scene before the crime was committed• could have been at the crime scene but did not commit the crime• someone else could have been wearing his boots	no mark for no if answered yes, no mark from list can be credited	1
Total			11

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Question 4

Question	Answers	Extra information	Mark
4(a)(i)	<p>any two from:</p> <ul style="list-style-type: none"> • <u>too much</u> salt (1) 98% of the daily allowance / nearly all of the allowance in one snack (1) • <u>too much</u> energy / kJ (1) Half of the RDA (1) • <u>too much</u> fat (1) 89% / nearly the whole allowance in one snack (1) • <u>too much</u> saturated fat (1) 148% which is 1½ times what is needed / more than the RDA (1) 	<p>give 1 mark for reason and the second mark for a quantitative reply relating to the RDA</p> <p>look for a usage of the numbers</p> <p>allow a lot of / full of or too much / many</p> <p>accept calories for energy / kJ</p>	4
4(a)(ii)	9970		1
4(b)	<p>can cause obesity / diabetes / tooth decay or makes you fat / put on weight</p>	<p>ignore harm your teeth ignore contains lots of energy (calories) ignore causes heart disease / high blood pressure / stroke</p>	1

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Question 4 continued

Question	Answers	Extra information	Mark
4(c)(i)	any three from: <ul style="list-style-type: none"> • <u>weigh</u> meat • put in the hot / warm <u>oven</u> or heat it in the <u>oven</u> • until no further weight loss / dried out • <u>reweigh</u> meat 	do not accept just put on balance ignore reference to measuring do not allow any reference to cooking allow time frame of hours (not minutes) or overnight	3
4(c)(ii)	60 °C		1
4(c)(iii)	$\frac{\text{mass before} - \text{mass after}}{\text{mass before}} \times 100$		1
Total			11

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Question 5

Question	Answers	Extra information	Mark
5(a)(i)	34.1		1
5(a)(ii)	1.9		1
5(a)(iii)	<p>any two from:</p> <ul style="list-style-type: none"> • accurate / reliable / avoid human error • precise / sensitive • can take more readings / continuous readings • can record while exercising or do not have to stop / write it down 	allow efficient	2
5(b)	<p>B</p> <p>any two from:</p> <ul style="list-style-type: none"> • capillary (loop) / blood vessel is wider or vasodilation • blood carried nearer to the surface of the skin or increased blood flow • <u>more</u> heat lost / radiated or heat lost quicker 	<p>no mark</p> <p>ignore blood vessel comes closer to the surface</p> <p>do not allow reference to sweating</p>	2

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Question	Answers	Extra information	Mark
5(c)	breath bar higher than normal day	1 mark for each bar	1
	sweat bar higher than breath bar and higher than normal day		1
	urine bar lower than normal day		1
Total			9

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Question 6

Question	Answers	Extra information	Mark
6(a)	ethanol	must be in correct order	1
	potassium (ions)		1
	carbon dioxide		1
	copper (ions)		1
6(b)(i)	NaCl		1
6(b)(ii)	(strong) forces of attraction / bonds	do not allow mark for bonds if single / double / hydrogen bonds mentioned	1
	between oppositely charged ions	accept positive and negative ions / charges / particles do not accept atoms / molecules	1
6(b)(iii)	lots of energy / heat needed	allow bonds hard to break ignore reference to single / double bonds	1
	<u>strong</u> forces / bonds (between the ions need to be broken)		1
Total			9
			Overall mark = 60