



**General Certificate of Secondary Education
June 2013**

Additional Applied Science

AAS1FP

(Specification 4505)

Unit 1: Science at Work

Final

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised 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 students' 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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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 bullet points 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	green, 5	0
2	red*, 5	1
3	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, 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 or by each stage of a longer calculation.

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.

3.8 Ignore / Insufficient / Do not allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

4. Quality of Written Communication and levels marking

In Question 8 candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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Question 1

question	answers	extra information	mark
<p>1</p>	<pre> graph LR FSS[Forensic Science Service] --- Accidents[accidents] FSS --- Evidence[evidence] HSE[Health and Safety Executive] --- Accidents HSE --- Evidence FSA[Food Standards Agency] --- Food[food] FSA --- Beds[beds] </pre>	<p>1 mark for each correct line more than one line from an organisation negates the mark</p>	<p>max. 3</p>
<p>Total</p>			<p>3</p>

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Question 2

question	answers	extra information	mark
2	low density		1
	stiff		1
	strong		1
Total			3

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Question 3

question	answers	extra information	mark
3(a)(i)	A – trachea		1
	B – bronchus		1
	C – bronchioles		1
	D – alveoli		1
3(a)(ii)	diaphragm	either order	1
	(intercostal) muscles		1
3(b)	oxygen		1
	blood / arteries / capillaries	accept pulmonary vein	1
	cells / organs / tissues / named organ / muscles	do not accept lung	1
Total			9

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Question 4

question	answers	extra information	mark
4(a)	because it's the same every time or can be replicated or results are consistent	accept repeatable/reproducible/reliable ignore accuracy/fair test/safety	1
4(b)(i)	suspect R (all) bands match or same pattern	two answers marked independently accept same bands allow because their DNA (profile) matches (the profile from the crime scene) if R is chosen	1 1
4(b)(ii)	NO (no mark) because DNA is unique (to the individual)	allow yes if <u>identical</u> twins	1
4(c)	it uses electrophoresis it can be used on small samples		1 1
4(d)	nucleus		1

Question 4 continues on the next page...

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Question 4 continued

<p>4(e)</p>	<p>paternity testing or identifying mother or determining whether people are related or identifying bodies</p>	<p>allow diagnosing genetic disease or pedigree testing of dogs or food testing etc ignore cloning</p>	<p>1</p>
<p>Total</p>			<p>8</p>

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Question 5

question	answers	extra information	mark
5(a)(i)	550(ml)	correct answer with or without working gains 2 marks if answer incorrect, allow 1500 + 100 + 350 or 1950 or 2500 - 1500 - 100 - 350 for 1 mark	2
5(a)(ii)	increase / higher (because needs) to cool down	accept wtte	1 1
5(b)	her breathing rate increased her heart rate increased		1 1
5(c)	use a thermometer in the correct place (under the arm, in the mouth, in the ear, in the rectum)	allow any other suitable method eg temperature strip	1 1
5(d)	thermoregulatory centre		1
Total			9

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Question 6

question	answers	extra information	mark
6(a)	<u>Procedure</u> up to 3 marks from: <ul style="list-style-type: none"> • use of a flame test wire / nichrome wire / splint / spatula / glass rod / metal rod / metal wire/named metal wire • dip wire in acid • dip wire in (solid) sample • place wire in (blue) Bunsen flame 	all three marks can be scored from a <u>labelled</u> diagram. allow make a solution (1), spray chemical (1) into (blue) flame (1) mention of yellow flame negates this mark	max. 3
	<u>Results</u> sodium (chloride) – yellow / orange		1
	potassium (chloride) – lilac / purple / pink		1
6(b)(i)	white		1
6(b)(ii)	a precipitate		1
6(c)	sodium + silver chloride nitrate \longrightarrow sodium + silver chloride nitrate	reactants either order, products either order allow mix of words and correct formulae	1
Total			8

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Question 7

question	answers	extra information	mark
7(a)	inside of curved material labelled C		1
7(b)	add weights (1N) at a time <u>measure</u> deflection (with ruler)	accept <u>measure</u> amount of bending	1 1
7(c)(i)	at least 4 points plotted correctly (± half a small square) best fit straight line		1 1
7(c)(ii)	K (no mark) (because for the same force or load) K bends less (than J) or line for K is less steep (than that for J)	explanation must be correct for the letter chosen accept converse accept converse allow ecf from their graph	1
Total			6

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Question 8

question	answers	extra information	mark
8	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.		6
0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	Brief description of change in materials. No comparisons of the changes have been made.	A clear description of changes in materials. An attempt at comparing the changes has been made with at least one linked to an advantage.	A detailed description of changes in materials, with clear comparisons made and linked to advantages.
Examples of the points made in the response:		Extra information	
<ul style="list-style-type: none"> • head size increases • so is easier to hit the ball • aluminium racquets lightest • so less effort needed • wood not strong enough for bigger heads • composite stronger than wood or aluminium • so won't break 			
Total			6

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Question 9

question	answers	extra information	mark
9(a)(i)	X		1
9(a)(ii)	same / similar concentration (of ions in the drink)	same / similar amount / number of ions	1
	as in the blood	accept substances / electrolytes / sugars/ salts for ions	1
9(a)(iii)	to replace the ions lost (in sweat)	accept ingredients / substances / electrolytes / salts for ions not nutrients/glucose/sugar	1
9(b)(i)	28.91	allow 28.9 or 29 correct answer with or without working gains 2 marks if answer incorrect, allow $74 \div (1.6 \times 1.6)$ for 1 mark	2
9(b)(ii)	any two from: <ul style="list-style-type: none"> • lose weight / over weight • exercise (more) • reduce intake of carbohydrates / fats / energy / calories 	ignore healthy diet allow correct advice given for ecf from calculation	2
Total			8

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