Version 1.0

General Certificate of Secondary Education
June 2010

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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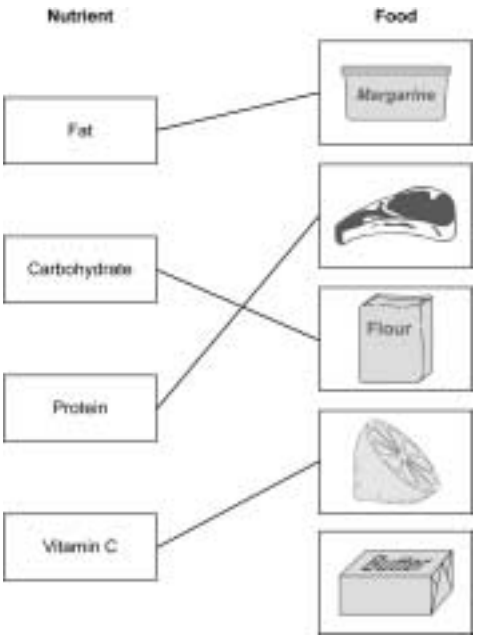
Question 1

Question	Answers	Extra information	Mark
1(a)		**1** mark for each correct line extra lines from nutrient = **0** marks	3
1(b)(i)	joules		1
1(b)(ii)	The carbohydrate is turned into fat and stored in the body.		1
1(b)(iii)	iodine (solution)	accept phonetic spelling	1
1(b)(iv)	blue – black	allow black **or** dark blue **or** blue do **not** accept any other colours with or without black / blue	1
1(c)(i)	Iron	allow Fe	1
1(c)(ii)	Iron Zinc	allow Fe allow Zn	1 1
Total			**10**

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Question 2

Question	Answers	Extra information	Mark
2(a)	any **three** from: • (where the) weapon / gun (was) • blood • footprint / shoeprints / footsteps • (where the) victim / body was lying • (wine) glasses • fingerprints / handprints	accept outline of victim / body ignore just body allow visible substances on wine glass eg lipstick on the wine glass ignore saliva / lipstick / lip marks / carpet fibres on their own	3
2(b)(i)	either: dust (with a powder) (1) use sticky tape / paper **or** photograph (1) **or** quasar illumination – UV light (1) photograph (1)	allow metallic powders allow carbon / black / white powder ignore sticky material ignore references to storing	2
2(b)(ii)	any **one** from: • database • NAFIS • CRFD – criminal records fingerprint database	do **not** accept NDNAD / DNA database ignore computer	1

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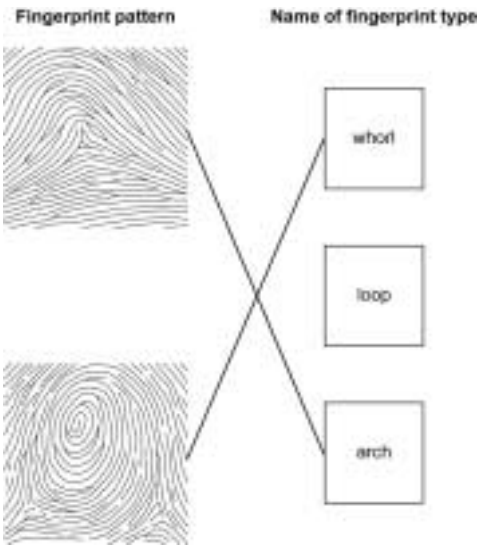
Question 2

Question	Answers	Extra information	Mark
2(b)(iii)		**1** mark for each correct line extra lines from fingerprint pattern = **0** marks	2
2(b)(iv)	any **one** from: • saliva • cells • DNA • lipstick • blood • sweat	ignore hair ignore pollen ignore fibres ignore skin ignore poison / chemicals ignore body fluids	1
Total			**9**

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Question 3

Question	Answers	Extra information	Mark
3(a)(i)	aorta – D vena cava – A left ventricle – F right atrium – B		1 1 1 1
3(a)(ii)	D / E / F		1
3(b)(i)	arteries		1
3(b)(ii)	capillaries		1
3(b)(iii)	oxygen		1
3(b)(iv)	lungs		1
3(c)	any **one** from: • to supply <u>more</u> oxygen • <u>more</u> glucose (to cells) • to <u>remove more</u> carbon dioxide from cells	 accept supply oxygen quicker ignore just to supply more blood accept the body / cells needs more oxygen / glucose carbon dioxide must be implied as waste product	1
Total			**10**

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Question 4

Question	Answers	Extra information	Mark
4(a)(i)	any **three** from: • amount / type of organic matter • size of particles • colour • shape of particles • texture • size / amount of space between particles (air spaces)	ignore patterns / moisture / solubility / pH / contaminants / stones	3
4(a)(ii)	comparison		1
4(b)(i)	any **one** from: • filter • centrifuge • settle • use barium sulfate ($BaSO_4$)	 accept use filter paper ignore sieve / distil accept wait for soil to sink / sedimentation ignore precipitate / add chemicals	1

Question 4 continues on the next page

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Question 4 continued

Question	Answers	Extra information	Mark
4(b)(ii)	either: (universal) indicator (1) check colour change / use colour scale / pH chart (1) **or** pH meter (1) read scale / pH (1)	 accept pH paper / stick ignore litmus paper allow recognition of colour usage	2
4(c)(i)	add to water / solvent see if it disappears **or** dissolves	accept liquid for water / solvent do **not** accept acid / alkali accept see if it goes clear	1 1
4(c)(ii)	When the gas is added to limewater, the limewater turns cloudy.		1
4(d)(i)	Z		1
4(d)(ii)	normal line drawn	line must be both sides of boundary at entry / exit point line must be 90° / straight by eye accept dotty lines	1
4(d)(iii)	refraction	do **not** accept refracted / refractive	1
Total			**13**

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Question 5

Question	Answers	Extra information	Mark
5(a)(i)	(aluminium) more flexible (than wood) (graphite carbon fibre) less flexible (than aluminium)	allow stiff **or** not flexible (for wood)	1 1
5(a)(ii)	composite	ignore synthetic ignore mixture ignore reinforced plastic	1
5(a)(iii)	any **three** from: • durable / lasts longer • does not dry out / crack with age • strong • light / low density • does not warp / distort • less flexible **or** more ball control	do **not** accept not brittle ignore hard to break / rigid ignore does not add weight do **not** accept high density allow easy to mould ignore suits all players ignore cost do **not** accept biodegradable	3
5(b)	(loss in weight =) 80 $\frac{(80)}{380} \times 100$ 21 **or** 21.05 **or** 21.1	 ecf from their 80 correct answer = **3** marks with or without working	1 1 1
Total			**9**

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Question 6

Question	Answers	Extra information	Mark
6(a)(i)	3	allow 2.5–3.5	1
6(a)(ii)	chips / potatoes cooked in oil		1
6(b)(i)	baked (in their skin) and served with (butter) substitute		1
6(b)(ii)	any **two** from: • less fat • less / no cholesterol • less salt / sodium than chips	ignore reference to fibre and protein if baked in skin **or** served with butter only allow: • less fat than chips • less salt	2
6(b)(iii)	any **one** from: • (too much salt) high blood pressure / heart attack / stroke / heart disease • (too much fat) obesity / diabetes / heart disease / clog arteries / heart attack / stroke / liver disease / CHD	allow kidney disease / failure allow heart failure allow overweight / heart failure ignore heart problems ignore cancer ignore any other medical conditions ignore any reference to cholesterol	1

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Question 6

Question	Answers	Extra information	Mark
6(c)	any **three** from: • wear protective clothing • wear gloves when handling food • cover cuts • do not sneeze / cough over food • wash hands • wear hat / cover hair / tie hair back / remove jewellery • clean utensils / equipment / surfaces • keep raw and cooked foods separate **or** separate equipment when preparing food • removal of waste from canteen area • control pests • cover food • store (food) in fridge	allow cut nails / no nail varnish allow store in cold places ignore freeze ignore storing food at correct temperature allow do not smoke ignore use by date ignore reference to heating food	3
Total			**9**

Overall mark = 60