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# Level 3 Certificate/Extended Certificate

## APPLIED SCIENCE

### ASC1/B

Unit 1 Key Concepts in Science  
Section A – Biology

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Mark scheme

June 2023

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Version: 1.0 Final



Mark schemes are prepared by the Lead Assessment Writer 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 associates 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 associate understands and applies it in the same correct way. As preparation for standardisation each associate 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, associates encounter unusual answers which have not been raised they are required to refer these to the Lead 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.

Further copies of this mark scheme are available from [aqa.org.uk](http://aqa.org.uk)

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## Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

### Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

### Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

**Question 1**

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>01.1</b>	to synthesise protein		1	AO1

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>01.2</b>	increases surface area to carry out respiration		1	AO1

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>01.3</b>	<b>X</b> phosphate (ion)	do <b>not</b> accept phosphorous	1	AO1
	<b>Y</b> ribose / pentose (sugar)		1	
	<b>Z</b> base	allow adenine / A, cytosine / C, guanine / G <b>and</b> thymine / T	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.4	<p><b>Stage of respiration</b></p> <div> <div>Electron transfer chain</div> <div>Glycolysis</div> <div>Krebs cycle</div> </div> <p>extra line from a box cancels the mark for that box</p>	<p><b>Description</b></p> <div> <div>Energy is released to phosphorylate ADP to ATP</div> <div>Series of oxidation-reduction reactions which generate ATP and carbon dioxide is lost</div> <div>Phosphorylation of ATP</div> <div>Produces glucose which is converted to lipids</div> <div>Produces pyruvate and reduced NAD</div> </div>	3	AO1
<b>Total Question 1</b>			<b>8</b>	

**Question 2**

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>02.1</b>	(154 – 140 =) 14	only allow use of 154 for males allow use of a value in the range 139 to 141 for females	1	AO2
	(14 × 24 =) 336 (kJ m <sup>-2</sup> day <sup>-1</sup> )		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>02.2</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• height</li> <li>• body / muscle mass</li> <li>• proportion of (body) protein / fat</li> <li>• illness / infection</li> <li>• pregnancy</li> <li>• (levels of) thyroxine</li> </ul>	ignore age and sex  allow body size / weight  if neither points given, allow <b>1</b> mark for health  allow climate	2	AO1

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>02.3</b>	person does not move / exercise during the test	allow person is resting throughout	1	AO1
	temperature of the water (going in and out) is recorded		1	
	measure the temperature rise / change of the water	allow measure the temperature rise of the air	1	

<b>Total Question 2</b>		<b>7</b>
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**Question 3**

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>03.1</b>	sends an <u>electrical</u> impulse in a regular rhythm		1	AO1
	(impulse travels) across the atria (to the AVN) <b>or</b> (impulse travels) to the AVN	allow (atria and) ventricles contract at the same time (as each other) do <b>not</b> accept (impulse travels) to the SAN	1	AO1 AO1
	(which then travels) down to the base / apex of the heart	allow travels down the bundle of His / Purkinje fibres	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
<b>03.2</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>fewer surgeries (over a lifetime)</li> <li>reduced (risk of) infection / anaesthesia</li> <li>potentially less interference from electronic devices</li> </ul> <b>or</b> potentially less interference from electromagnetic waves <ul style="list-style-type: none"> <li>reduced / no risk of lead displacement</li> </ul> <b>or</b> reduced risk of battery leakage	ignore lasts longer ignore cost  allow reduced blood clots	2	AO3 AO3

<b>Total Question 3</b>		<b>5</b>
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