

# Mark Scheme (Results)

November 2009

GCSE

360Science

GCSE Additional Science  
Structured Paper B2 (5016H/1H)

GCSE Biology  
Structured Paper B2 (5028H/1H)

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## Using the Mark Scheme

1. This mark scheme gives you;
  - \* an idea of the type of response expected
  - \* how individual marks are to be awarded
  - \* the total mark for each question
  - \* examples of responses that should not receive credit.
2. ; separates points for the award of each mark.
3. / means that the responses are **alternatives** and either answer should receive full credit.
4. ( ) means that a phrase/word is not essential for the award of the mark but helps the examiner to get the sense of the expected answer.
5. Phrases/words in **bold** indicate that the meaning of the phrase/word is **essential** to the answer.
6. OWTTE (or words to that effect) and eq (equivalent) indicate that valid alternative answers (which have not been specified) are acceptable.
7. 'Ignore' means that this answer is not worth a mark but does not negate an additional correct response.
8. 'Reject' means that the answer is wrong and negates any additional correct response for that specific mark.
9. ORA (or reverse argument) indicates that the complete reverse is also valid for the award of marks.
10. ecf (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

## Marking

1. Suggestion/explanation questions should be marked correct even when the suggestion is contained within the explanation.
2. **Do not** award marks for repetition of the stem of the question.
3. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct scientific context.

## Amplification

1. In calculations, full credit must be given for a bold, correct answer. If a numerical answer is incorrect, look at the working and award marks according to the mark scheme.
2. Consequential marking should be used in calculations. This is where a candidate's working is correct but is based upon a previous error. When consequential marks have been awarded write "ecf" next to the ticks.
3. If candidates use the mole in calculations they must be awarded full marks for a correct answer even though the term may not be on the syllabus at their level.
4. If candidates use chemical formulae instead of chemical names, credit can only be given if the formulae are correct.



Question Number	Answer	Additional guidance	Mark
1(a)	<ol style="list-style-type: none"> <li>1. they can become any type of (body) cell or tissue / they are undifferentiated;</li> <li>2. they have no Hayflick limit/description - eg no limit to the number of divisions;</li> </ol>	<p>Accept: unspecialised;</p> <p>Ignore: organs / limbs</p>	(1)

Question Number	Answer	Additional guidance	Mark
1(b)	<p>Any two from:</p> <ol style="list-style-type: none"> <li>1. curing a genetic disease / named genetic disease / cancer;</li> <li>2. growing new organs/limbs ;</li> <li>3. less chance of rejection (if grown from own stem cell) ;</li> <li>4. increase understanding of cell development owtte;</li> </ol>	<p>Accept : Parkinson's disease/ diabetes/ leukaemia</p> <p>Accept: repair e.g. heart tissue /growing organs for transplant Ignore: organ transplant"</p> <p>"More successful transplants" is insufficient Ignore: cloning</p>	(2)

Question Number	Answer	Mark																														
2	<table border="1"> <thead> <tr> <th></th> <th colspan="2">animals</th> <th colspan="2">plants</th> </tr> <tr> <th>process</th> <th>day (light)</th> <th>night (dark)</th> <th>day (light)</th> <th>night (dark)</th> </tr> </thead> <tbody> <tr> <td>use oxygen in cells</td> <td>yes</td> <td>yes</td> <td>yes</td> <td>yes</td> </tr> <tr> <td>produce oxygen in cells</td> <td>no</td> <td>no</td> <td>yes</td> <td>no</td> </tr> <tr> <td>use CO<sub>2</sub> in cells</td> <td>no</td> <td>no</td> <td>yes</td> <td>no</td> </tr> <tr> <td>produce CO<sub>2</sub> in cells</td> <td>yes</td> <td>yes</td> <td>yes</td> <td>yes</td> </tr> </tbody> </table> <p>3 marks for 4 rows correct 2 marks for 3 rows correct 1 marks for 1 or 2 rows correct</p> <p>Accept ticks and crosses, If no's are left blank do not credit</p>		animals		plants		process	day (light)	night (dark)	day (light)	night (dark)	use oxygen in cells	yes	yes	yes	yes	produce oxygen in cells	no	no	yes	no	use CO <sub>2</sub> in cells	no	no	yes	no	produce CO <sub>2</sub> in cells	yes	yes	yes	yes	(3)
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use CO <sub>2</sub> in cells	no	no	yes	no																												
produce CO <sub>2</sub> in cells	yes	yes	yes	yes																												

Question Number	Answer	Mark
3(a)	24 ;	(1)

Question Number	Answer	Additional guidance	Mark
3(b)	the lungs / respiratory system / nervous system not sufficiently developed to sustain life / no surfactant produced ;	Accept: not able to breathe. Accept: organs not developed fully / properly / enough.  Ignore: refs to fetus not being viable /not developed enough  Ignore refs to embryo	(1)

Question Number	Answer	Additional guidance	Mark
3(c)	the belief that the fetus has a <b>right</b> to life / the belief of a <b>named</b> religious group that life begins at conception ;		(1)

Question Number	Answer	Additional guidance	Mark
3(d)	(continuation of pregnancy) will put the life of the mother at severe risk / mother may die / if the child is severely disabled;	Accept: will put the life of the mother at risk	(1)

Question Number	Answer	Additional guidance	Mark
4(a)	Any two from: 1. not enough oxygen (in/to the muscle cells);  2. blood does not move fast enough / heart rate has not increased fast enough / eq ;  3. idea of providing extra energy from anaerobic;	Reject: no oxygen gets to /in the muscles / no aerobic respiration  Ignore: refs to breathing  Accept: blood flow has not increased enough yet  Ignore: refs to oxygen debt	(2)

Question Number	Answer	Additional guidance	Mark
4(b)	glucose ;	Accept: fats / lipids  Ignore: sugar / food /eq	(1)

Question Number	Answer	Additional guidance	Mark
4(c)	causes cramp (in the muscles) / good description e.g. stops muscles from being able to relax (so stays contracted);	Ignore: muscle pain  Accept: stitch	(1)

Question Number	Answer	Additional guidance	Mark
4(d)	(aerobic respiration) supplies more energy / allows exercise for longer;	Ignore: answers related to lactic acid - e.g. doesn't build up oxygen debt	(1)

Question Number	Answer	Mark
5(a)	11 000 - 12 000 hectares; Unit required	(1)

Question Number	Answer	Additional guidance	Mark
5(b)	<ol style="list-style-type: none"> <li>1. the trend 2004 - 2007 is reduction in loss / area of rainforest destroyed ;</li> <li>2. in 2008 the loss has increased again ;</li> </ol>	<p>Care here with comments about less deforestation and less forest!</p> <p>Ignore: just quoting numbers</p>	(2)

Question Number	Answer	Additional guidance	Mark
5(c)	<p>Any two from:</p> <ol style="list-style-type: none"> <li>1. increase in human population ;</li> <li>2. (land needed for) farming / crops / habitation /roads /industrial sites / mines ;</li> <li>3. (trees needed for) timber / paper / wood for building / for fuel /other tree product that would need cutting the tree down, e.g. guar gum ;</li> </ol>	Ignore references to forest fires	(2)

Question Number	Answer	Additional guidance	Mark
5(d)	<p>Increased desertification / decrease in soil quality /soil erosion / increased flooding / loss of medicinal plants / (increased carbon dioxide) may increase or cause global warming / animal habitats lost / loss of animal species / loss of plant species / extinction of species / increase in other plants on forest floor.</p>	<p>Just 'less animals' - insufficient</p> <p>Ignore: refs to oxygen and photosynthesis</p>	(1)

Question Number	Answer	Additional Guidance	Mark
6(a)	<ol style="list-style-type: none"> <li>1. numbers of booming males increase <b>and</b> nesting sites increase ;</li> <li>2. number of nesting sites increases at a lower rate / ORA ;</li> </ol>	<p>Accept: Both have increased</p> <p>Ignore: just quoting numbers</p>	(2)

Question Number	Answer	Additional Guidance	Mark
6(b)(i)	<ol style="list-style-type: none"> <li>1. <math>27 \div 54</math>;</li> <li>2. 50% (award 2 marks if no working shown) ;</li> </ol>	ecf for percentage calculated correctly from wrong data	(2)

Question Number	Answer	Additional guidance	Mark
6(b)(ii)	<p><b>Any one from below</b></p> <ol style="list-style-type: none"> <li>1. the number of reed beds have not increased as rapidly as the number of booming males;</li> <li>2. competition for nesting site (from other species) /eq ;</li> <li>3. not enough females;</li> </ol>	Accept nesting sites for reed beds	(1)

Question Number	Answer	Additional Guidance	Mark
7	<p>Any four from:</p> <ol style="list-style-type: none"> <li>1. parent cell diploid</li> <li>2. chromosomes/DNA replicated;</li> <li>3. chromosomes pulled apart (to poles);</li> <li>4. chromosomes pulled apart again (to poles);</li> <li>5. chromosomes arranged randomly here (causing variation in sperm/ova);</li> <li>6. four cells produced;</li> <li>7. haploid /half number of chromosomes /23 chromosomes in each;</li> <li>8. gametes genetically different</li> <li>9. variation occurs from 2 sets of chromosomes being mixed at fertilisation / random sets of chromosomes in sperm and ovum mixed at fertilisation;</li> <li>10. credit any one of the following scientific terms: prophase / anaphase / metaphase / telophase /crossing over / chiasmata ;</li> </ol>	<p>If points are out of sequences then max 3</p> <p>Accept: duplicated / copied</p> <p>NB: 1 mark for cell splits twice instead of marking points 3 and 4</p> <p>Accept: (labelled) diagrams if they clearly show a marking point</p> <p>Max 1 mark</p>	(4)

TOTAL MARK 30

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