

# GCSE Science – Investigative Skills Assignment – Marking Guidelines

## Biology 3.1 – Transpiration

For use until May 2009

**Last date for submission for moderation May 2010**

Please mark in red ink, and use one tick for one mark. Each part of each question must show some red ink to indicate that it has been seen.

Subtotals for each part of each question should be written in the right hand margin.

Please add annotations where necessary to explain why marks have or have not been awarded.

Enter the marks for **Section 1** and **Section 2** and the **total mark** on the front cover of the answer booklet.

The teacher must sign and date the front cover of the ISA.

The papers must be kept in a secure place and must **not** be returned to candidates.

The marking guidelines show examples of typical responses that candidates may make. However, teachers should use their professional judgement in deciding whether or not to award marks. If, in the judgement of the teacher, the candidate has provided a response which correctly answers the question, then a mark should be awarded even if this response is not shown in the mark guidance. If necessary, the teacher should annotate the script and/or mark guidance to justify the decision.

In the mark guidance:

- the use of a solidus (/) indicates an alternative answer
- the use of brackets ( ) indicates wording that is not essential in the candidate's answer, but makes the guidance clearer.

### SECTION 1

	Answer	Additional Guidance	
<b>1</b>	Statement referring to <b>change</b> in the dependent variable eg to see if the rate of transpiration changes	Dependent variable must be identified Just 'transpiration' is <b>not</b> sufficient	1 mark
	Independent variable correctly identified and linked to dependent variable eg ...when I changed the temperature		1 mark
<b>2(a)</b>	Response based on variable investigated eg the speed of water uptake / distance moved by bubble in a certain time		1 mark
<b>(b)</b>	Correct instrument stated eg ruler / balance / allow 'scales' / potometer		1 mark

	<b>Answer</b>	<b>Additional Guidance</b>	
<b>3</b>	<p>Answer depends on particular variable investigated</p> <p>eg <b>continuous</b> for investigations concerning temperature / wind speed / humidity / surface area of leaves</p> <p>eg <b>categoric</b> for investigations concerning type of leaves</p>		1 mark
<b>4</b>	<p>Depends on particular investigation carried out</p> <p>eg external light / temperature</p>		1 mark
<b>5</b>	Use finer scale instrument	Allow suitable alternative method to collect results described	1 mark
<b>6(a)</b>	Repeat <b>and</b> calculate new mean / use alternative method to collect results / compare results with those of others		1 mark
<b>(b)</b>	<p>Any <b>one</b> from: eg</p> <ul style="list-style-type: none"> <li>• (calculated) mean is closer to true value</li> <li>• allows anomalies to be identified</li> <li>• minimises effect of random errors</li> <li>• if results of others are in agreement, this confirms reliability</li> </ul>	<b>NB</b> Explanation <b>must</b> relate to suggestion in 6 (a)	1 mark
<b>7</b>	<p>Any <b>one</b> from: eg</p> <ul style="list-style-type: none"> <li>• to see if chosen values (of independent variable) give a suitable range of readings</li> <li>• to determine a suitable range of values (for independent variable) at which to investigate</li> </ul>	Do <b>not</b> credit 'to see if it works'	1 mark
<b>8</b>	<p>Amplified statement for <b>2</b> marks</p> <p>eg wind affects water uptake / transpiration for <b>1</b> mark</p> <p><b>plus</b></p> <p>water uptake / transpiration increases with wind for <b>2</b> marks</p> <p><b>or</b></p> <p>there is no relationship between wind and transpiration / water uptake for <b>1</b> mark</p> <p><b>plus</b></p> <p>as there is no trend / results are random for <b>2</b> marks</p>	<p><b>NB</b> statement <b>must</b> relate to candidate's own results</p> <p>Simple correct statement, stating whether or not there is a relationship between the two variables, for <b>1</b> mark only</p>	2 marks

	Answer	Additional Guidance	
9	<b>Table:</b> Correct headings AND units all correct for all measured variables	Table with incomplete headings or units for the measured variables gains <b>1</b> mark eg all headings present = 1 eg all units present = 1	2 marks
	<b>Graph/chart:</b> X axis: suitable scales chosen and labelled with quantity and units	Accept axes reversed	1 mark
	Y axis: suitable scales chosen and labelled with quantity and units		1 mark
	Points or bars plotted correctly to within $\pm 1$ mm	Allow <b>one</b> plotting error out of every 5 points plotted. Allow error carried forward from incorrect plots	1 mark
	Suitable line drawn on graph or bars correctly labelled on bar chart		1 mark
	If wrong type of graph / chart, maximum <b>3</b> marks		
	If the independent variable is: <i>continuous</i> should draw a <i>best fit line graph</i> <i>categoric</i> should draw a <i>bar chart</i> <i>discrete</i> may draw either a <i>best fit line graph</i> or a <i>bar chart</i> (but allow dot-to-dot joining of points in this case)		
			<b>Max 18 marks</b>

## SECTION 2

	Answer	Additional Guidance	
10(a)(i)	Ring around points at (60,2.5) and (90,7.5)	<b>Both</b> rings needed	1 mark
	<b>or</b> (70,4.5) and (80, 2.7) and (80,7.5) and (100,1.7)	<b>All four</b> needed	
(ii)	Ignore / discard		1 mark
	Repeat / average other values		1 mark
(b)	Suitable smooth best-fit curve drawn	Curve should omit anomalies but does not necessarily need to pass through all other points	1 mark
(c)	10 (%)		1 mark

	<b>Answer</b>	<b>Additional Guidance</b>	
<b>10 (d)</b>	Values (at each concentration / of repeats) added		1 mark
	Divide by number of values		1 mark
<b>11</b>	<p>Correct reason given  <b>No</b> – (because at 50%...)            Any <b>two</b> from: eg</p> <ul style="list-style-type: none"> <li>• significant reduction in water uptake</li> <li>• by 6.8 cm<sup>3</sup> per hour / approx a third of maximum water uptake</li> <li>• should use less than 30/40% concentration</li> </ul>	<p>No mark for <b>Yes</b> or <b>No</b> mark is for the reason</p> <p>Accept <b>Yes</b> with suitable reason for <b>1</b> mark</p> <p>eg water uptake is (still) greater than 50% of highest value</p>	2 marks
<b>12</b>	<p>Scientists at NSTL are likely to have more experience of testing products</p> <p>Shiny Plants manufactures the solution, so it may be biased.</p>		2 marks
<b>13(a)</b>	<p>Any <b>two</b> from: eg</p> <ul style="list-style-type: none"> <li>• more precise</li> <li>• less variation / smaller range</li> <li>• lower values</li> </ul>	Accept reverse argument if rubber plants stated	2 marks
<b>(b)</b>	<p>NSTL has...</p> <p>Any <b>two</b> from eg:</p> <ul style="list-style-type: none"> <li>• tested more (types of) plant</li> <li>• no (apparent) anomalies</li> <li>• (shown that) not all plants affected in same way / fig plants not affected</li> </ul> <p><b>Quality of written communication</b></p> <p>Candidates should use at least <b>one</b> technical term: eg</p> <ul style="list-style-type: none"> <li>• values</li> <li>• anomaly</li> <li>• data</li> <li>• range</li> <li>• precise</li> <li>• valid</li> <li>• reliable</li> <li>• evidence</li> </ul>	<p>Accept other sensible suggestions</p> <p>eg tabular format easier to understand</p> <p>The marker should circle these terms            Annotate below candidate's answer with <i>Q✓</i> for mark given or <i>Q×</i> for mark not given</p>	<p>2 marks</p> <p>1 mark</p>
<b>Max 16 marks</b>			

**ISA Total 34 Marks**