

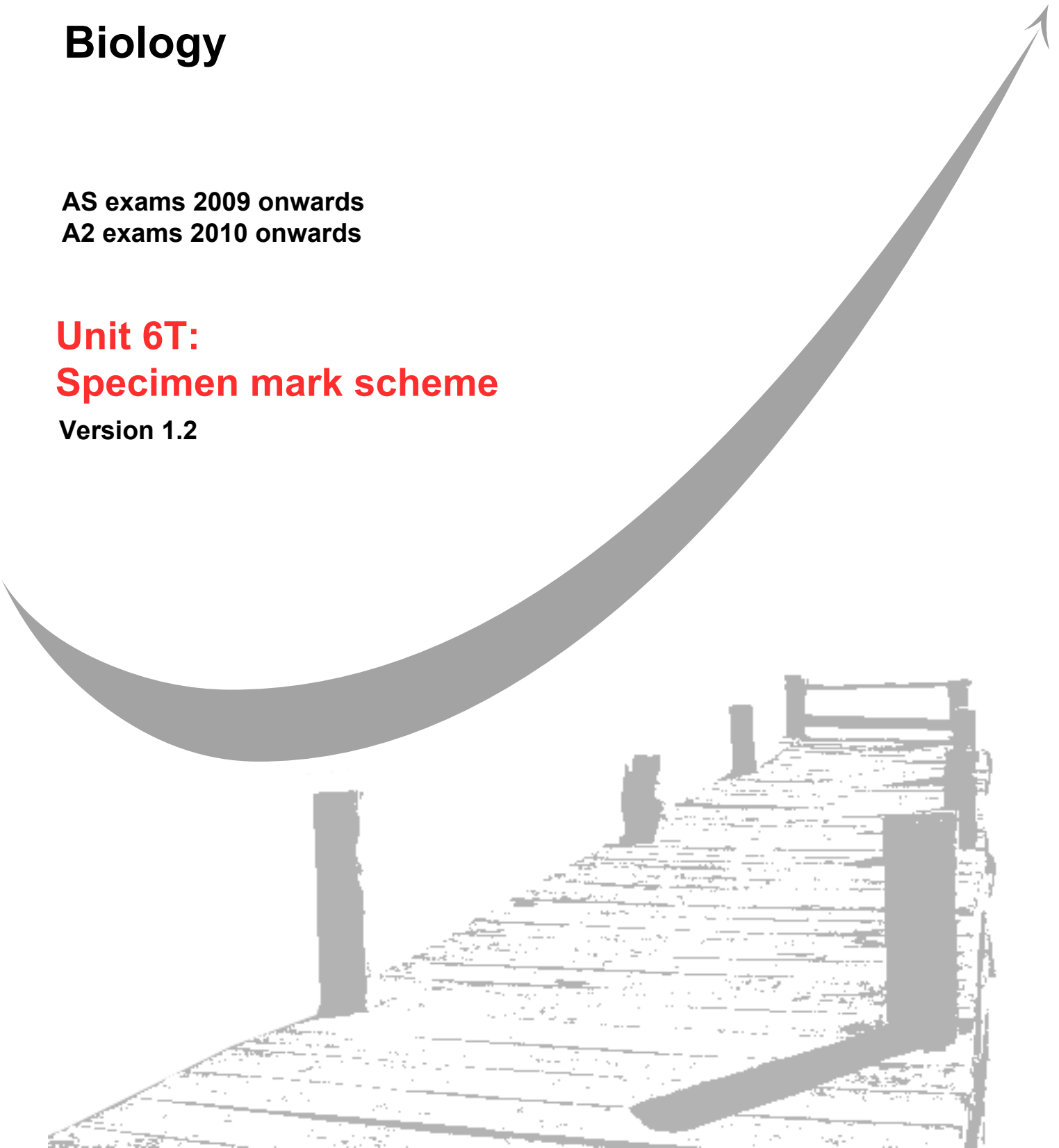
GCE
AS and A Level

Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 6T: **Specimen mark scheme**

Version 1.2





General Certificate of Education

Biology

BIO6T

Investigative Skills Assignment (ISA)

A2 Centre Assessed Unit

Marking Guidelines

Specimen Paper

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. The specimen assessment materials are provided to give centres a reasonable idea of the general shape and character of the planned question papers and mark schemes in advance of the first operational exams.

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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Stage 2**Assessment of statistical analysis of data collected by the candidate.**

Choice of statistical test appropriate to data collected;	1
Justification of test with a clear explanation of why specific test was chosen;	1
Clear statement of null hypothesis;	1
Test statistic calculated correctly;	1
Correct Interpretation of statistical test, in terms of acceptance or rejection of null hypothesis;	1
Interpretation involves appropriate reference to both chance and probability;	1

Total 6

The statistical analysis and the data must be attached to the ISA test.

ISA test

SECTION A

Question 1

Award 2 marks if the method would provide reliable quantitative data;;
Award 1 mark if the method would provide quantitative data but with some concerns about reliability, such as that the method is subjective; 2 max

Question 2

(No mark awarded for number of trees)

Sample large enough to minimise the effect of anomalies / extremely large or small results;
Sample sufficient for statistical test;
Sample not too large that work could not be completed in the time available; 2 max

Question 3

Height from ground;
Diameter of tree
Species of tree;
Exposure to light/wind; 2 max
(not quadrat size or number of quadrats)

Question 4

Any two from

Texture;
Affects ability of species to attach / hold water / other valid answer relating to texture;

Run off of water down bark/water content of bark;
Affects nutrient availability / affects supply of water;

pH;
Affects enzyme activity in photosynthesis/respiration 4 max

Question 5

- (a) Light intensity;
Temperature;
Wind speed; 2 max
- (b) Either affects rate of photosynthesis or desiccation/water content of cells; 1

Question 6

If percentage cover used as a measure of abundance

Measurements are subjective;
Some squares are only partly covered;

If frequency used as a measure of abundance

Only recording presence at a point;
Might not be representative; 2 max

Total 15

SECTION B**Question 7**

- (a) Rate of photosynthesis increases with increasing light intensity, then no further increase in rate with increasing light intensity / remains constant;
Change in rate at (approximately) 22 500 lux; 2
- (b) Slower initial rise and higher plateau; 1

Question 8

1500 lux; 1

Question 9

- (a) Compensation point / greater than 1000 lux / indoor light intensity;
So respiration greater than photosynthesis;
Plant loses mass/fails to grow/dies; 2 max
- (b) From the buyer's point of view 15 weeks;
Because plant is at compensation point / will live in home;
- Form seller's point of view about 10 weeks;
Because minimises energy use / maximum turnover; 4

Question 10

- (a) Mass proportional to volume;
Volume = surface area x thickness;
If same surface area used all differences in mass are due to thickness; 2 max
- (b) Calculation of standard errors as 1.30 and 1.49;
Calculation of 95% confidence limits as 2.55 and 2.92;
No overlap between $22 + 2.55/24.55$ and $28 - 2.92/25.08$;
Therefore differences significant; 4

Question 11

1. Take same number of leaf discs from each sample;
2. Add same volume of ethanol;
3. Grind up for same length of time;
4. Separate cell debris by centrifugation/filtering;
5. Use a colorimeter;
6. With blue/red filter;
7. Zero with (blank of) ethanol;
8. Measure % transmission/absorbance;
9. Repeats with each sample of leaves;

OR

1. Take same number of leaf discs from each sample;
2. Add same volume of ethanol;
3. Grind up for same length of time;
4. Separate cell debris by centrifugation/filtering;
5. Make a dilution series;
6. Using sample of more concentrated chlorophyll;
7. Dilute to make series of 9 dilutions ranging from 10% to 90%;
8. Compare less concentrated chlorophyll solution to find relative concentration of chlorophyll;
9. Repeats with each sample of leaves;

7 max

Total 22