

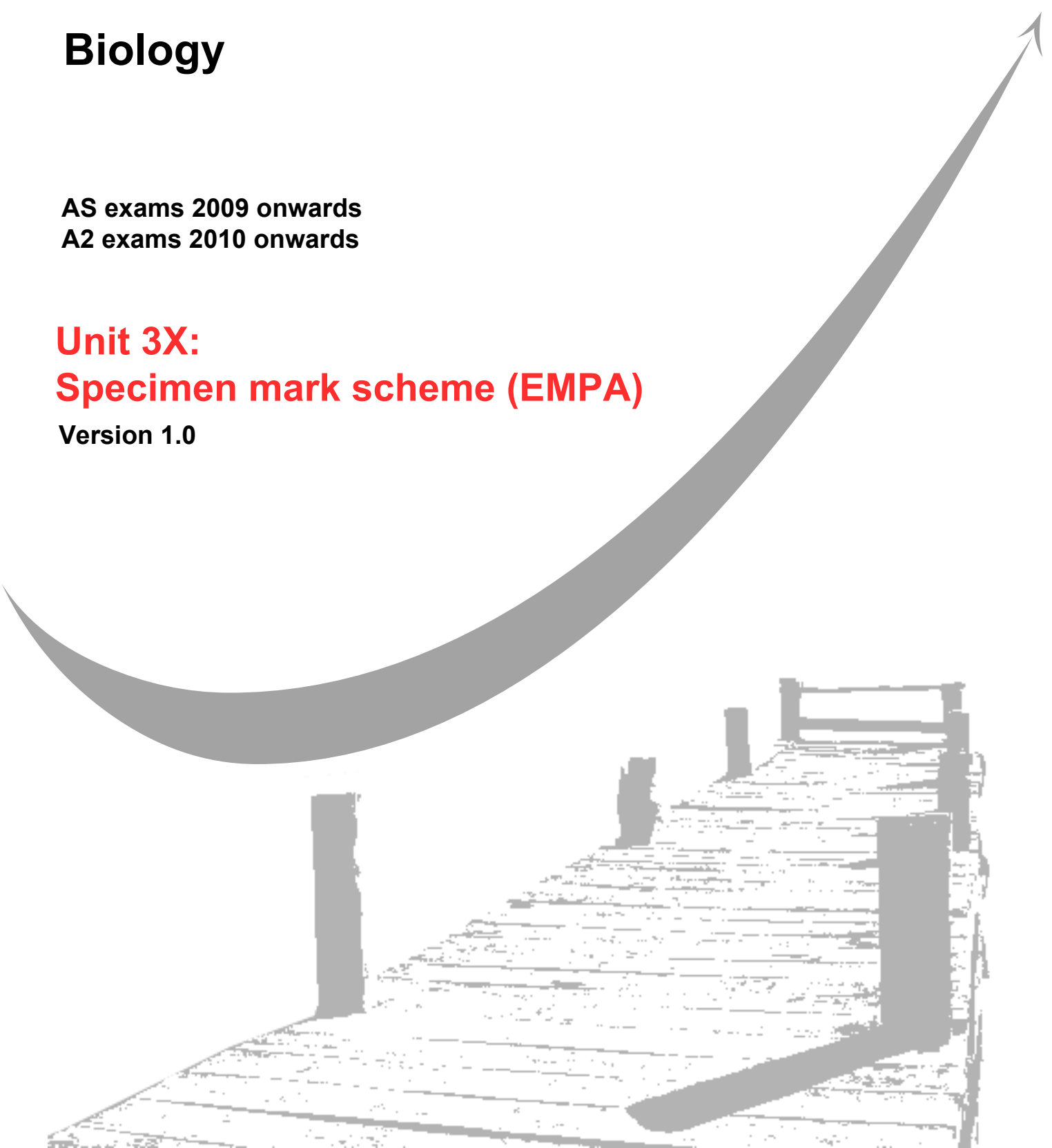
GCE
AS and A Level

Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 3X: **Specimen mark scheme (EMPA)**

Version 1.0





General Certificate of Education

Biology 1411/2411

**BIO3X Externally Marked Practical
Assignment (EMPA)**

Mark Scheme

Specimen Paper

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.

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TASK 1**Question 1**

Accept any two precautions that should have been taken in this investigation

For example

Release the weight from the same point each time;
Use the same apparatus/weight/burette/mixture;
Keep the temperature constant;

2 max

Question 2

Check candidate's calculations from data in table

Mean;
Standard deviation;

2

Question 3

Near to the true value/few errors in making measurements;

1

Question 4

Problem of measuring small values (accurately) / there will be time delays in operating the stop watch/time between dropping weight and starting stop watch;
The error will be a greater proportion of a small value;

2

Question 5

Make sure that maximum volume of mixture in burette/use a lighter weight;

1

Question 6

The greater the standard deviation the less reliable are the results;
Standard deviation is a measure of spread;

2

Total for Task 1 10 marks

TASK 2**Table**

Concentration of enzyme/amylase in first column;
 Time measured in seconds or minutes;
 Units in headings and not in body of table; 3
(Note: These marks can be awarded irrespective of the quality of the data)

Graph

Data presented as a line graph;
 Enzyme concentration on x-axis, rate of fall on y-axis and axes labelled correctly
 with appropriate units;
 Axes labelled correctly with appropriate units;
 Accuracy of plotting;
 Points joined with best-fitting curve or with ruled lines as appropriate; 5

Quality of data

Points distributed randomly with no apparent pattern	0
Points show a general trend. Rate falling with increasing enzyme concentration	1
Trend more or less straight line or smooth curve with one point departing substantially from this overall trend	2
Points all fall more or less on a straight line or smooth curve	3

Total for Task 2 11 marks

The EMPA Test**Question 1**

- (a) To keep the pH constant; 1
- (b) Optimum pH for amylase/pH at which amylase works best; 1

Question 2

- (a) Allows reactants to reach the specified temperature;
Before the reaction starts; 2
- (b) Measure the temperature in the beaker/boiling tube/of the
amylase/rice-flour mixture; 1

Question 3

The greater the concentration of amylase, the greater the number of active sites;
Therefore the greater the number of (successful) collisions/more enzyme-substrate
complexes formed;
More rice-flour/starch broken down producing thinner mixture; 3

Question 4

Curve would be lower/below 40 °C curve;
Rate of reaction slower as less kinetic energy/fewer collisions; 2

Question 5

Heat with Benedict's solution and look for *correct* colour change;
Standardise test/use same amounts of solutions/same time in water bath;
Measure mass of precipitate/colour change; 3

Question 6

Made sure that only the treatment given to the two groups differed;
By making sure that all patients were male/all between age of 6 and 59/been
suffering from diarrhoea for similar amounts of time/had cholera; 2

Question 7

- (a) Prevents bias/make up of two groups being different;
As equal probability that a given person would be in either group;
Conclusions would not be justified; 2 max
- (b) Make sure results were not influenced by scientists; 1

Question 8

Allows comparison;
As amount of faeces produced depends on a person's size/body mass; 2 max

Question 9

Greater length of time affected;
More dehydrated they would be;
Dehydration would affect the amount of ORS required; 2 max

Question 10

(a) Experimental group drunk less ORS solution/less water;
Recovered faster/Did not require intravenous treatment;
Therefore must have absorbed more from the gut; 2 max

(b) Higher solute concentration as alanine added to glucose;
Therefore lower water potential/more negative water potential in gut;
By osmosis; 3 max

Question 11

Repeating the work increases reliability of the results;
Need to determine optimum concentrations/whether other amino acids would be effective/effect on small children/effect on old people/whether effective with other diarrhoeal diseases; 2

Total for EMPA Test 29 marks