**STUDENT GUIDE TO A-LEVEL PRACTICAL ASSESSMENT IN BIOLOGY**

**There are 3 components to the OCR AS Practical exam – code 213- as follows:**

**Q1 (Qualitative test) 10 marks**

**Q2 (Quantitative test) 10 marks**

**E (Evaluative test) 20 marks**

* Q1 and Q2 are the practical components where you are required to demonstrate skills such as observation, recording of data and making valid conclusions.
* The practicals will take place in lessons and will be run like the GCSE ‘ISA’s
* i.e. recording data in suitable table and graph form during the lesson and handing in at the end for marking.
* The Evaluation written section is similar to the ISA at GCSE in that the first part refers to your own practical and asks about your variables, and your ability to make improvements to reliability and accuracy, while the second part is prepared data which you are expected to analyse and process yourself.

**Tables**

The following guidelines should be followed when presenting results in tables.

• All raw data in a single table with **ruled lines and border**.

• **Independent variable (IV) in the first column; dependent variable (DV) in columns to the right**

(for quantitative observations) OR descriptive comments in columns to the right (for

qualitative observations).

• **Processed data** (e.g. means, rates, standard deviations) in columns to the **far right**.

• No calculations in the table, only calculated values.

• Each column headed with informative description (for qualitative data) or physical quantity

and correct **SI units** (for quantitative data); units separated from physical quantity using

either brackets or a solidus (slash).

• **No units in the body of the table**, only in the column headings.

• Raw data recorded to a number of decimal places and significant figures appropriate to the

least accurate piece of equipment used to measure it.

• All raw data recorded to the same number of decimal places and significant figures.

• Processed data recorded to up to one decimal place more than the raw data.

**Graphs**

The following general guidelines should be followed when presenting data in graphs.

• The type of graph used (e.g. bar chart, histogram, line graph, pie chart or scattergram)

should be appropriate to the data collected.

• The graph should be of an **appropriate** **size** to make good use of the paper.

• There should be an **informative** **title, and axes should be fully labelled with units**.

**Bar charts and histograms**

These are used when the dependent variable on the y-axis is **discrete**, i.e. whole numbers,

fractions are impossible and the data under consideration deal with frequencies.

**Bar charts**

Bar charts are used when the independent variable is **non-numerical**, e.g. the number of

different insect species found on trees. These data are discontinuous.

• They can be made up of lines, or blocks of equal width, which do not touch.

• The lines or blocks can be arranged in any order, but it can aid comparison if they are

arranged in descending order of size.

• Each axis should be labelled clearly with an appropriate scale.

**Histograms**

These are used when the independent variable is **numerical** and the data are **continuous**. They

are sometimes referred to as frequency diagrams.

• One axis, usually the x-axis, represents the independent variable and is continuous. It

should be labelled clearly with an appropriate scale.

• The number of classes needs to be established. This will largely depend on the type and

nature of the data. However, five times the log of the number of observations is one

approach.

• The blocks should be drawn touching.

• The edges of the blocks should be labelled, so a block might be labelled ‘7’ at the left and ‘8’at the right; this is expressed as a class range 7 - 8 units but it is implied that 7.0 is included in this range but 8.0 is not. 8.0 will be included in the next class range, 8 - 9.

• The other axis, conventionally the y-axis, represents the number or frequency, and should

be labelled with an appropriate scale.

**Pie charts**

These can be used when displaying data that are proportions or percentages.

• Sector angles are calculated by dividing their percentage by 100 and multiplying the answer by 360° (if figures are proportions then just multiply by 360°).

• When comparing two or more pie charts, the sequence of segments should be the same.

• The size of the pie circle can be made proportional to the size of the sample.

• Pie charts should not contain more than 6 to 7 sectors, otherwise they become confusing.

• There should be segment labels or a key.

**Line graphs**

• Straight lines should join points. A smooth curve is only drawn if there is reason to believe

that intermediate values fall on the curve.

• The independent variable should be plotted on the horizontal axis (x) and the dependent

variable plotted on the vertical axis (y).

• Axis labels should be stated horizontally and in lower case, using SI units or in full.

• Axes should have an arrow end when there is no scale. If the origin (0,0) is not included in a printed graph, the axis should be broken.

• Points should be plotted with encircled dots (**o**) or saltire crosses ( **x** ). When multiple

curves are being plotted, vertical crosses ( **+** ) can be employed.

• If a graph shows more than one curve, then each curve should be labelled to show what it

represents.

**Scattergrams**

These are used when investigating the **relationship between two variables** of a sample or

replicate and observations are in pairs. The data can then be used to establish if there is a

relationship between the variables. The relationship can be a positive correlation, a negative

correlation or no correlation at all.

• The two axes of the graph are marked out with appropriate scales.

• The two variables are plotted for each sample as a point so that each point on the graph

represents an individual.

**Annotations**

• Whilst a label might be the name of a tissue, an annotation adds a descriptive quality such

as shape, size or colour.

**Drawings from a microscope**

• Single, clear lines drawn with a sharp pencil.

• No shading or colour on the diagram.

• Informative title to be included.

• Scale included (e.g. high power, low power, x80, x10) to show approximate magnification.

• Low power “tissue plans” may not include cells.

• High power diagrams show a few adjacent (touching) cells only; adjacent cells must have complete lines.

• Cells or tissues should be in correct proportions.

• Label lines drawn in pencil using a ruler.

**Glossary:**

**Analyse** Separate information into components and identify their characteristics.

**Annotate** To provide notes of explanation.

**Apply** Put into effect in a recognised way.

**Assess** Make an informed judgement.

**Calculate** Generate a numerical answer, with working shown.

**Comment** Present an informed opinion or infer points of interest relevant to the context of

the question.

**Compare** Identify similarities.

**Complete** Write the information required.

**Consider** Review and respond to information provided.

**Contrast** Identify differences.

**Deduce** Draw conclusions from information provided.

**Define** Specify meaning of the word or term.

**Demonstrate** Provide clear evidence.

**Describe** Provide a detailed account (using diagrams/data from figures or tables where

appropriate). The depth of the answer should be judged from the marks allocated

for the question.

**Determine** The quantity cannot be measured directly but can be obtained by calculation. A

value can be obtained by following a specific procedure or substituting values

into a formula.

**Discuss** Give a detailed account that addresses a range of ideas and arguments.

**Distinguish** Recognise and identify difference(s).

**Draw** Produce a diagram or to infer.

**Estimate** Assign an approximate value.

**Evaluate** Judge from available evidence.

**Examine** Investigate closely.

**Explain** Set out reasons or purposes using biological background. The depth of treatment

should be judged from the marks allocated for the question.

**Identify** Recognise or select relevant characteristics.

**Illustrate** Make clear by using examples or provide diagrams.

**Interpret** Translate information provided.

**Justify** Present a reasoned case.

**Label** To indicate (by using a straight line).

**List** Provide a number of points with no elaboration. If you are asked for two points

then give only two!

**Measure** Establish a value using a suitable measuring instrument.

**Name** To provide appropriate word(s) or term(s).

**Outline** Restrict the outline to essential detail only.

**Plot** Mark out points on a graph or illustrate by use of a suitable graph.

**Predict** Suggest possible outcome(s).

**Recall** Repeat knowledge from prior learning.

**Recognise** To identify.

**Record** Report or note.

**Relate** Make interconnections.

**Sketch** Produce a simple, freehand drawing. A single clear sharp line should be used.

In the context of a graph, the general shape of the curve would be sufficient.

**State** Produce a concise answer with no supporting argument.

**Suggest** Apply your biological knowledge and understanding to a situation which you may

not have covered in the specification.

**Summarise** Present main points in outline only.

**Use** Apply the information provided or apply prior learning.

**Additional Clarification:**

**How:** Describe in what way or by what means……

**What:** Provide specific information……

**Why:** Explain the reason or purpose……

**Accuracy:** The accuracy of an observation, reading or measurement is the degree to which

it approaches a notional ‘true’ value or outcome. For example: closeness to a

line of best fit; accuracy of apparatus on percentage error.

**Precision:** The ability to be exact (degree of precision).

**Reliability:** The measure of confidence that can be placed in a set of observations or

measurements. For example: confidence limits of statistical tests or

concordance of repeats or standard deviation.

**Validity:** The implication that the outcome of an activity is not being distorted by

extraneous factors.

***FAQ***

***When are the Tasks happening?***

All practical work for AS must be submitted to OCR by 15 May 2009, so they will be happening throughout the next two terms.

***How many Tasks do I have to complete?***

Just one from **each** of the Qualitative, Quantitative and Evaluative task types at AS (and the same for A2). If you do more than one of a task type, your best mark will be submitted to

OCR.

***Is there a time limit for each Task?***

Quantitative and Qualitative tasks are not time restricted: most have been designed to be

conducted in a single practical session lasting about an hour. However, there may be a number of circumstances in which it is not possible to complete the work in the time available; for example, there may be difficulties with the experiment, a fire alarm or shortage of equipment.

Some practical tasks may require a longer period of time to complete depending upon the

nature of the task. In such cases, your work wil be collected in and issued to you

again at the start of the next lesson. You must **not** take the work away with you or complete it without supervision.

Evaluation tasks should be completed within 1 hour.

*However, students who are eligible for additional time need to speak to Mr Adams so your details can be registered with OCR.*

***Can I take Tasks home to complete?***

**No.** The tasks have to be completed in lesson time under controlled conditions, under the direct supervision of your teacher.

***What can I bring into class to help me do a Task?***

In most cases no additional materials will be permitted. If they are, then the front page of the

task will always indicate this.

***Can I word process my work and use ICT to draw graphs?***

**No.** You must write your answers and plot any graphs in the spaces provided on the task

sheet.

***Can I ask for additional answer sheets?***

**Yes.** Any additional answer sheets used by a student will get stapled securely to their

completed task sheet.

***Can I do research in lesson time and if so can I be given suitable stimulus***

***material by the teacher?***

**No.** All the assessment material required for the task is given on the day.

***What will a teacher do if there is evidence of students producing identical work?***

Your teacher is required to authenticate the work and the marks awarded for each student in the class. Teachers are trained to look out for evidence of copying and collusion during the tasks.

If your teacher is not prepared to authenticate your work, the marks will not be submitted.

***Am I able to copy sections straight from a book or a website?***

This will very rarely be appropriate and only where tasks require the use of reference books or websites. The front page of the task will always specify whether or not extra material, such as reference books, is required.

***What happens if my experiment does not work?***

All tasks will be trialled by your teacher before they are given to you so there will be a ‘model’ set of data which you can use. However, this assumes there has been a genuine mishap ( eg spillage, breakage), rather than incompetence on your part!

***I have attempted a Task but I didn’t do very well. What can I do?***

You will not do well unless they are taught the skills needed and have had a chance to practice them. That is why we do so much practical work in Biology. Ask your teacher for some feedback and then ask if there is another task to do. Make sure you understand what is required for the task type in order to improve.

***Can I draft and redraft Tasks?***

**No.** You must submit your original piece of work. If this is unsatisfactory, for any reason,

you should attempt another, different task.

***Can I repeat a Task?***

**No.** Tasks must be attempted by students only once. If you wish to improve your

performance you may take another task within that task type, e.g. Qualitative tasks. Your

teacher is allowed to give formative feedback on your completed task, but cannot show you the mark scheme.

***Can I resubmit an AS Task on a subsequent occasion eg when I am in Y13?***

**Yes.** However, the marks confirmed by the Moderator when the Task was first submitted cannot be ‘carried forward’. Your teacher will be able to remark the Task in light of any comments made by the original Moderator and it will be re-moderated when it is re-submitted. Up to two Tasks per student may be re-submitted (for example you may have performed well in your Qualitative and Quantitative Tasks in June 2009 and re-submit them for Moderation with a new Evaluative Task in June 2010 – chosen from the new Evaluative Tasks available for assessment in the June 2010 session).

***Can a teacher tell me my mark for the Task?***

**Yes.** But your marked task **will not** be given back to you or shown to you. You will also be told that this is a provisional mark, subject to moderation.