Command Words

These are the words in a question that tell you what to do. They are very important and often the difference between misinterpreting the question and full marks!

8 Command Words

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 is a measure of the closeness of agreement between an individual test result and the true value. If a test result is **accurate**, it is in close agreement with the true value. An accepted reference value may be used as the true value, though in practice the true value is usually not known.

Anomaly (outlier) is a value in a set of results that is judged not to be part of the inherent variation.

Confidence is a qualitative judgement expressing the extent to which a conclusion is justified by the quality of the evidence.

Error (of measurement) is the difference between an individual measurement and the true value (or accepted reference value) of the quantity being measured.

Precision is the closeness of agreement between independent measurements obtained under the same conditions. It depends only on the distribution of random errors (*i.e.* the spread of measurements) and does not relate to the true value.

Repeatability is the precision obtained when measurement results are produced over a short timescale by one person (or the same group) using the same equipment in the same place.

Reproducibility is the precision obtained when measurement results are produced over a wider timescale by different people using equivalent equipment in different (but equivalent) places.

Resolution is the smallest change in the quantity being measured that can be detected by an instrument.

Uncertainty is an estimate attached to a measurement which characterises the range of values within which the true value is asserted to lie. This is normally expressed as a range of values such as 44.0 ± 0.4.

Validity can apply to an individual measurement or a whole investigation. A measurement is valid if it measures what it is supposed to be measuring. An investigative procedure is valid if it is suitable to answer the question being asked. Validity will be reduced, for example, if no negative control is included in an investigation into the efficacy of a therapeutic drug.

The ASE booklet *The Language of Measurement* (Campbell 2010) provides information on these and other terms along with examples of their use. In particular please note that **reliability** will no longer be used. As the authors of the booklet say:

> *"The word 'reliability' has posed particular difficulties because it has an everyday usage and had been used in school science to describe raw data, data patterns and conclusions, as well as information sources. On the strong advice of the UK metrology institutes, we avoid using the word 'reliability' because of its ambiguity. For data the terms 'repeatable' and 'reproducible' are clear and therefore better. For conclusions from an experiment, evaluative statements can mention 'confidence' in the quality of the evidence."*

Typical/possible examples:

Some command words are used more frequently than others. Some are mainly used in examined units, others mainly appear in the coursework tasks.

Analyse Separate information into components and identify their characteristics.

Annotate To provide notes of explanation.

Old F216 Practice Qualitative Task Instructions

6 Use the **high power** of your microscope to observe the film from the **sun leaf**.

(a) In the box provided on page 4, make a drawing of three adjacent epidermal cells, and three stomata with their associated guard cells.

You may need to adjust the illumination and focus to observe the cells more clearly.

(b) Label and annotate your drawing.

Apply Put into effect in a recognised way.

Assess Make an informed judgement.

Calculate Generate a numerical answer, with working shown. (See the sections on calculations in this skills file for further guidance.)

F211 January 2009 Question 1 a iii)

(iii) Calculate the actual length of structure **C**.

Show your working and give your answer in micrometres (μm).

Answer = ... μm **[2]**

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

F214 June 2010 Question 2 c ii)

(ii) The urine of some high profile athletes has been tested and found to contain abnormally high levels of banned steroids or their metabolites.

The pressure on elite athletes to succeed in their sport leads some of them to resort to the use of these performance-enhancing steroids.

Comment on whether the use of steroids should be permitted in sport.

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You need to think about advantages and disadvantages

2	(c)	(ii)			
			1	fairness / giving unfair advantage / does not give an 'even playing field' ;	
			2	*idea of* health risks / dangerous / unhealthy / fatal / side effects ;	
			3	specified health risk ;	
			4	*idea of* distrust of 'outstanding' performances / does not reflect athlete's natural talent / sport should reflect athlete's natural talent ;	
			5	*idea of* pressure to keep up with rival competitors ;	
			6	*idea that* can train for longer (without tiring) / can respire longer (without tiring) / can recover from injury quicker / can build up muscle mass ;	
			7	AVP ;	
					3 max

Compare Identify similarities (and differences if there are any).

F212 January 2011 Question 3 a i)

Table 3.1 shows the breeding success of a number of bird species between 1970 and 2000. Specialist sub-arctic species are marked with an asterisk *.

Table 3.1

species	number of young raised per year			
	1970	1980	1990	2000
snow bunting *	78	69	36	2
Lapland bunting *	7	3	0	0
ptarmigan *	1280	1134	960	876
red grouse	890	920	933	962
wheatear	209	240	190	231
meadow pipit	23	45	48	82
ring ouzel	23	21	29	26
dotterel *	45	43	39	35

* = specialist sub-arctic species

(a) (i) Using the data in Table 3.1, compare the breeding success of the sub-arctic species and the non sub-arctic species between 1970 and 2000.

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Always QUOTE figures to back up your points

3	(a)	(i)		
		1	(all), sub-arctic / all 4 named sub-arctic, species / birds, show decrease ;	
		2	(all / most), other / non sub-arctic / all 4 named non sub-arctic, species / birds, show, increase / no change ;	
		3	greater change / AW (in breeding success), in sub-arctic than in non sub-arctic species ;	
		4	comparative figs (in 1970 **AND** 2000) ;	
				3

Complete Write the information required.

F211 January 2010 Question 3 a)

3 (a) Complete the passage below.

Membranes have a variety of functions in cells. All membranes are ..... permeable. This means that they allow the passage of certain substances by processes such as active transport or ..... through the membrane. The cell surface membrane, also known as the ..... membrane, surrounds the cytoplasm. The cell surface membrane consists of a bilayer of ..... . To stabilise the structure of the membrane and keep it fluid, molecules of ..... are also found in this bilayer. [5]

F211 June 2010 Question 5 c)

(c) Table 5.1 shows a comparison of xylem vessels and phloem sieve tube elements.

Complete the table. The first row has been done for you.

Table 5.1

feature	xylem vessel	phloem sieve tube element
cells living or dead	dead	living
bordered pits present or absent		
lignin present or absent		
substances transported		

Consider Review and respond to information provided.

Contrast Identify differences.

Deduce Draw conclusions from information provided.

Define Specify meaning of the word or term.

F211 January 2011 Question 4 c i)

(c) (i) Define the term *transpiration*.

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..... [2]

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.

F211 January 2009 Question 5 b ii)

(ii) Describe how the action of the heart is initiated **and** coordinated.

In your answer, you should use appropriate technical terms, spelt correctly.

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F215 January 2011 Question 1 d)

(d) The control of the expression of the *lac* operon genes, which allow uptake and digestion of lactose in the bacterium *Escherichia coli*, is well known.

Fig. 1.2 shows the arrangement of the elements of the *lac* operon.

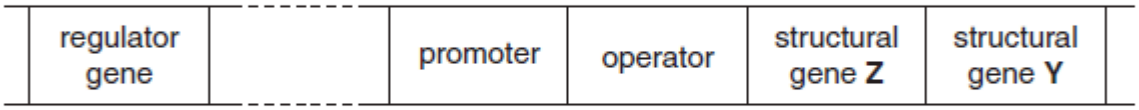

Fig. 1.2

Describe how genes **Z** and **Y** are switched on in bacteria that are moved to a nutrient medium that contains lactose.

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..... **[3]**

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.

F212 Specimen Paper Question 4 d i)

(d) Studies of biodiversity are an integral part of an environmental impact assessment (EIA).

(i) Discuss the role of an EIA as part of a local planning decision.

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(d) (i)	ref to (bio)diversity values and need for conservation; ref to endangered species and need for protection; ref to laws concerning endangered species (that might affect decision); ref to planning stipulation e.g. translocation of species; AVP; e.g. example of type of local planning decision;	**max[3]**

F215 January 2012 Question 4 b)

(b) Discuss the **potential benefits** to mankind and the **ethical concerns** raised by the following examples of genetically modified organisms:

- rice modified for increased vitamin A content ('Golden Rice™')
- humans having somatic gene therapy treatment for a genetic disease.

In your answer you should give a balanced account of the benefits and concerns for each example of genetic modification.

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Distinguish Recognise and identify difference(s).

F215 January 2011 Question 1 c i)

(c) (i) All human babies produce the enzyme lactase. The genetic change that allows adults to produce this enzyme is thought to involve a mutation in a regulatory gene. This mutation causes the structural gene to be expressed in adults.

Distinguish between the terms 'regulatory gene' and 'structural gene'.

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1	(c)	(i)	*regulatory* *idea that* makes , repressor protein / transcription factor or *idea that* product switches (structural / another) gene , on / off ; *structural* *idea that* makes , enzyme / polypeptide / protein ; *relationship between the 2* *idea that* regulatory gene , controls / affects , the expression of structural gene ;

Draw Produce a diagram or to infer.

F211 June 2010 Question 2 d i)

Fig. 2.2 shows the dissociation curves of adult oxyhaemoglobin (curve **A**) and fetal oxyhaemoglobin (curve **F**).

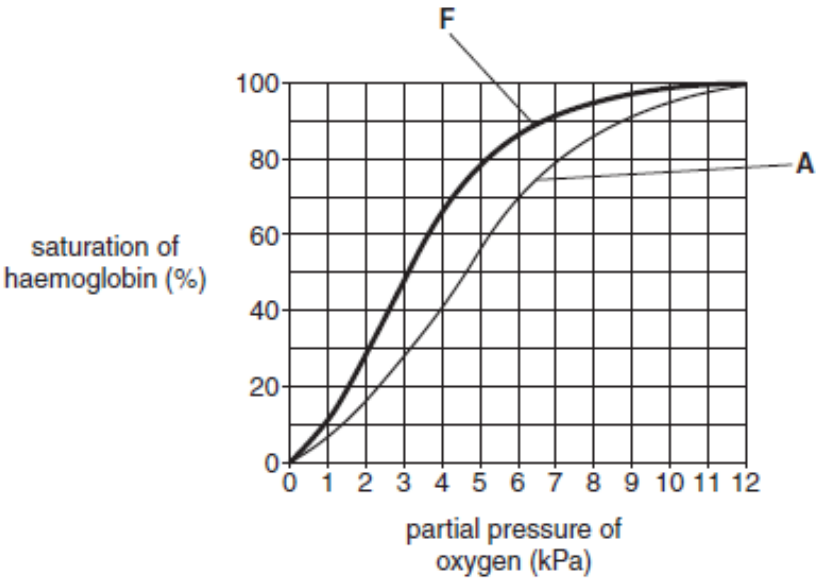

Fig. 2.2

(d) In high partial pressures of carbon dioxide, the oxyhaemoglobin dissociation curve undergoes a change known as the Bohr shift.

(i) **Draw a curve on Fig. 2.2** to show the effect of the Bohr shift. **[2]**

F212 Specimen Paper Question 2 a i)

2 DNA and RNA are nucleic acids.

(a) (i) Describe the structure of a DNA **nucleotide**.

In your answer you should spell the names of the molecules correctly.

You may use the space below to draw a diagram if it will help your description.

Estimate Assign an approximate value.

F216 Practice Quantitative Task Instructions

5 Estimate the percentage cover to the nearest whole number using the subdivided grids within the quadrat. Fig. 2 gives advice on how to estimate the percentage cover.

Evaluate Judge from available evidence.

F215 June 2011 Question 7 b ii)

(ii) Evaluate whether the student was correct to conclude as follows:

"My data showed a positive correlation between increasing altitude and the frequency of the black form of the ladybird. I therefore concluded that high altitude causes the black form to survive better."

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7	(b)	(ii)	*yes (for first statement)* 1 first statement true / correlation exists ; 2 number of black ladybirds increase , from 100m to 300m / until 300m ; 3 400m number decrease **but** % black increases ; *no (for second statement)* 4 correlation not proof of causation / no proof of causal link / second statement not (necessarily) true ; 5 another (named) factor could be involved ;	**3 max**

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.

F211 January 2009 Question 2 b)

(b) Explain, using the term **water potential**, what has happened to cell **M**.

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..... **[3]**

F214 January 2012 Question 5 b i)

(b) (i) Explain how the glomerulus is able to perform its function.

In your answer, you should use appropriate technical terms, spelt correctly.

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5	(b)	(i)	1 **afferent** arteriole , has diameter greater than that of / is wider than , **efferent arteriole** ; 2 build up of / high , **hydrostatic** / blood , pressure ; 3 **endothelium** / wall , of , capillary / glomerulus , has , (small) pores / **fenestrations** ; 4 (these allow) **ultrafiltration** ;	**2 max**

If this question asked for a description of the glomerulus, you would not have to explain the hydrostatic pressure or allowing ultrafiltration – you have been clearly asked here to EXPLAIN how these features enable efficient functioning.

Identify Recognise or select relevant characteristics.

F211 January 2010 Question 5 c)

Identify the following:

enzyme **X** .....

substance **Y** .....

ion **Z** ..... [3]

F212 June 2011 Question 2 b ii)

(ii) Identify **one** potential problem with using samples of liquidised celery as a source of catalase in this investigation **and** suggest a way to minimise this problem.

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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).

F216 Practice Qualitative Task Instructions

6 Use the **high power** of your microscope to observe the film from the **sun leaf**.

(a) In the box provided on page 4, make a drawing of three adjacent epidermal cells, and three stomata with their associated guard cells.

You may need to adjust the illumination and focus to observe the cells more clearly.

(b) Label and annotate your drawing.

List Provide a number of points with no elaboration. If you are asked for two points then give only two!

F212 January 2012 Question 1 b ii)

(ii) List **three other** examples of where hydrogen bonds are found in biological molecules.

1 .....

2 .....

3 ..... **[3]**

Measure Establish a value using a suitable measuring instrument.

F216 Practice Quantitative Task Instructions

6 Measure the named environmental factor at this sample point. You will have been shown how to do this by your teacher. Record the result in the second column of Table 1.

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

F211 January 2009 Question 1 a i)

(a) (i) Name the structures of the cell labelled **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D ..... [4]

This might be from a labelled diagram or flow chart

F214 January 2010 Question 4 a i) and b)

4 (a) Blood enters the kidneys through the renal arteries and the human kidneys process 1200 cm^3 of blood every minute. This 1200 cm^3 of blood contains 700 cm^3 of plasma. As this blood passes through a glomerulus, 125 cm^3 of fluid passes into the renal tubule.

(i) Name the process by which the fluid passes from the glomerulus into the renal tubule.

..... [1]

(b) Fig. 4.1, **on the insert**, is an electronmicrograph of a transverse section of part of a proximal convoluted tubule.

(i) Name the tissue that lines the proximal convoluted tubule.

..... [1]

(ii) Name the structures indicated by **X**.

..... [1]

Outline Restrict the outline to essential detail only.

F211 January 2009 Question b)

(b) Proteins are produced by the structure labelled **F**. Some of these proteins may be **extracellular** proteins that are released from the cell.

Outline the sequence of events following the production of extracellular proteins that leads to their release from the cell.

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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.

F216 Practice Quantitative Task Instructions

1 Record in Table 1 the environmental factor you are measuring, together with the units used, and the name of the plant species.

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.

F211 January 2009 Question 3 a i)

3 The division of stem cells by mitosis produces cells that are genetically identical.

(a) (i) State what is meant by the term *stem cell*.

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..... [2]

F214 January 2010 Question 4 c iv)

(iv) State the process by which molecules and ions, **other than water**, will move from the blood into the dialysate.

..... [1]

Suggest Apply your biological knowledge and understanding to a situation which you may not have covered in the specification. **This is a very common command word in A Level Biology**.

F211 January 2009m Question 1 a ii)

(ii) Structures **C** and **E** are examples of the same organelle.

Suggest why **E** looks so different to **C**.

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..... [2]

Summarise Present main points in outline only.

Use Apply the information provided or apply prior learning.

F211 January 2011 Question 6 c i)

(c) (i) The water potential of the onion epidermis cells can be assumed to be the same as the water potential of a solution that causes 50% plasmolysis.

Use the information in Table 6.1 to **estimate the water potential** inside these onion epidermis cells.

..... **[1]**

Sometimes more than one command word is used in a question. Marks are usually shared between the command words.

e.g. F211 January 2010 Question 1 c ii)

(ii) The spiral band in the xylem vessel shown in Fig. 1.1 contains a substance called lignin.

State the function of this spiral band of lignin **and** explain why it is important that the xylem vessel becomes lignified in this way.

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..... **[3]**

F211 January 2010 Question 5 b iii)

Describe **and** explain what happens to the blood plasma at point **A** along the capillary in Fig. 5.2.

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