The Importance of exam technique

"I know the work but can't answer the questions!"

I have taught Biology for many years and this is a phrase I hear all the time. Students who have worked hard are bewildered and frustrated – why do I still keep getting D's and E's when I've revised really hard and know everything? Why do I always seem to write the wrong answer? Why do I keep getting B's however hard I try? I need A's for medical school – help!

Gaining top grades in Biology is a complex process, and success depends on **six key factors**, all of which must be in place to get that all important A or A*.

- The ability to write a coherent answer. Good sentence construction and clear use of language. Selecting and using data given in the question.

- A full understanding of all the work
- A detailed memory of all the work
- Keeping calm in the exam and finishing the paper

- The use of subject-specific terminology accurately all the time

- The ability to work out what the question is asking. Identifying and understanding the command words in a question

These skills are something you have to work hard at throughout the course:without understanding the basic concepts, top grades are unlikely. These also show 'revision skills' – an accurate and detailed memory of all the work is essential. The other skills represent what is generally termed 'exam technique'. Lack of skills in this area (even if understanding and memory are excellent) leads to the frustrated comments such as those in the first paragraph. As an examiner for both AS and A2 Biology, I see the effects of poor exam technique every year. The same mistakes and omissions are made over and over again, costing vital marks and dashing hopes of entry to top universities and courses. The sad thing is, most examiners are also experienced teachers, and just know that the candidate understands the work and knows the facts but is simply not able to get their knowledge down accurately on paper. Hence, we cannot give any marks. Even more upsetting (yes, examiners are human!) is to see candidates write brilliant prose, demonstrating impeccable learning and knowledge, only for it to not answer the question which was actually asked. In those situations, we have no option but to give zero marks and move on.

Common exam technique errors

1. Confusion over the words 'describe' and 'explain'

This is one of the most common exam technique errors. Problems include:

- •Describing something inaccurately or with insufficient detail;
- •Omitting units from quantitative descriptions;
- •Explaining something instead of describing it;
- •Describing something instead of explaining it;

•Explanations which are too short and lack detail;

2. Failure to use comparative terminology

Biological systems are complex and adapt to changes. Understanding that these changes must be described using comparative terms such as faster, slower, more, less, fewer,

taller, greater, shorter, brighter, etc is key to writing good answers. A statement such as "the atrioventricular valve opens because pressure in the atrium is high" will not gain credit. The use of a comparative term is crucial: "the atrioventricular valve opens because pressure in the atrium is higher than pressure in the ventricle".

3. Confusion over 'structure', 'properties' and 'function'

Biological structures are exquisitely adapted to carry out their functions. Their structure determines their properties, which in turn allows them to function efficiently. Though closely linked, these three terms have distinct meanings and cannot be used interchangeably. When asked a question such as "Describe the structure of a collagen molecule", candidates will often state that collagen is "insoluble, tough and gives strength to artery walls". This will not gain credit as it is stating properties and function rather than structure.

4. The use of vague and imprecise terminology

Science is full of specialist and technical language which many students find difficult to master. Together with the fear of plagiarism, and the instruction to "put ideas into your own words", it is little wonder that students write imprecise and vague answers. There are many examples of this, but perhaps the use of the word 'amount' is the most common. When asked to state factors which must be kept constant in an investigation, candidates will often write statements such as "the amount of sodium chloride solution". In Chemistry or Biology this is meaningless - they should be using the terms 'concentration' or 'volume'. Other specialist terms to use instead of 'amount' could be 'mass' or 'number'. Helping students develop good exam technique should be an integral part of teaching, it is just as important as imparting factual knowledge and helping students develop understanding. Sadly, many young teachers do not realise this, and concentrate on factual teaching. For students, developing good exam technique requires practice and dedication. It involves reading widely round the subject, not just cramming from one revision guide. Most schools and colleges subscribe to magazines like Biological Sciences Review, Chemistry Review, New Scientist and Nature. They contain excellent examples of precise and accurate scientific writing. Studying mark schemes is essential, paying particular attention to the marking points which were not awarded and working out why not. Did you describe instead of explain? Did you use the word 'amount' instead of 'volume'? Did you fail to use an essential specialist term such as 'active site'? Most of all, be aware that learning the work and having a photographic memory is only part of exam success. You also need to actively learn how to interpret questions and write concise and accurate answers.

The good news is that exam technique is actually not that difficult to master, in fact some of the most common errors (like omitting units) are really simple to put right. Just a few intensive sessions of working on these skills can turn a C grade student into an A grade one.

What are examiners looking for?

Whatever type of question you are answering, it is important to respond in a suitable way. Examiners use instructions to help you to decide the length and depth of your answer. The most common words used are given below, together with a brief description of what each word is asking for.

Define

This requires a formal statement. Some definitions are easy to recall. Define the term transport.

This is the movement of molecules from where they are in lower concentration to where they are in higher concentration. The process requires energy.

Other definitions are more complex. Where you have problems it is helpful to give an example.

Define the term endemic.

This means that a disease is found regularly in a group of people, district or country. Use of an example clarifies the meaning. Indicating that malaria is invariably found everywhere in a country confirms understanding.

Explain

This requires a reason. The amount of detail needed is shown by the number of marks allocated.

Explain the difference between resolution and magnification.

Resolution is the ability to be able to distinguish between two points whereas magnification is the number of times an image is bigger than an object itself.

State

This requires a brief answer without any reason. State one role of blood plasma in a mammal. Transport of hormones to their target organs.

List

This requires a sequence of points with no explanation. List the abiotic factors which can affect the rate of photosynthesis in pond weed. carbon dioxide concentration; amount of light; temperature; pH of water

Describe

This requires a piece of prose which gives key points. Diagrams should be used where possible.

Describe the nervous control of heart rate.

The medulla oblongata (1) of the brain connects to the sino-atrial node in the right atrium, wall (1) via the vagus nerve and the sympathetic nerve (1) the sympathetic nerve speeds up the rate (1) the vagus nerve slows it down. (1)

Discuss

This requires points both for and against, together with a criticism of each point. (*Compare* is a similar command word).

Discuss the advantages and disadvantages of using systemic insecticides in agriculture. Advantages are that the insecticides kill the pests which reduce yield (1) they enter the sap of the plants so insects which consume sap die (1) the insecticide lasts longer than a contact insecticide, 2 weeks is not uncommon (1)

Disadvantages are that insecticide may remain in the product and harm a consumer e.g.

humans (1) it may destroy organisms other than the target (1) no insecticide is 100% effective and develops resistant pests.(1)

Suggest

This means that there is no single correct answer. Often you are given an unfamiliar situation to analyse. The examiners hope for logical deductions from the data given and that, usually, you apply your knowledge of biological concepts and principles. The graph shows that the population of lynx decreased in 1980. Suggest reasons for this. Weather conditions prevented plant growth (1) so the snowshoe hares could not get enough food and their population remained low (1) so the lynx did not have enough hares (prey) to predate upon. (1) The lynx could have had a disease which reduced numbers. (1)

Calculate

This requires that you work out a numerical answer. Remember to give the units and to show your working, marks are usually available for a partially correct answer. If you work everything out in stages write down the sequence. Otherwise of you merely give the answer and if it is wrong, then the working marks are not available to you. Calculate the Rf value of spot X. (X is 25 mm from start and solvent front is 100 mm) Rf = distance moved by spot

distance moved by the solvent front = <u>25 mm</u> 100 mm = 0.25

Outline

This requires that you give only the main points. The marks allocated will guide you on the number of points which you need to make.

e.g. Outline the use of restriction endonuclease in genetic engineering.

If a question does not seem to make sense, you may have mis-read it. Read it again!

Some dos and don'ts

DO's

- Do answer the question. No credit can be given for good Biology that is irrelevant to the question.
- Do use the mark allocation to guide how much you write. Two marks are awarded for two valid points writing more will rarely gain more credit and could mean wasted time or even contradicting earlier valid points.
- Do use diagrams, equations and tables in your responses. Even in 'essay style' questions, these offer an excellent way of communicating biology.
- Do write legibly. An examiner cannot give marks if the answer cannot be read.
- Do write using correct spelling and grammar.
- Structure longer essays carefully. Marks are now awarded for the quality of your language in exams.

DON'Ts

- Don't fill up any blank space on a paper. In structured questions, the number of dotted lines should guide the length of your answer. If you write too much, you waste time and may not finish the exam paper. You also risk contradicting yourself.
- Don't write out the question again. This wastes time. The marks are for the answer!

- Don't contradict yourself. The examiner cannot be expected to choose which answer is intended. You could lose a hard-earned mark.
- Don't spend too much time on a part that you find difficult. You may not have enough time to complete the exam. You can always return to a difficult calculation if you have time at the end of the exam.