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Revision Guidance Pack

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Introduction

We at science exam tuition have supported students to succeed in their exams for years. We have worked closely with students of all abilities and we have amassed a large amount of experience in understanding the best ways for students to revise for their exams.

We have taken the time to create this free revision guidance pack to enable you to make the most of your preparation for your examinations. We hope that you find the following useful and we urge you strongly to take on board the guidance that we offer. Remember you get out of your exams as results what you put in as revision.

Finally, good luck with your revision and we wish you every success in all your exams.

Science exam tutors.

Common mistakes

Students do not do as well in exams because;

1. They have not spent enough time revising
2. Their revision has only been reading over notes
3. Their revision has been writing out revision notes and then not using them to write out over and over again
4. They fail to read the question. You must read the question once through, then a second time highlighting the command and key words watching out for describe, explain, suggest, how, what and why, and finally a third time emphasising in their minds the keywords and command words.
5. They have not spent enough time working through past paper questions
6. They have not updated their revision notes with marking points from mark schemes
7. They believe understanding the content is the same as knowing the content
8. They do not use a specification to ensure they have covered all of the information needed for the exam.
9. They believe they have a problem with exam technique when the majority of the time it is lack of detailed knowledge
10. Students only learn the general points. The marks are awarded for the fine details. You must learn the details.
11. Students believe that the time allocated in exams is for writing purposes only. You must start viewing exams

as puzzles that need time allocated to understanding the question asked before writing your answer.

12. Students do not understand what the words, describe, explain and suggest actually mean. You must correctly interpret how these command words will inform you to target what information and to what depth of the information is required.
13. Students are unwilling to change their revision approach that they have used for previous exams. You must recognise that if old methods have not worked then you must change your approach.

How to revise

Why is it important to revise

The biggest mistake that students make is not to make revision notes. This may be a result of not knowing how to or that they just don't see the point because they take too long and students up to now have done alright in past exams without making any.

If this has been you, then you have been very fortunate. Making a clear, detailed set of revision notes is essential. Reading over and over a textbook or class notes will only help familiarise yourself with the content but will not ensure that you have memorised the information, especially the details which are where the marks are awarded.

Let us use the analogy of the actor/actress learning their lines.

An actor/actress is handed a script for a play, they read over and over the lines until they are fairly confident they know the story and have a good grasp on their character and how they should be played. They are able to discuss the play with the director and fellow actors/actresses. On the first night of the performance all is set, there are no scripts to read from and all the hard work is cumulating on tonight's performance. The cue is given and the actor/actress walks onto the stage.

..... silence.....

The actor/actress is speechless. How can this be they thought, I have read over and over the lines, I was able to talk about the play to the director and my fellow actors/actresses, I even know exactly how to play my character.

What has happened?

The actor/actress has only familiarised themselves with the content of the script, they haven't sat down and actively worked with the lines, saying them out loud, writing them out, spending time to engage with the content. They have made the common mistake.

Understanding is NOT the same as knowing. Your exams expect you to know the details, not simply be able to follow them.

Remember understanding is being able to follow a textbook, your teacher or your notes.

Knowing is the ability to recall this detailed information without any support.

How to make revision notes

Revision notes can take many forms, but they must all be detailed and clear so that you can have confidence that they have all the marking points and they are laid out in a style that supports your learning of them.

Revision notes essentials

1. Diagrams

Revision notes must include coloured diagrams and flow charts to enable you to see exactly where the information applies. Diagrams are a lot easier to bring to mind under exam conditions than blocks of text. They also reduce the amount of words that you will need to remember as diagrams can instantly tell you where the event is happening for example.

2. Colour

Revision notes should be as colourful as possible. Colours enable strong connections to be made quickly which are also longer lasting. Try writing in one colour for certain pieces of information and a different for others (e.g. blue for similarities and red for differences)

3. Mind maps and spider diagrams

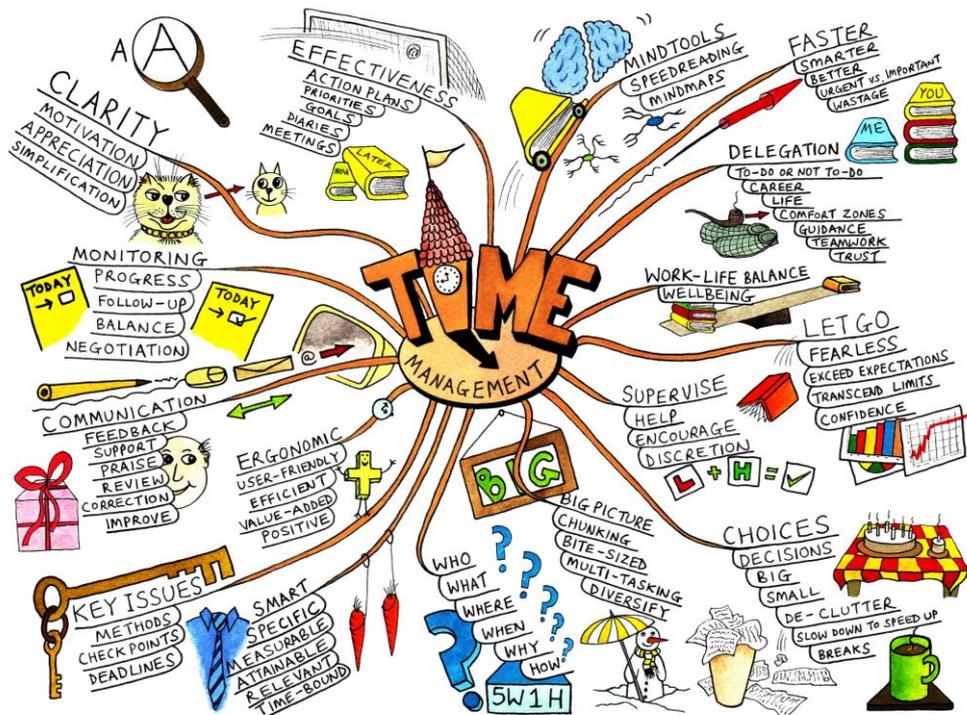
A common problem students have is only being able to recall information when asked directly for it. Students learn information in distinct sections and have trouble making connects between groups of information. Making mind maps allows students to make connects between two or more pieces of information. This supports the application style questions and allows students to see the wider picture.

How to create mind maps

http://www.mindtools.com/pages/article/newISS_01.htm

Mind map software

http://freemind.sourceforge.net/wiki/index.php/Main_Page



4. Keywords

Revision notes should highlight keywords throughout, as in exams often correctly spelt keywords are marking points.

5. Mark Schemes

When students sit past exam questions, they should reflect on the mark schemes afterwards and see if they have all the marking points in their revision notes. If not add the marking points to the relevant section in the revision notes so the facts can be incorporated and learnt.

6. Actively working on the revision notes.

This is probably the most important point. When the revision notes have been made, they should be constantly added to. A clear set of colourful revision notes should be kept, however neat revision notes does not equal exam success. The revision notes need to be memorised and written out over and over again from memory. It is this writing and rewriting of the notes that allows your mind to actively work with the information, ensuring it is memorised.

How much time should you spend revising

There is not a specific amount of time that should be dedicated to revising. For some students revision can take a very long time as they have difficulty memorising the details.

Students should firstly make a set of revision notes and be aware that creation of these is only preparation for revision. Once created students should write the notes out over and over again. Students should not move away from the part of the revision notes that they are memorising until they are completely confident that they know them off by heart (remember the actor/actress and their lines).

Students often say to themselves 'I have spent enough time on this section, that surely should be enough' even though they know that they honestly do not know it well enough. If this is the case then how can they expect to succeed in an exam. The answer is they cannot.

As a rule of thumb students should spend as much time actively writing out revision notes over and over again for the same length of time in a week as they have timetabled lessons for each subject. i.e six hours a week are spent in Biology classes should equate to six hours a week spent at home revising.

However do keep in mind the idea that some parts of the course will take you much longer than that, and do not listen to how little time it took our friends, remember this is your exam and only you know when you have completely memorised the information.

Making a revision timetable

A revision timetable is something that students have mixed feelings about. It may be something that they see as being childish or something that they make and then never stick to.

From our experience a revision timetable is essential in making sure you are thoroughly prepared for your exams.

Reasons to create, and use a revision timetable.

1. It keeps you on track

Creating a revision timetable will allow you to plan out your time and ensure that you cover all the content needed for each exam.

2. It relieves stress and worry

By creating a revision timetable you know that you have enough time allocated for revision of each exam. This prevents you worrying about whether you will be able to revise all of the content effectively for each exam, as you will have planned it from the start.

3. It gives you a sense of priority

Creating a revision timetable will allow you to plan out your time and see just how much or little time you have available to allocate to each exam.

Important points to consider when making a revision timetable.

1. Keep it realistic

Some students create a revision timetable that allocates all of their time out of lessons to revision. This obviously is not realistic and students do not stick to it, lose faith and their revision drifts off. Make sure you allocate enough time for relaxing, socialising and your hobbies so that you can mentally recover from the revision workload.

2. Keep it personal

Students often complain saying that they prefer to revise several hours of a subject rather than an hour of each subject at a time. That is fine, allocate as much or as little time to each revision session per subject as you wish. This is your revision timetable so make sure it is personal to you. Do remember that you will at some point have to allocate enough time to all subjects.

3. Be flexible with it

It isn't always possible to foresee and plan perfectly for many weeks ahead. Life will not follow your timetable as you would hope so be flexible to adapt it to suit the ever changing lifestyle. Do be aware that too much change could result in no revision being completed so any missed hours should be made up again as and when possible without overloading you.

How to answer questions

Interpretation of the Question

It is essential that you are able to interpret the question that is being asked of you in an exam. This is an area that most students have most difficulty with.

When reading a question it is important to ensure you have read every word carefully and not skimmed it.

Techniques to improve issues with interpretation:

1. Read the question three times. Reading the question slowly and pause for a moment or two between each reading. Through the second reading it might be useful to highlight the command words and important phrases and words. On the third reading emphasise these highlighted words more in your mind.

2. Substitute some complex command or important words or phrases in the question to make the question sound more basic and less daunting. Be careful however that you substitute a correct alternative word. E.g. Function could be substituted for job or role.

3. It is likely a lot of information will come to mind so it is important to organise this information before you start writing. Remember if it is hard to think under pressure, it will be even more difficult to think clearly if you are writing as well as trying to organise an answer because you have started writing immediately without clarifying your thoughts.

Some ideas that might help would be to write down a few main points that come to mind on rough paper or on a space beside your answer and eliminate points that are not relevant after rereading the question. You might want to order these

points by writing a number beside each point so that your answer has a logical flow.

These rough points could also include a diagram to help reduce panic and give you something to focus on to develop and structure your answer.

4. It is important to spend time understanding the keywords (at the back of this pack) as part of your revision.

5. It is extremely unlikely that an examiner will ask the same question again that they have used in a past paper, so although using mark schemes as part of your revision is sensible do not learn a mark scheme or set answer as you are more likely to rewrite this than answer the question being asked.

Describe, Explain & Suggest questions

Describe questions

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.

When answering a describe question it pays to imagine you are describing what you are looking at or a process to someone on the other end of the telephone. They are relying on you to give as accurate and detailed an account as you can.

Better answers include;

- A title of what is being described. This is usually the name of the process, i.e ultrafiltration.
- Often a description may require a location, as where the process is occurring.
- Make sure that you differentiate between what you are describing. A classic mistake is to mix up whether you are to describe a function (job, role) or a structure of a organelle, cell etc.
- Data (remember the units) where possible usually from tables or graphs.
- Descriptive words, i.e. directly proportional. Do not use words like it, they, up, down as these are inaccurate and not clear enough for marking points.
- Acknowledge command words 'How' or 'what' in the question stem.
- See alternatives in the command word section.

Explain questions

Set out reasons or purposes using biological background. The depth of treatment should be judged from the marks allocated for the question.

When answering an explain question there is no need to describe the process or event. The examiner will assume you know this information. The biggest mistake students make is to describe the event or process and not explain what, how or why it is happening.

Better answers include;

- A title of what is being explained. This is usually the name of the process, i.e ultrafiltration.
- Data (remember the units) where possible usually from tables or graphs.
- Acknowledge command words 'How' or 'what' in the question stem.
- See alternatives in the command word section.

Suggest

Apply your biological knowledge and understanding to a situation which you may not have covered in the specification.

In these questions, student often panic and write anything often not even related to the subject. Remember an examiner will only be asking you on something that is laid out in your specification.

Think to yourself;

1. Where does this question link to the specification
2. How does this question link to the question stem
3. if neither 1 or 2 help then where does this link most logically to the subject.

Additional Command words

These words are often used in conjunction with describe, explain and suggest.

How: Describe in what way or by what means.....

What: Provide specific information.....

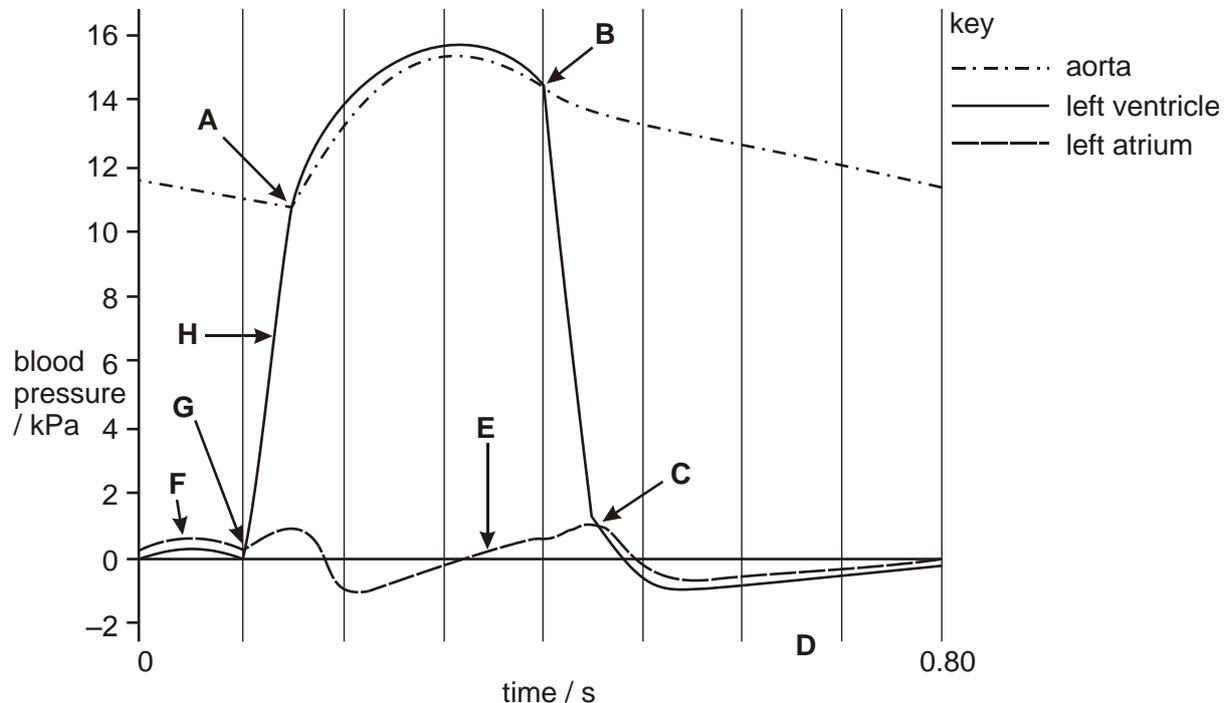
Why: Explain the reason or purpose.....

Finally

You should always read over your answer to check that

1. It answers the question correctly
2. It includes enough correct detailed statements to achieve all the marking points available in the question

How to answer graph questions



When faced with a graph question, you should take comfort that it is likely that most of the marks available will actually be in the graph and so all that is needed is to interpret the information correctly.

Graphs with multiple lines are often daunting, so here are a few guidelines to help.

1. Read the axis's, remembering that the x-axis is the independent variable and so this is what has been chosen by the experimenter or it is what will have an effect on the dependent variable the y-axis.
2. Take each line on the graph and interpret them individually. Each line has its own story and so must be read separately.
3. Be aware of any points where the lines cross either axis or each other as these are probably points of interest or events.
4. When quoting from graphs use data including units from both axis to describe a point.

How to answer table questions

type of neurone	axon diameter (μm)	speed of conduction (m s^{-1})	animal taxon
Myelinated	4	25	Mammal
Myelinated	10	30	Amphibian
Myelinated	14	35	Amphibian
Unmyelinated	15	3	mammal
Unmyelinated	1000	30	mollusc

Again when faced with a table question, you should take comfort that it is likely that most of the marks available will actually be in the table and so all that is needed is to interpret the information correctly.

Graphs with multiple lines are often daunting, so here are a few guidelines to help.

1. Read the column headings, remembering that the first column is the independent variable and so this is what has been chosen by the experimenter or it is what will have an effect on the dependent variable the columns to the right.
2. Take each row on the table and interpret them individually. Each row has its own story and so must be read separately.
3. When quoting from tables use data including to describe a point.
4. Often there are marks for comparative data quotes with units.

What happens if you do not know how to answer a question

It is very off putting if you come across a question in an exam and you have no idea how to answer it. In these situations student often panic and write anything often not even related to the subject.

You must remember an examiner will only be asking you on something that is laid out in your specification.

Think to yourself;

1. Where does this question link to the specification
2. How does this question link to the question stem
3. If neither 1 or 2 help then where does this link most logically to the subject.
4. Is there any information in the stem of the question that can help. Remember each questions subsection i.e. a, b or i, ii will still all relate the the overall question number and so the stem of the question may hold some information that can help.

Command Words

Command words highlighted in red are most common

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.

Alternatives: What.

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.

Alternatives: How, Why.

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 point 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.

Alternatives: How, Why, what.

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).

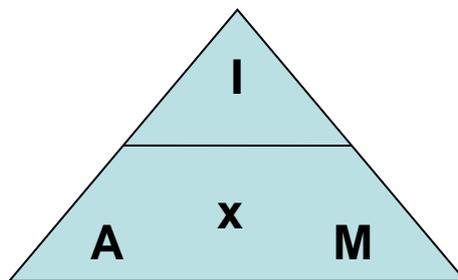
Reliability: The measure of confidence that can be placed in a set of observations or measurements. For example: confidence limits of statistical tests or concordance of repeats or standard deviation.

Validity: The implication that the outcome of an activity is not being distorted by extraneous factors.

Calculations

$$\% \text{ INCREASE or DECREASE} = \frac{\text{Change in amount}}{\text{Original amount}} \times 100$$

$$\text{Magnification} = \frac{\text{Image size}}{\text{Actual Size of object}}$$



I = Image size (must measure using a ruler)

A = actual size of feature

M = magnification used

Most common unit in microscopy is the

Macron or **micrometres** (μm)

1/1,000th of a millimetre.

1/10,000th of a centimetre.

So if you measure the image length in;

- mm you should times your answer by **x1,000**
- cm you should times your answer by **x10,000**