

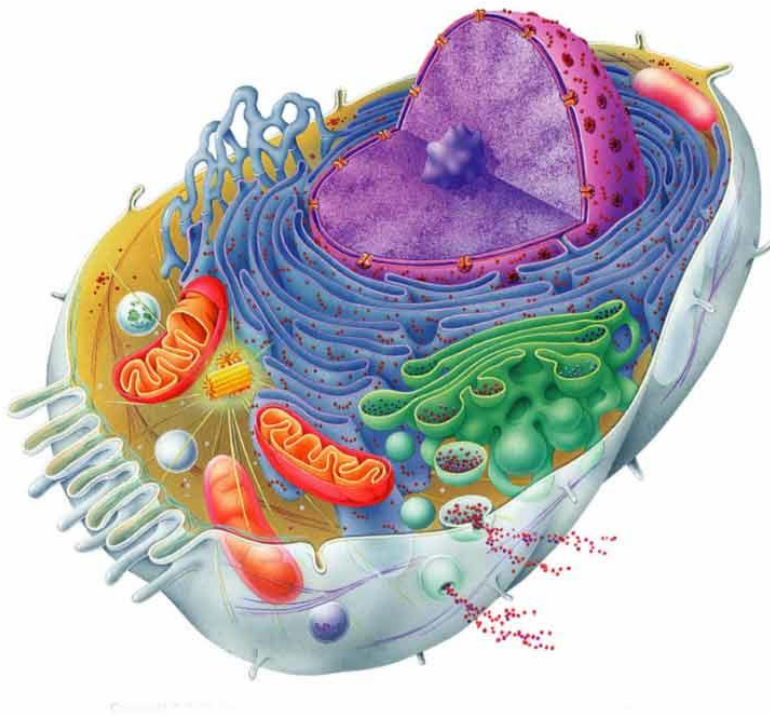


Woodkirk Academy
&
The Sixth Form @ Woodkirk Academy

Woodkirk Academy

Course Handbook

A-LEVEL BIOLOGY



How is the Subject Examined?

- There are three papers for each subject that last 2 hours. Each paper has questions on set topics.
- The style of questions are multiple choice questions, structured questions, open and closed answer questions as specified below.
- There is no coursework. Students complete a number of required practicals and skills to achieve the practical endorsement – this is independent of their A-level grade

The content of each paper is summarised below

Paper 1	+	Paper 2	+	Paper 3
What's assessed <ul style="list-style-type: none"> Any content from topics 1– 4, including relevant practical skills 		What's assessed <ul style="list-style-type: none"> Any content from topics 5–8, including relevant practical skills 		What's assessed <ul style="list-style-type: none"> Any content from topics 1–8, including relevant practical skills
Assessed <ul style="list-style-type: none"> written exam: 2 hours 91 marks 35% of A-level 		Assessed <ul style="list-style-type: none"> written exam: 2 hours 91 marks 35% of A-level 		Assessed <ul style="list-style-type: none"> written exam: 2 hours 78 marks 30% of A-level
Questions <ul style="list-style-type: none"> 76 marks: a mixture of short and long answer questions 15 marks: extended response questions 		Questions <ul style="list-style-type: none"> 76 marks: a mixture of short and long answer questions 15 marks: comprehension question 		Questions <ul style="list-style-type: none"> 38 marks: structured questions, including practical techniques 15 marks: critical analysis of given experimental data 25 marks: one essay from a choice of two titles

For a more detailed breakdown of the subject content use the link to the specification below

<http://filestore.aqa.org.uk/resources/biology/specifications/AQA-7401-7402-SP-2015.PDF>

Year 12 year view

Week	Lead teacher	2nd teacher
1	1.1 Biological molecules	2.3 Cell Structure
2	1.1	2.3
3	1.1	2.3
4	1.1	2.3
5	1.1	2.3
6	1.1	2.3
7	1.1	2.3
Half term		
8	1.1	2.4 Transport across a membrane
9	1.2 Nucleic Acid	2.4
10	1.2	2.4
11	1.2	2.4
12	1.2	2.4
13	3.6 Gas exchange	2.4
14	3.6	2.5 Immune System
Xmas		
Xmas		
15	3.6	2.5
16	3.6	2.5
17	3.6	2.5
18	3.6	2.5
19	3.7 Mass transport	2.5
20	3.7	2.5
Half term		
21	3.7	4.10 Biodiversity
22	3.7	4.10
23	3.7	4.10
24	3.7	4.10
25	3.7	REV - Maths
26	4.8 Genetics	REV - Maths
Easter		
Easter		
27	4.8	REV - Section 1 inc PRAC
28	4.8	REV - Section 1 inc PRAC
29	4.8	REV - Section 2 inc PRAC
30	4.8	REV - Section 2 inc PRAC
31	4.9 Genetic Diversity	REV - Section 3 inc PRAC

32	4.9	REV - Section 3 inc PRAC
Half Term		
33	4.9	Mock & Feedback
34	7.18 Populations and evolution	7.19 Populations in ecosystems
35	7.18	7.19
36	7.18	7.19
37	7.18	7.19
38	7.18	7.19
39	7.18	7.19

Year 13 year view

Week	Lead teacher	2nd teacher
1	5.11 Photosynthesis	7.17 Inheritance
2	5.11	7.17
3	5.12 Respiration	7.17
4	5.12	7.17
5	5.12 & 5.13	7.17
6	5.13 Energy & Nutrient cycles	7.17
7	5.13	7.17
Half term		
8	6.14 Response to stimuli	7.17
9	6.14	7.17
10	6.14	7.17
11	6.14	8.20 Control of Gene expression
12	6.15 Nerves and muscles	8.20
13	6.15	8.20
14	6.15	8.20
Xmas		
Xmas		
15	6.15	8.20
16	Revision for mock - Paper 2	Revision for mock - Paper 1
17	6.15	8.20
18	6.15	8.21 Recombinant DNA technology
19	6.16 Hormones & Homeostasis	8.21
20	6.16	8.21
Half term		
21	6.16	8.21
22	6.16	8.21

23	6.16	8.21
24	Section 3 rev - Inc PRAC	8.21
25	Section 3 rev - Inc PRAC	Section 1 rev - Inc PRAC
26	Maths Rev	Section 1 rev - Inc PRAC
Easter		
Easter		
27	Section 4 rev - Inc PRAC	Section 2 rev - Inc PRAC
28	Section 4 rev - Inc PRAC	Section 2 rev - Inc PRAC
29	Section 5 rev - Inc PRAC	Section 7 rev - Inc PRAC
30	Section 5 rev - Inc PRAC	Section 7 rev - Inc PRAC
31	Section 6 rev - Inc PRAC	Section 8 rev - Inc PRAC
32	Section 6 rev - Inc PRAC	Section 8 rev - Inc PRAC
Half Term		
33	Study leave	Study leave

Revision Top Tips

1.) **Avoid Distractions**

Revise away from the TV and especially your phone as this is a major distraction. Distractions such as checking phones has been proven to reduce the information absorbed. So put that phone away, turn off the T.V and find a quiet place to revise.



2.) **Flash Cards**

Ensure you practice and learn key definitions and formulas. Repetition is key to remembering key facts. Flash cards are available from you teacher, quizlet or even better make your own. Test yourself on them then check the answer – repeat. You could even get someone else at home to test you on these.



3.) **Look, Cover, Write, Check**

Another way to revise key points and core practical's is look at the thing you are revising. Cover it over so you can't see it. Write it out and check whether you have done it correctly. Doing this with mind maps help to revise large chunks of information.



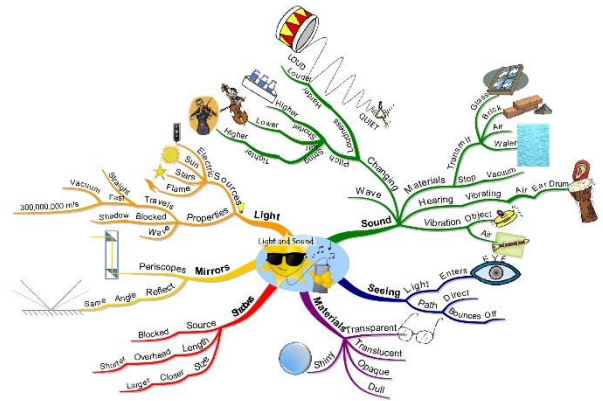
4.) **Be organised**

You have a large amount to revise. This can be daunting but with a bit of organisation plan out your revision. Be realistic about how long you will spend on each topic. Use the specification or tick lists to check you have covered everything. Don't try and cram everything in a short time period remember repetition is key.



5.) Don't just read or write out notes

The ability of the brain to remember visual information is much better than just text. Summarise notes using diagrams or use mind-maps. These are great when combined with the Look, Cover, Write, Check technique



6.) Attend Revision Sessions

Revision is every **Tuesday (yr12)** and **Thursday (y13)** after school. Teachers are there to help and guide you with areas that you are finding difficult.

7.) Practice Exam Questions

Booklets of exam questions are available on pupil share. You don't have to print these off. Just use a scrap piece of paper and complete these then mark your answers using the mark scheme.



8.2 A-level required practical activities

The following practicals must be carried out by all students taking this course. Written papers will assess knowledge and understanding of these, and the skills exemplified within each practical.

Required activity	Apparatus and technique reference
1. Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction	a, b, c, f, l
2. Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index	d, e, f
3. Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue	c, h, j, l
4. Investigation into the effect of a named variable on the permeability of cell-surface membranes	a, b, c, j, l
5. Dissection of animal or plant gas exchange or mass transport system or of organ within such a system	e, h, j
6. Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth	c, i
7. Use of chromatography to investigate the pigments isolated from leaves of different plants, eg leaves from shade-tolerant and shade-intolerant plants or leaves of different colours	b, c, g
8. Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts	a, b, c
9. Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms	a, b, c, i
10. Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze	h
11. Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown 'urine' sample	b, c, f
12. Investigation into the effect of a named environmental factor on the distribution of a given species	a, b, h, k, l

Required practical lab book guidance

Aspect	CPAC	Key points
Planning	1, 2, 3	<ol style="list-style-type: none"> 1. <u>Independent</u> (including range), 2. <u>dependent</u> (and how you will measure precisely) 3. <u>controls</u> (and how and why they are controlled) 4. <u>Prediction</u> (using scientific knowledge to say what outcome you expect and why) 5. <u>Risk assessment</u> – table identifying hazards, evaluating the associated risks and control measures to reduce likelihood.
Research	2 & 5	<ol style="list-style-type: none"> 1. -What is the date accessed and full url of both sources 2. What is your proposed method and why did you choose this based on the research. E.g. choice of equipment, control variables, range of independent variable, how to precisely measure the dependent variable 3. What are the safety considerations of the practical and how can risk be minimised? 4. - Which source do you consider most useful and which method is most likely to give valid results, why?
Results (collecting and manipulating data)	4	<ol style="list-style-type: none"> 1. Suitable table inc. units, results recorded during practical 2. Relevant calculations done e.g. mean, rate, Rf, mitotic index, stats. 3. Graph if applicable.
Conclusion	5	<ol style="list-style-type: none"> 1. Clear description of what the results show, do they match your prediction (use scientific knowledge to explain what you expected) Why? Why not? What statistical test did you use? Why? What is your null hypothesis? Do you accept or reject the null hypothesis? Why? (if model results are needed write what you can conclude from your results and the model results
Evaluation	5	<ol style="list-style-type: none"> 1. Are your results reliable? Do you think they are accurate? What are the main possible causes of error and how can the method be improved 2. Evaluations should include at least 5 key terms from the glossary.

Accuracy

A measurement result is considered accurate if it is judged to be close to the true value.

Errors

See also uncertainties.

measurement error

The difference between a measured value and the true value.

anomalies

These are values in a set of results which are judged not to be part of the variation caused by random uncertainty.

random error

These cause readings to be spread about the true value, due to results varying in an unpredictable way from one measurement to the next.

Random errors are present when any measurement is made, and cannot be corrected. The effect of random errors can be reduced by making more measurements and calculating a new mean.

systematic error

These cause readings to differ from the true value by a consistent amount each time a measurement is made.

Sources of systematic error can include the environment, methods of observation or instruments used.

Systematic errors cannot be dealt with by simple repeats. If a systematic error is suspected, the data collection should be repeated using a different technique or a different set of equipment, and the results compared.

zero error

Any indication that a measuring system gives a false reading when the true value of a measured quantity is zero, eg the needle on an ammeter failing to return to zero when no current flows.

A zero error may result in a systematic uncertainty.

Precision

Precise measurements are ones in which there is very little spread about the mean value.

Precision depends only on the extent of random errors – it gives no indication of how close results are to the true value.

Range

The maximum and minimum values of the independent or dependent variables. For example a range of distances may be quoted as either:

'from 10 cm to 50 cm' or

'from 50 cm to 10 cm'.

Repeatable

A measurement is repeatable if the original experimenter repeats the investigation using same method and equipment and obtains the same results.

Reproducible

A measurement is reproducible if the investigation is repeated by another person, or by using different equipment or techniques, and the same results are obtained.

Resolution

This is the smallest change in the quantity being measured (input) of a measuring instrument that gives a perceptible change in the reading.

Uncertainty

The interval within which the true value can be expected to lie, with a given level of confidence or probability eg "the temperature is $20\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, at a level of confidence of 95%".

Validity

Suitability of the investigative procedure to answer the question being asked. For example, an investigation to find out if the rate of a chemical reaction depended upon the concentration of one of the reactants would not be a valid procedure if the temperature of the reactants was not controlled.

Valid conclusion

A conclusion supported by valid data, obtained from an appropriate experimental design and based on sound reasoning.

Variables

These are physical, chemical or biological quantities or characteristics.

categoric variables

Categoric variables have values that are labels eg names of plants or types of material or reading at week 1, reading at week 2 etc.

continuous variables

Continuous variables can have values (called a quantity) that can be given a magnitude either by counting (as in the case of the number of shrimp) or by measurement (eg light intensity, flow rate etc).

control variables

A control variable is one which may, in addition to the independent variable, affect the outcome of the investigation and therefore has to be kept constant or at least monitored.

dependent variables

The dependent variable is the variable of which the value is measured for each and every change in the independent variable.

independent variables

The independent variable is the variable for which values are changed or selected by the investigator.

Guidance on use of statistics

- You will not be expected to carry out stats calculations (inc. standard deviation)
- You will be expected to choose an appropriate stats test, justify your choice and analyse the results

Choosing an appropriate statistical test and justifying your choice

Chi Squared – Chosen because data is categoric to be able to compare observed frequencies with expected frequency (from a ratio e.g. genetics).

(Spearman's rank) correlation coefficient – Chosen because we are examining the association between two sets of data (finding if there is a statistically significant correlation between two variables).

Student's T-test – Chosen because we are comparing the mean values of two sets of data that are normally distributed.

Formulating a null hypothesis

Chi Squared – there will be no statistically significant difference between the observed and expected values for.....

Correlation coefficient - there will be no statistically significant correlation between.....

Student's T test – there will be no statistically significant difference between the mean values of.....

Accepting or rejecting the null hypothesis based on given table of critical values and statistical test result (you will not be asked to calculate these yourself)

1. Find the critical value for $p=0.05$ with the relevant degrees of freedom
2. If the calculated value given is higher than the critical value (for $p=0.05$) then we reject the null hypothesis. If the calculated value is lower than the critical value we accept the null hypothesis.

Degrees of freedom:

Chi squared – Number of categories - 1

Correlation coefficient – Number of pairs of data

Student's T test – (Number of values used to calculate mean 1 + number of values used to calculate mean 2) - 2

3. Explain your decision:
The calculated value is above the critical value for $p=0.05$ withdegrees of freedom so we reject the null hypothesis as the probability is less than 0.05/5% that the results are due to chance.

Or

The calculated value is below the critical value for $p=0.05$ withdegrees of freedom so we accept the null hypothesis as the probability is greater than 0.05/5% that the results are due to chance.

See the Maths skills section at the back of the A" text book or the maths for Biology revision guide for guidance on other practical & mathematical skills and the key equations to learn

Biological drawing

The purpose of drawing in the teaching of Biology is the development of observational skills. A student must look very closely at a specimen in order to draw it accurately and must have sound knowledge of the component structures in order to choose what to draw and what to omit from the drawing.

Drawings should always be in pencil. Fine detail cannot be represented accurately unless the pencil has a sharp point.

The outlines of any structures should be drawn but there should be no colouring or shading. The relative sizes of the structures drawn should be accurate. Construction lines or frames could be used to solve this problem. If the relative size of any structure has been exaggerated, eg, because an actual cell wall was too thin to be able to draw its outline using two pencil lines, a note should be added to the drawing to explain this.

If required, the drawn structures should be labelled, using label lines that do not cross or obscure the drawing, with brief annotations about their functions or interrelationships.

The drawing should have an explanatory title and an indication of the real size of the structures drawn or of the magnification used.

During an AS or A-level Biology course, students are likely to make three types of drawing.

- **Cell drawing**

The purpose of this drawing is to show accurately the components of individual cells observed using an optical microscope. The drawing should be detailed but should not show more than two or three cells.

- **Tissue map**









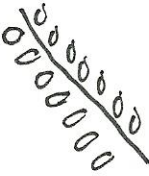



The purpose of a tissue map is to show the location and extent of tissues in an organ or in a whole organism. Cellular detail of any of the tissues should **not** be shown. Instead, the outline of each tissue should be drawn. This often presents a problem, since cell differentiation is seldom discrete. Students must use their background knowledge and understanding to interpret what they see.

- **Body plan**

Following dissection, a morphological drawing should provide a lifelike representation of the main body parts exposed by the dissection.

Common errors in biological drawing

The table shows errors that commonly occur when students begin to practise drawings of biological material. Each would reduce the value of the drawing and result in loss of credit being awarded. Most result from lack of attention or care and are easily solved.

Comment	Incorrect	Correct
Cell outline		
Tissue with too much detail		
Crossing lines		
Hanging lines		
Over casual		
Sketch rather than draw		

AS Holiday Homework – Half term 1

Hour	Task
1	Learn section 1 & 2 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1 & 2 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1 & 2 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

AS Holiday Homework – Christmas

Hour	Task
1	Learn section 1 & 2 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1 & 2 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1 & 2 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red.

AS Holiday Homework – Half term 2

Hour	Task
1	Learn section 1-3 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-3 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-3 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

AS Holiday Homework – Easter

Hour	Task
1	Learn section 1-4 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-4 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-4 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

AS Holiday Homework – Half term 3

Hour	Task
1	Learn section 1-4 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-4 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-4 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

AS Holiday Homework – Summer

Hour	Task
1	Learn section 1-4 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-4 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-4 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

A2 Holiday Homework – Half term 1

Hour	Task
1	Learn sections 1-2 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-2 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 4-6 in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

A2 Holiday Homework – Christmas

Hour	Task
1	Learn section 3-6 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 3-6 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-3 mindmaps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

A2 Holiday Homework – Half term 2

Hour	Task
1	Learn section 1-4 keyword flashcards (you will be tested on these after the holidays)
2	Learn section 1-4 long answer flashcards (you will be tested on these after the holidays)
3	Make sure your notes are up to date
4	Fill in the sections 1-6 mind maps in blue/black without a book then add to it in red using your notes
5	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

A2 Holiday Homework – Easter

Hour	Task
1-2	Learn all keyword flashcards (you will be tested on these after the holidays)
3-4	Learn all long answer flashcards (you will be tested on these after the holidays)
5	Make sure your notes are up to date
6-7	Fill in the sections 1-8 mind maps in blue/black without a book then add to it in red using your notes
8-10	Complete (under exam conditions) at least 1 mini test from pupil share and mark in red

Topic strengths and weaknesses analysis

0 - Achieve 0-2 marks can't answer precisely

1 - Achieve 3-4 marks

2 - Achieve 5-6 marks using key terms precisely

3 - Can apply to most questions

Section 1 – Biological molecules

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Topic	Key idea	0	1	2	3
1	Monosaccharides & Disaccharides				
	Polysaccharide structure and function – Cellulose, glycogen & starch				
	Condensation reactions & hydrolysis				
	Fatty acid & Lipid structure and function				
	Amino acid & Protein structure				
	Enzymes – Lock & Key and Induced fit				
	RP 1 effect of temperature on rate of reaction				
	Enzymes – Factors that affect rate				
	Inhibition				
2	Structure of RNA & DNA				
	DNA Replication				
	ATP Structure and function				
	Water Structure and function				

Section 2 – Cells

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
3	Cell fractionation				
	Comparing microscopes				
	Calculating magnification				
	Eukaryote cells				
	Prokaryotes and viruses				
	RP 6 Aseptic technique & antibiotics				
	Mitosis				
	RP 3 root tip squash				
	Cell Cycle				
4	Plasma membrane structure				
	Simple & Facilitated diffusion				
	Osmosis				
	RP 2 Osmosis in potatoes				
	Active transport				
	Co-transport & absorption of glucose				
	RP 4 Beetroot cell membrane				
5	Specific & Non-specific defences				
	Phagocytosis				
	Cell Mediated Response				
	Humoral response				
	Antibody Structure and function				
	Monoclonal antibodies uses inc. ELISA				
	Vaccinations & Types of immunity				
	HIV structure, replication & AIDS				

Section 3 – Exchange & Mass Transport

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
6	Factors that affect exchange				
	Gas exchange in single celled organisms & insects				
	Gas exchange in fish				
	Gas exchange in plants				
	Xerophytes – limiting water loss				
	Structure of human gas exchange system & mechanism of breathing				
	Gas exchange in lungs				
	Function of parts of the digestive system				
	Carbohydrate digestion and absorption				
	Protein digestion and absorption				
	Lipid digestion and absorption				
7	Haemoglobin structure				
	Oxygen loading and unloading				
	Blood vessel & blood structure and function				
	Structure of the heart				
	Tissue fluid formation and return				
	RP 5 heart dissection				
	Cardiac Cycle				
	Xylem structure & Cohesion tension				
	Phloem structure & Mass Flow				
	Investigating transport in plants inc. ringer & Tracer exp.				

Section 4 – Genetics & Relationships

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
8	Genes and the triplet code				
	Chromosome structure				
	RNA structure and types				
	Transcription & Splicing				
	Translation				
9	Types of mutations				
	Meiosis & genetic variation				
	Natural selection and genetic diversity				
	Types of selection				
10	Species, taxonomy, phylogeny – ways of grouping				
	3 Domains				
	Defining biodiversity, types of diversity and calculating diversity				
	Effect of human activity on diversity				
	Ways of comparing different species to find evolutionary relationships				
	Quantitative investigation of intra specific variation				

Section 5 – Energy Transfer

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
11	Photosynthesis and structure of a leaf and a chloroplast				
	Light dependent reaction				
	Light independent reaction				
	RP 7 Shade tolerance chromatography				
	RP 8 Effect of ammonium hydroxide on DCIP reduction by chloroplast suspension				
12	Glycolysis				
	Link & Krebs Cycle				
	Oxidative phosphorylation and the chemiosmosis theory				
	Anaerobic respiration and alternative substrates				
	RP 9 Investigating the effect on temperature on the rate of methylene blue discoloration by yeast				
13	Food Chains and energy transfer				
	Phosphorus cycle				
	Nitrogen cycle				
	Using fertilisers – farming methods				
	Leaching & Eutrophication				

Section 6 – Responding to change

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
14	Stimulus, response, taxis & Kinesis				
	Tropism and tropism experiments				
	RP 10 Maggot choice chambers				
	Reflex arc				
	Pacinian corpuscle				
	Receptors in the eye				
	Control of cardiac cycle				
	Modifying heart rate				
15	Neurone structure and types				
	Resting potential				
	Action Potential				
	How an action potential is propagated and factors that affect the speed				
	Structure and function of a synapse				
	Transmission in excitatory and inhibitory synapses				
	Structure and function of skeletal muscle				
	Contraction of muscle – sliding filament				
16	Importance and mechanism of homeostasis inc. negative feedback				
	Hormone control of blood sugar				
	Second messenger model				
	Diabetes and its control				
	Structure and function of the kidney				
	Ultrafiltration				
	Selective reabsorption				
	Loop of Henle & counter current multiplier				
	Hormonal regulation of water potential of the blood				
	RP 11 Finding concentration of unknown urine samples				

Section 7 Genetics & Populations

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
17	Inheritance key terms				
	Monohybrid inheritance				
	Dihybrid inheritance				
	Codominance and multiple alleles				
	Sex linkage and pedigrees				
	Autosomal linkage				
	Epistasis				
	Chi Squared				
18	Population genetics – hardy Weinberg				
	Genetic & environmental variation				
	Natural Selection				
	Types of selection				
	Allopatric speciation				
	Sympatric Speciation				
19	Ecology key terms				
	Biotic & Abiotic factors				
	Random sampling				
	Systematic sampling				
	Mark-release recapture				
	Succession				
	Conservation				
	RP 12 Random sampling				

Section 8 Control of Gene Expression

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2	3
20	Types of mutation				
	Stem cells				
	Effect of oestrogen on transcription				
	Epigenetics				
	Effect of RNA interference on gene expression				
	Cancer – types of tumour				
	Cancer – genetic control – proto-oncogenes (mutation to oncogenes) and tumour suppressing genes (abnormal methylation)				
	Genome project				
21	Producing DNA fragments – Reverse transcriptase				
	Producing DNA fragments – Restriction endonuclease				
	The 'gene machine'				
	In vivo cloning				
	In vitro cloning				
	Comparing in vivo and in vitro				
	DNA Probes, hybridisation and screening				
	Personalised medicine & genetic counselling				
	Genetic fingerprinting				

Section 9 – Maths & Investigation Skills

These are the key ideas **not everything you need to know** make sure you use your text book and PLC to learn everything

Term	1.1	1.2	2.1	2.2	3.1	3.2
Average						

Topic	Key idea	0	1	2
22	Units, prefixes and conversions			
	Standard form, sig figs			
	Ratios, fractions and % calculations			
	Averages			
	Learn key equations and rearrange			
	Measuring uncertainty			
	Construct and interpret frequency tables and diagrams, bar charts and histograms			
	Calculating rate – Drawing a tangent			
	Understand that $y = mx + c$ represents a linear relationship			
	Statistical tests – Choosing and explaining results			
	Understand measures of dispersion, including standard deviation and range			
	Use logarithms in relation to quantities that range over several orders of magnitude			
	Calculate the circumferences, surface areas and volumes of regular shapes			
	Key techniques from the required practical's			
	Evaluating and suggest improvements of experimental design			
	Evaluating conclusions			
	Identify variables including those that must be controlled			
	Consider margins of error, accuracy and precision of data			
	Apply scientific knowledge to practical contexts			

Study habits

Skill	Almost never do this (10% of time or less)	Rarely do this (Below 50%)	I usually do this (75%)	I almost always do this (90- 100%)
Listening carefully with full attention, writing down key ideas and asking questions with the aim of making sure I full understand the idea.				
Making summary notes before the lesson including a list of key word definitions and questions to ask the teacher				
Notes are in a different format and/or summarised using the specification or learning outcomes in the book. Revision guide is used actively				
Using a specification or tick list to identify weaknesses.				
Plan week by week what topics to revise.				
Include exam questions after revising every topic.				
Mark exam questions carefully, (making sure key terms have been used precisely) find %.				
Seek help on exam questions you got wrong, adding key ideas to revision notes				
Practice key long answer questions and keywords for each topic using flashcards and a mini whiteboard or scrap paper. And Red, Amber green to narrow down to the ones you need to ask the teacher about and/or spend more time learning				
Complete all work in a quiet place where you can concentrate at home or school				
Use tests to decide which topics are a weakness and which parts of the topic need work.				
Write a list of your weak topics then take them to the teacher for an explanation or write your own explanation and ask teacher to check it for accuracy				
Active revision notes – writing headings from revision book/specification taking at least 20 minutes to write anything I can on each heading before using book to fill in the gaps in red then learning the red bits actively keep repeating regularly for each topic				
At least 3 booklets of exam questions a week under timed conditions with no resources (including mark scheme until I have finished the question/booklet				
How many hours of effective study do you do for biology	2 or less	3	4	5 or more
Check through after completing an exam question with asking for each question: <ul style="list-style-type: none"> Understanding - Have I understood and actually answered this question or just written something about a key word I recognise Complete - Have I completely answered it A Level - Have I used enough A level key terms (at a level that can be more than the number of marks Precise - Have I used the words correctly and precisely 				

Exam technique tips and targets

Application/Suggest Target	Required
1. Develop deeper knowledge of the topics	
2. Work on precision by replacing words with A-level terminology and using it correctly.	
3. Use the number of marks to decide how many precise (A level standard) points (sentences) to write. Aim for more than the number of marks where possible.	
4. Underline with a solid line key words that you know to brainstorm what to talk about.	
5. Underline with a dotted line words that you don't know then find in the question information to find the information you need.	
6. Use PEE (Point, Evidence & Explanation) for most questions to ensure you apply to the question. They are looking for deep knowledge not mark scheme memorising	
7. Practice more application questions at home under exam conditions and seek feedback on how to do difficult questions	
8. Practice planning and writing essays to help you analyse and link up topics	

Maths Skills Target	Required
1. Invest in a Maths for A level Biology guide and use it	
2. Underline with a solid line the values you will need to use	
3. Underline with a dotted line words the units for the values and the answer so you can see what conversion is needed	
4. Check your sig figs – Same precision as the data being used (often 3 sig figs)	
5. Check your working out twice to catch any mistakes	
6. Check your answer is reasonable e.g. a magnification of 1.2 suggest a mistake	
7. Practice more maths skills questions at home under exam conditions and seek feedback on how to do difficult questions	
8. Learn the topic specific formulae at AS & A2 and the general calculations from the back of the book e.g. Stats, % Uncertainty, Rate, % Change, Ratios etc.	
9. Keep a log of the type of maths questions you are getting wrong and work on improving specific ones	

Analyse, Conclude, Evaluate Target	Required
1. Develop deeper knowledge of the topic -	
2. Work on precision by replacing words with A-level terminology and using it correctly.	
3. Use the number of marks to decide how many precise (A level standard) points (sentences) to write. Aim for more than the number of marks where possible.	
4. Underline with a solid line key words that you know to brainstorm what to talk about.	
5. Underline with a dotted line words that you don't know then find in the question information to find the information you need.	
6. Underline conclusions the use checklist to decide on pros and cons – DAD describe any data that supports and any that doesn't, use error bars or SD, Use control for comparison, look for any assumptions , Design (of investigation), discuss sample size, discuss other possible causes of the correlation, look at what was controlled	
7. Practice more analysis and conclusion questions at home under exam conditions and seek feedback on how to do difficult questions	
8. Practice planning and writing essays to help you analyse and link up topics	

Study skills improvement targets

Month	Target 1 – Hours a week	Target 2	Target 3	5 topic numbers to focus on
October				
November				
December				
January				
February				
March				
April				
May				