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A-Level Biology Year 12 Transition Work

Why study A Level Biology?

Biology A-level will give you the skills to make connections and associations with all living things around you. Biology literally means the study of life - and if that's not important, what is? Being such a broad topic, you're bound to find a specific area of interest, plus it opens the door to a fantastic range of interesting careers.
Many people use an A-level in Biology in their future studies or work. Even if you don't decide to work in biology, studying it still develops useful and transferable skills for other careers. You'll develop research, problem solving and analytical skills, alongside teamwork and communication. Universities and business regard all of these very highly.

Possible degree options:

According to bestcourse4me.com, the top seven degree courses taken by students who have A-level Biology are:

- Biology
- Psychology
- Sport and exercise science
- Medicine
- Anatomy
- Physiology and pathology pharmacology
- Toxicology and pharmacy chemistry.

This list is by no means exhaustive. Biology can prove useful for a wide variety of degree courses.

For more details, go to the bestcourse4me.com, or UCAS.

A-Level Biology at a glance

AS and A-level (year 1)

1. Biological molecules.
2. Cells.
3. Organisms exchange substances with their environment.
4. Genetic information, variation and relationships between organisms.

A-level only (year 2)

5. Energy transfers in and between organisms.
6. Organisms respond to changes in their internal and external environments.
7. Genetics, populations, evolution and ecosystems.
8. The control of gene expression.

A-Level Biology Assessments

The assessment for the A-level consists of three exams, all of which are 2 hours in length. Paper 1 and 2 are worth 35% of the A-level each and Paper 3 is worth 30% of the A-level.

Paper 1 can include any content from topics 1–4 and any relevant practical skills.
Paper 2 can include any content from topics 5-8 and any relevant practical skills.
Paper 3 can include any content from topics 1–8 and any relevant practical skills.

You will receive more details of this in your course handbook at the start of the year.

The purpose of the transition work

The purpose of this bridging unit is to ensure that you all have a basic knowledge of the vocabulary needed for A level Biology and continue to work on your independent learning skills, you should be completing about 6 hours of independent work per fortnight. Please ensure that you bring your transition work to your first lesson as it will be marking this and working on any areas of difficulty.

Transition tasks:

Please read through the useful information below and complete the activities

Important Vocabulary for Practical Work:

There are many words used in practical work. You will have come across most of these words in your GCSE studies. It is important you are using the right definition for each word

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Join the boxes to link the word to its definition.

Accurate	A statement suggesting what may happen in the future.
Data	An experiment that gives the same results when a different person carries it out, or a different set of equipment or technique is used.
Precise	A measurement that is close to the true value.
Prediction	An experiment that gives the same results when the same experimenter uses the same method and equipment.
Range	Physical, chemical or biological quantities or characteristics.
Repeatable	A variable that is kept constant during an experiment.
Reproducible	A variable that is measured as the outcome of an experiment.
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 the true value can be expected to lie.
Variable	The spread of data, showing the maximum and minimum values of the data.
Control variable	Measurements where repeated measurements show very little spread.
Dependent variable	Information, in any form, that has been collected.

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Cells

All life on Earth exists as cells. These have basic features in common.

Complete the table.

Structure	Function
Cell-surface membrane	
Chloroplast	
Cell vacuole	
Mitochondria	
Nucleus	
Cell wall	
Chromosomes	
Ribosomes	

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Draw the structure of a plant cell and an animal cell in the space below.
On each cell, add labels showing each of the structures in the table, if they exist.

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Photosynthesis and respiration

Two of the most important reactions that take place in living things are photosynthesis and respiration. They both involve transfer of energy.

Complete the table.

	Photosynthesis	Aerobic respiration
Which organisms carry out this process?		
Where in the organisms does the process take place?		
Energy store at the beginning of the process	Sun	
Energy store at the end of the process		In cells
Reactants needed for the process		
Products of the process		
Overall word equation		
Balanced symbol equation for the overall process		

Which of the answers for aerobic respiration would be different for anaerobic respiration? Add these answers to the table in a different colour.

Analysing data

Biological investigations often result in large amounts of data being collected. It is important to be able to analyse this data carefully in order to pick out trends.

A student investigated an area of moorland where succession was occurring. She used quadrats to measure the area covered by different plant species, bare ground and surface water every 10 metres along a transect. She also recorded the depth of soil at each quadrat. Her results are shown in the table.

	Area covered in each quadrat A to E in cm^2				
	A	B	C	D	E
Bog moss	55	40	10	–	–
Bell heather	–	–	–	15	10
Sundew	10	5	–	–	–
Ling	–	–	–	15	20
Bilberry	–	–	–	15	25
Heath grass	–	–	30	10	5
Soft rush	–	30	20	5	5
Sheep's fescue	–	–	25	35	30
Bare ground	20	15	10	5	5
Surface water	15	10	5	–	–
Soil depth / cm	3.2	4.7	8.2	11.5	14.8

– indicates zero cover.

Calculate:

1. the mode area of soft rush in the sample
2. the mean soil depth
3. the median amount of bare ground in the sample.

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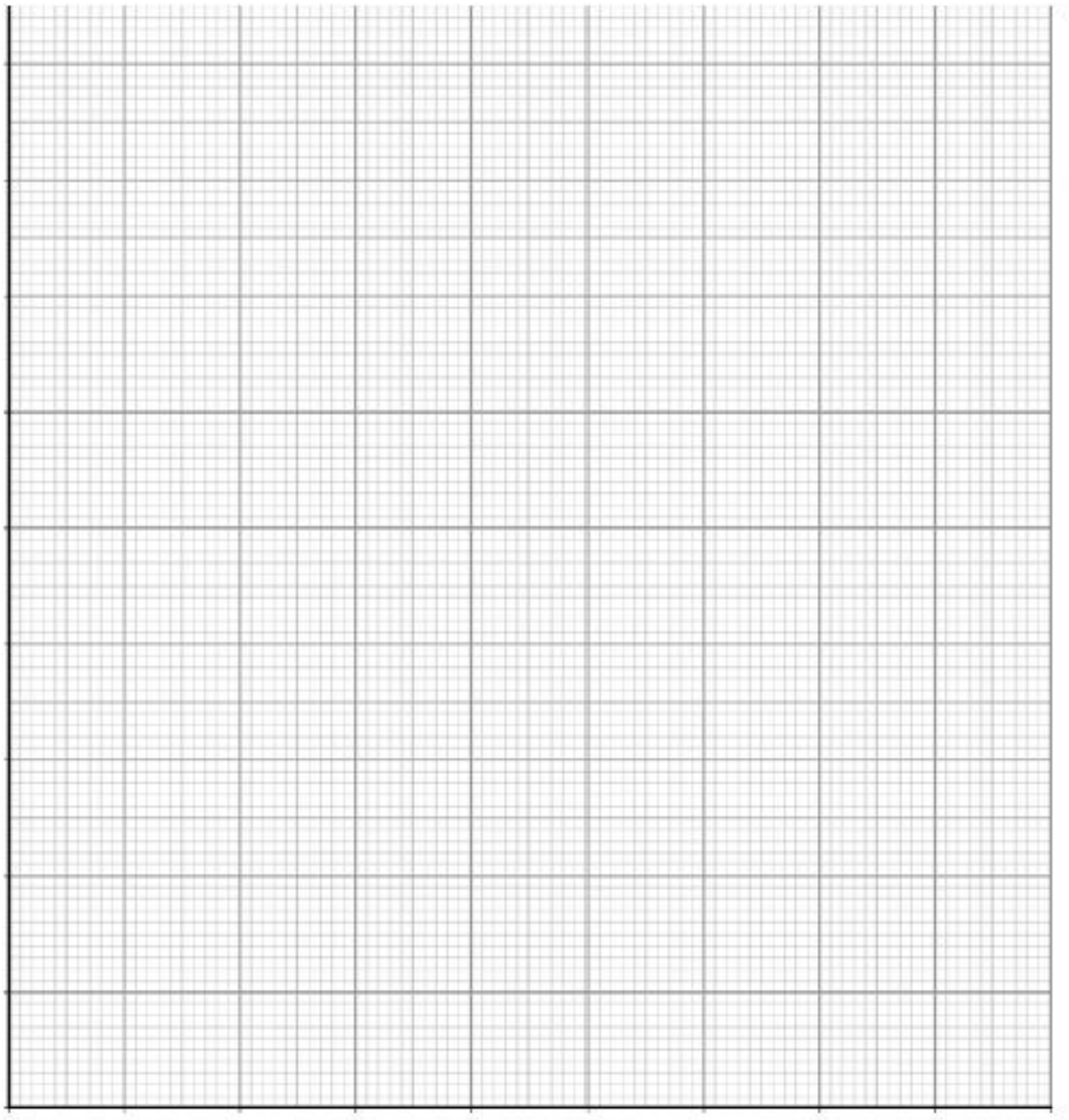
Use the data from the table to plot a scatter graph of soil depth against the area covered by bare ground, soft rush and bog moss (use different colours or markers for each).



4. What conclusions does your graph suggest?

5. How confident are you in these conclusions?

Lung cancer, chronic bronchitis and coronary heart disease (CHD) are associated with smoking. Tables 1 and 2 give the total numbers of deaths from these diseases in the UK in 1974.

Table 1 Men

Age/years	Number of deaths (in thousands)		
	lung cancer	chronic bronchitis	coronary heart disease
35-64	11.5	4.2	31.7
65-74	12.6	8.5	33.3
75+	5.8	8.1	29.1
Total (35-75+)	29.9	20.8	94.1

Table 2 Women

Age/years	Number of deaths (in thousands)		
	lung cancer	chronic bronchitis	coronary heart disease
35–64	3.2	1.3	8.4
65–74	2.6	1.9	18.2
75+	1.8	3.5	42.3
Total (35–75+)	7.6	6.7	68.9

1. Of the men who died aged 35-64 from one of these three causes, what percentage of them died of lung cancer?

2. What percentage of deaths from chronic bronchitis in women happened to women aged 65-74?

3. Deaths from lung cancer drop as people get older. Is there a bigger percentage difference for men or women from 35-64 to 75+?

4. What fraction of coronary heart disease deaths of men over 34 are in the 75+ bracket? What about for women?

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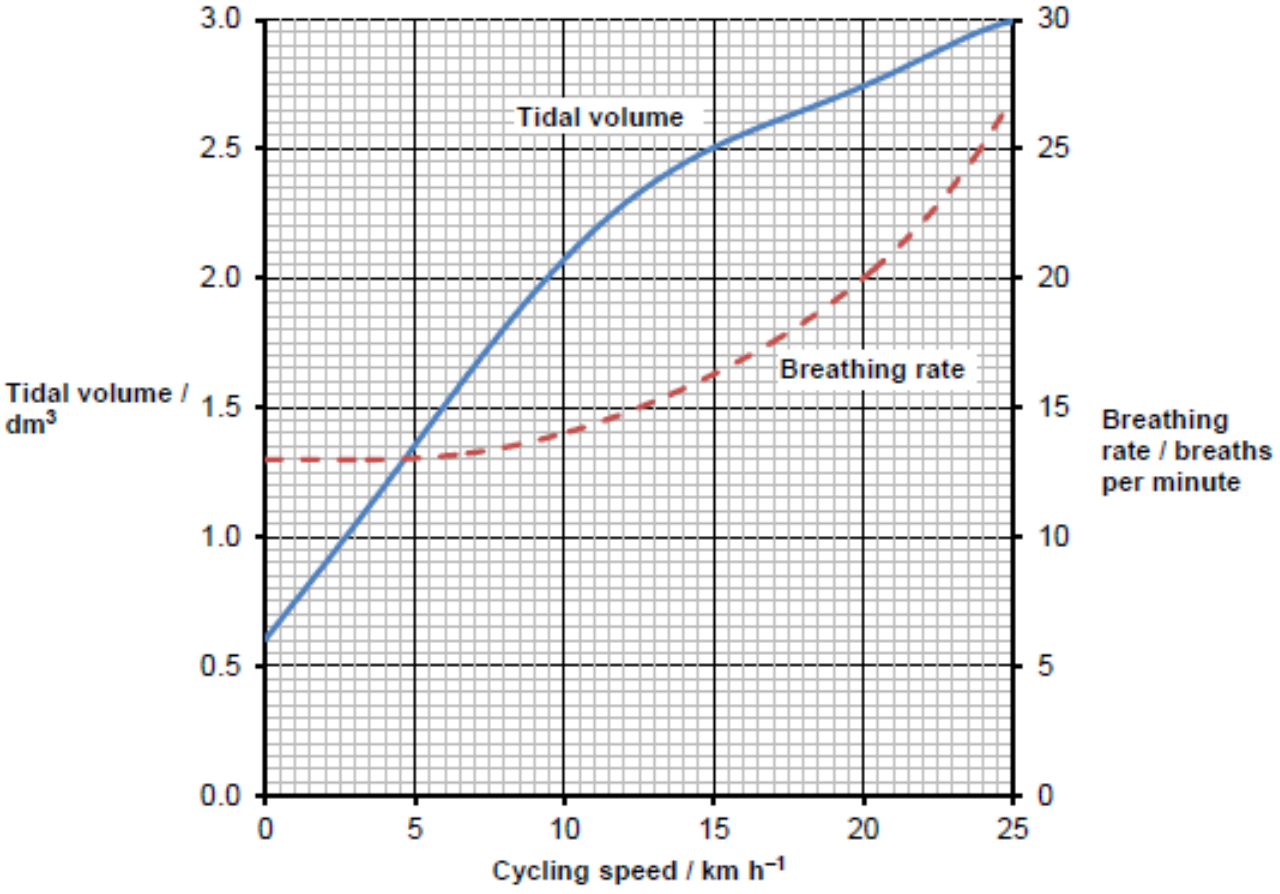
The volume of air breathed in and out of the lungs during each breath is called the tidal volume. The breathing rate and tidal volume were measured for a cyclist pedaling at different speeds. The graph shows the results.



1. What was the tidal volume when the cycling speed was 17 km h^{-1}?
2. What was the breathing rate when the cycling speed was 8 km h^{-1}?
3. What was the change in breathing rate when the cyclist changed from 10 to 20 km h^{-1}? Express this as a percentage.
4. At what speed did the breathing rate start to increase?
5. The tidal volume increased linearly with cycling speed up to about 10 km h^{-1}. Calculate the increase in volume for each increase in speed of 1 km h^{-1}.
6. For this initial linear section, what is the equation of the tidal volume line?

   Hint: use $y=mx+c$

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Extended Writing Task:

In the paper 3 Biology A-level exam you will have to write an essay which is worth 25 marks. The essay title will be broad and to get good marks you will have to refer to several different, relevant sections of the specification. To get top marks you will have to do as above and include information that goes above the specification.

Below are two sample question:

Q1. Write an essay on the importance of diffusion in organisms.

Q2. Write an essay on the functions of enzymes and their importance in organisms.

I would like you to choose one of the above questions and have a go at writing an extended answer based on your knowledge from GCSE.

Continue this task on lined paper if needed and attach it behind this sheet.

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Places to go for help.

1. **AQA website is a great place to start.**

Our AS and A-level Biology webpages are aimed at teachers, but you may find them useful too. Information includes:

- The specification – this explains exactly what you need to learn for your exams.
- Practice exam papers.
- Lists of command words and subject specific vocabulary – so you understand the words to use in exams.
- Practical handbooks explain the practical work you need to know.
- Past papers from the old specification. Some questions won't be relevant to the new AS and A-level so please check with your teacher.
- Maths skills support.
- Web resources page with many links to other resources to support study.

2. **The Royal Society of Biology**

"A single unified voice for biology". They work with everyone from government policy makers to students, as well as universities and researchers studying biology. Their website includes a dedicated student section. Have a look at rsb.org.uk

3. **The student room**

Join the A-level Biology forums and share thoughts and ideas with other students if you're stuck with your homework. Just be very careful not to share any details about your assessments, there are serious consequences if you're caught cheating. Visit thestudentroom.co.uk

4. **Textbooks**

Our approved textbooks are published by Collins, Hodder and Oxford University Press. Textbooks from other publishers will also be suitable, but you'll need to double check that the content and formula symbols they use match our specification.

5. **Revision guides**

These are great if you want a quick overview of the course when you're revising for your exams. Remember to use other tools as well, as these aren't detailed enough on their own.

6. **YouTube**
YouTube has thousands of Biology videos. Just be careful to look at who produced the video and why, because some videos distort the facts. Check the author, date and comments – these help indicate whether the clip is reliable. If in doubt, ask your teacher.

7. **Magazines**
Focus, New Scientist or Philip Allan updates can help you put the biology you're learning in context.

Wider reading:

Books

- A short History of Nearly Everything - Bill Bryson
- On the Origin of Species - Charles Darwin
- The Vaccine Race - Meredith Wadham
- The Animal Kingdom: A Very Short Introduction - Peter Holland
- The Blind Watchmaker - Richard Dawkins (and other titles by this author)
- The Ancestor's Tale - Richard Dawkins & Yan Wong
- How We Live and Why We Die - Lewis Wolpert
- The Wasp that Brainwashed the Caterpillar - Matt Simon
- In the Blood: God, Genes and Destiny - Steve Jones (and other titles by this author)
- The Gene: An Intimate History - Siddhartha Mukherjee
- Endless Forms Most Beautiful - Sean Carroll
- The Epigenetics Revolution - Nessa Carey

Websites

www.thenakedscientist.com
www.bbc.co.uk/science
www.bbc.co.uk/nature
www.mrc.ac.uk
www.nhm.ac.uk
www.royalsociety.org

www.zsl.org/science
www.ted.com
www.rsb.org.uk
www.kew.org
www.bmj.com
www.wellcome.ac.uk
www.ibiblio.org/virtualcell/amazingbiology
www.cellsalive.com
www.centreofthecell.org
www.biology-online.org

Podcasts

- The Life Scientific
- New Scientist Weekly
- TED Health

Magazines/journals

- Biology Science Review
- National Geographic
- New Scientist