

BIOLOGY



Year 11 to Year 12 TRANSITION WORK

Introduction

Biology involves the study of a wide range of exciting topics, ranging from molecular biology to the study of ecosystems and from microorganisms to mammals. A-level Biology will give you the knowledge and skills to understand the connections and associations between all living things. This enhanced appreciation of the mechanisms that underpin life will prepare you for further study in the biological sciences at university.

This transition work aims to prepare you for success in year 12. The jump in difficulty between GCSE and A level can be daunting and these tasks should make that a bit easier for you. It will help develop your numeracy and investigative skills and reinforce some principles of science from GCSE that we will build on in A Level Biology.

Bring all transition work you complete to your first lesson with each teacher

1 - Prepare for learning

For this subject you will need the following to every lesson:

- Pens
- Pencils
- Transparent ruler
- Lined paper
- Scientific calculator
- Ring bound folder
- Plastic wallets for notes and handouts

We will provide a revision guide for you.

2 - Tasks for Learning

Task 1: Preparing for A-Level Biology. Bridging the gap between GCSE and A-Level

Using your old notes, BBC Bitesize (AQA), or the book *Head Start to A Level biology* by CGP, make notes or flashcards on the following topics.

- Eukaryotic and Prokaryotic cells
- How to use a light microscope
- Sub-cellular structures and their function
- The different types of chemical bond
- Proteins
- Carbohydrates
- Lipids
- Enzymes

Task 2: Numeracy Skills

1. How many?

mm in a m

μm in a m

nm in a mm

mm in a μm

μm in a nm

μl in a litre

μl in a m l

μs in a ms

μm in a mm

nm in a μm

nm in a m

m in a μm

mm in a nm

m l in a litre

ms in a s

2. Convert each of the following into metres.

(a) 70 nm

(b) 5 μm

(c) 1 mm

(d) 0.2 mm

3. Convert each of the following into μm .

(a) 4 m

(b) 200 nm

(c) 17 mm

(d) 0.3 nm

4. Areas. How many?

(a) μm^2 in a m^2

(b) μm^2 in a mm^2

5. Volumes. How many?

(a) mm^3 in a cm^3

(b) μm^3 in a mm^3

6. Convert each of these into more sensible units using standard form to express your answers if appropriate.

(a) 0.0003 μm

(b) 0.004 km

(c) 4500000 nm

(d) 0.0007 s

7. Standard Form- <https://www.bbc.co.uk/bitesize/articles/zh4ny4j#z7s7m39>

- (a) Write 2530 in standard form.
- (b) Write 280 in standard form.
- (c) Write 0.77 in standard form.
- (d) Write 0.0091 in standard form.
- (e) Write 1 872 000 in standard form.
- (f) Write 12.2 in standard form.
- (g) Write 2.4×10^2 as a normal number.
- (h) Write 3.505×10^1 as a normal number.
- (i) Write 8.31×10^6 as a normal number.
- (j) Write 6.002×10^2 as a normal number.
- (k) Write 1.5×10^{-4} as a normal number.
- (l) Write 4.3×10^3 as a normal number.

8. In each case convert to the number of significant figures quoted.

- (a) 2342 to 3 sig fig
- (b) 2342 to 2 sig fig
- (c) 456 to 2 sig fig
- (d) 0.07842 to 3 sig fig
- (e) 0.07842 to 2 sig fig
- (f) 0.003004 to 3 sig fig

9. Calculate the following to an appropriate number of significant figures

- (a) $63.2 / 78.1$
- (b) $39 + 78 + 120$
- (c) $(3.4 + 3.7 + 3.2) / 3$
- (d) 0.0256×0.129
- (e) $592.3 / 0.1772$

10. Circumference of circle

Radius =

- (a) $0.50 \mu\text{m}$
- (b) 3.00 mm

11. Area of circle

Radius =

- (a) $0.50 \mu\text{m}$
- (b) 3.00 mm

12. Surface area of cuboid

- (a) $b = 4.00 \text{ cm}$ $l = 6.00 \text{ cm}$ $h = 1.00 \text{ cm}$
(b) $b = 3.00 \text{ mm}$ $l = 4.00 \text{ mm}$ $h = 3.00 \text{ mm}$

13. Volume of cuboid

- (a) $b = 4.00 \text{ cm}$ $l = 6.00 \text{ cm}$ $h = 1.00 \text{ cm}$
(b) $b = 3.00 \text{ mm}$ $l = 4.00 \text{ mm}$ $h = 3.00 \text{ mm}$

14. Surface area of cylinder

- (a) $r = 0.500 \text{ }\mu\text{m}$ $l = 4.00 \text{ }\mu\text{m}$
(b) $r = 3.00 \text{ mm}$ $l = 10.0 \text{ mm}$

15. Volume of cylinder

- (a) $r = 0.500 \text{ }\mu\text{m}$ $l = 4.00 \text{ }\mu\text{m}$
(b) $r = 3.00 \text{ mm}$ $l = 10.0 \text{ mm}$

16. Surface area of sphere

- (a) $r = 0.500 \text{ }\mu\text{m}$
(b) $r = 3.00 \text{ mm}$

17. Volume of sphere

- (a) $r = 0.50 \text{ }\mu\text{m}$
(b) $r = 3.00 \text{ mm}$

18. Calculate the mean, median and mode.

- (a) Students measured the number of carrots eaten by rabbits over 24 hours. Calculate the mean number of carrots eaten.

Carrots eaten per rabbit: 6 5 8 5 9 6 7 7 7 8

- (b) The number of stomata on the upper and lower sides of 5 leaves of a plant were counted.

No. of stomata on lower side of leaf	No. of stomata on upper side of leaf
45	6
48	9
47	11
50	7
48	7

- (c) Plants were grown in both the sun and the shade and height measurements taken.

Height in sun (cm)	244	265	312	199	178	265
Height in shade (cm)	104	83	131	99	118	84

Task 3 - Expand your mind

These tasks are not compulsory, but if you would like to delve a little deeper into your subject here are some suggested readings/watch.

Royal Society of Biology <https://www.rsb.org.uk/education/teaching-resources/secondary-schools>

Science news: <https://www.sciencenewsforstudents.org/>

FILMS and Documentaries

David Attenborough - there are many options available on iPlayer, some suggestions are;

Kingdom - Series

Green Planet - Series

Life in Colour - 2-part special

Planet Earth a celebration – 1 hour special

Our Planet - Netflix

World War Z (2013) A movie focusing on the World's response after a virus starts turning millions into the living dead, it follows UN investigator Gerry Lane as he tries to find a solution for the sudden zombie apocalypse.

The Island (2005) A man living in a futuristic sterile colony begins to question his circumscribed existence when his friend is chosen to go to The Island, the last uncontaminated place on Earth.

Andromeda Strain (1971) Science fiction by the great thriller writer Michael Crichton Humans begin dying when an alien microbe arrives on Earth.

Inherit The Wind (1960) Great if you can find it. Based on a real life trial of a teacher accused of the crime of teaching Darwinian evolution in school in America, a debate that still rumbles on today.

Jurassic Park (1993) An industrialist invites some experts to visit his theme park of cloned dinosaurs. After a power failure, the creatures run loose, putting everyone's lives, including his grandchildren's, in danger.

BOOKS

The Biology Book: Big Ideas Simply Explained by DK. Part of the fascinating Big Ideas series, this book tackles tricky topics and themes in a simple and easy to follow format. The Biology Book brings a fresh and vibrant take on the topic through eye-catching graphics and diagrams to immerse yourself in.

The body: A Guide for occupants by Bill Bryson Explore the human body and how it functions. Full of extraordinary facts and astonishing stories.

The Selfish Gene by Richard Dawkins, a seminal book that explains the links between DNA, genes, proteins and evolution. Worth persevering with.

Junk DNA by Nessa Carey Our DNA is so much more complex than you probably realise, this book will deepen your understanding of all the work you will do on Genetics. Available at amazon.co.uk

The Red Queen: Sex and the Evolution of Human Nature by Matt Ridley It is about sexual selection. This book will help your understanding of evolution and particularly the fascinating role of sex in evolution.

Entangled Life: How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures

by Merlin Sheldrake. The more we learn about fungi, the less makes sense without them. They can change our minds, heal our bodies and even help us avoid environmental disaster.

The Virus by Ben Martynoga and Moose Allain. Explore the science behind viruses and the COVID-19 pandemic in a fascinating story of hijacked human cells and our own internal emergency services. Along the way, you'll learn what viruses are, how they work, and how we can overcome – or at least learn to live alongside – those that do us harm.

TED TALKS

[Growing New Organs](#)

[A new superweapon in the fight against cancer](#)