



# A-Level Biology Summer Transition Activities

## Welcome!

This booklet is designed to help you prepare for A-Level Biology. You'll review key concepts, develop your research skills, and even discover some fascinating biology trivia. Work through each section at your own pace – all you need is internet access, something to write with, and your curiosity!

# Explore the Cell

The cell is a unifying concept in biology.

## 1A Cell Exploration

Explore the interactive 3D cell model provided by [HudsonAlpha iCell](#). This tool allows you to:

- Visualize the structures of animal, plant, and bacterial cells.
- Interact with each organelle to learn about its function.
- Rotate and zoom to examine cellular components in detail.

Or use [Cell Models](#)

Choose a cell type (animal, plant, or bacterial) and explore its components. For each organelle, note:

- Name
- Function
- Location within the cell

**1B Comparison Table:** Create a table comparing the structures of plant and animal cells. Include at least five differences, such as the presence of chloroplasts in plant cells and the shape of the vacuole.

**1C Draw and Label:** In the space below, draw a detailed diagram of a plant cell. Label all visible organelles and provide a brief description of their functions.

**1D** Fill in the table with the function of each organelle:

Organelle	Function
Nucleus	
Mitochondria	
Ribosomes	
Chloroplasts	
Vacuole (plant)	

# SI Units and Measurements

Every measurement should have a size (e.g. 2.7) and a unit (e.g. metres or °C). Sometimes, there are different units available for the same type of measurement. For example, ounces, pounds, kilograms and tonnes are all used as units for mass.

To reduce confusion, and to help with conversion between different units, there is a standard system of units called the SI units which are used for most scientific purposes. These units have all been defined by experiment so that the size of, say, a metre in the UK is the same as a metre in China. The seven SI base units are:

Physical quantity	Usual quantity symbol	Unit	Abbreviation
Mass	m	kilogram	kg
Length	l	metre	m
Time	t	second	s
Electric Current	I	Ampere	A
Temperature	T	Kelvin	K
Amount of substance	N	mole	mol

All other units can be derived from the SI base units. For example, area is measured in square metres (written as m<sup>2</sup>) and speed is measured in metres per second (written as ms<sup>-1</sup>). It is not always appropriate to use a full unit. For example, measuring the width of a hair or the distance from Manchester to London in metres would cause the numbers to be difficult to work with.

Prefixes are used to multiply each of the units. You will be familiar with centi- (meaning 1/100), kilo- (1000) and milli- (1/1000) from centimetres, kilometres and millimetres.

There is a wide range of prefixes. The majority of quantities in scientific contexts will be quoted using the prefixes that are multiples of 1000. For example, a distance of 33,000 m would be quoted as 33 km.

The most common prefixes you will encounter are:

Prefix	Symbol	Multiplication factor		
Giga	G	10 <sup>9</sup>	1 000 000 000	
Mega	M	10 <sup>6</sup>	1 000 000	
kilo	k	10 <sup>3</sup>	1000	
deci	d	10 <sup>-1</sup>	0.1	1/10
centi	c	10 <sup>-2</sup>	0.01	1/100
milli	m	10 <sup>-3</sup>	0.001	1/1000
micro	μ	10 <sup>-6</sup>	0.000 001	1/1 000 000
nano	n	10 <sup>-9</sup>	0.000 000 001	1/1 000 000 000
pico	p	10 <sup>-12</sup>	0.000 000 000 001	1/1 000 000 000 000

## 2A Matching quantities and units

Match each quantity with its SI unit:

Kilogram, cubic metre (m<sup>3</sup>), Kelvin (or °C), Second, Metre

Quantity	SI Unit
Mass	
Volume	
Temperature	
Time	
Length	

## 2B Which SI unit and prefix would be appropriate for the following quantities:

Quantities	SI unit and prefix
The time between heart beats	
The length of a leaf	
The distance that a migratory bird travels each year	
The width of a cheek cell	
The mass of a rabbit	
The mass of iron in the body	
The volume of the trunk of an oak tree	

# Practical Skills and Scientific Terms

Biology is a very practical subject. The skills you will learn will build on the skills from GCSE and will include: microscopy, dissection, setting up equipment, taking measurements and readings, making drawing.

Some examples of the practical work you will be doing are here:

[01. Food Tests | Experiments on Film](#)

[04. Determination of water potential by measuring changes in mass or length | Experiments on Film](#)

[07. Investigation into the effect of temperature or pH on enzyme activity | Experiments on Film](#)

[09. Simple extraction of DNA from living material | Experiments on Film](#)

## 3A Terms used in practical work

Match the following terms with their description

Term	Letter	Description
Accurate		<b>1</b> Measurements where repeated measurements show very little spread
Control variable		<b>2</b> An experiment that gives the same results when a different person carries it out
Data		<b>3</b> Information, in any form, that has been collected
Dependent variable		<b>4</b> A measurement that is close to the true value
Precise		<b>5</b> An experiment that gives the same results when the same experimenter uses the same method and equipment
Range		<b>6</b> Physical, chemical or biological quantities or characteristics
Repeatable		<b>7</b> A variable that is kept constant during an experiment
Reproducible		<b>8</b> A variable that is measured as the outcome of an experiment
Uncertainty		<b>9</b> The spread of data, showing the maximum and minimum values of the data
Variable		<b>10</b> The interval within the true value can be expected to lie

## 3B Scenario: light and photosynthesis

You are testing how light affects the rate of photosynthesis. Write a short plan (5 sentences max) explaining:

- Your independent variable
- Your dependent variable
- 2 control variables
- A method to measure results

# Biology in the Real World

Pick a current topic in biology from this sources:

[Science News Explores | News from all fields of science for readers of any age](#)

## **4A Instructions:**

- Read one recent article of your choice.
- Summarise it in 100 words.
- Why do you think this topic is important? (Write 2-3 sentences)

## **4B Biological Careers Research**

Research 3 careers that use biology. Use: [Prospects - Biology Careers](#). Make a mini fact file for each:

- Job title
- What they do
- Qualification needed
- One fun/interesting fact

# Biology Trivia

## 6A Time to test your biology trivia (or your ability to google/use AI)

World's tallest plant species	
Animal with the biggest brain	
Longest bone in the human body	
Smallest bone in the human body	
Animal with the widest nerve cells	
Longest living animal	
Largest bacterium	
Largest single-celled organism	
Fastest fish	
Scientific name of Aleksandr Orlov	
Animal with largest brain	
Animal with the longest tongue	
Number of pencils you can make from the carbon in the human body	
The mass of ATP made per day by an average person	
Number of cells contained in the human body	
Percentage of cells in the human body that are bacterial cells	
Most abundant enzyme in the world	
Largest (longest) human gene	
Species with the fewest chromosomes	