23rd April 2020

Dear Year 11 students,

I am thrilled to hear that you have expressed an interest in following the Biology A Level course from September at Wood Green School.

In order to best prepare you for starting the A level you will need to complete the following activities in this booklet and be ready to bring this with you to your first lesson of Biology to be handed in.

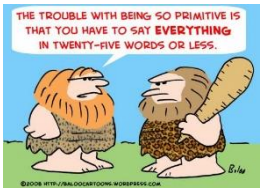
In addition to this, we would also like you to complete an Open University online course, details of which can be found later on in the booklet.

Good luck with your GCSE results and I look forward to seeing you in September.

Yours sincerely,

Miss H Evans

Head of Biology



Biology Bridging the Gap

Biology at A Level has a whole new vocabulary. Your task is to find the biological meaning to the following 50 key words and learn them. These key words are from the first to chapters of the AS topic. You will be expected to show your teacher your completed sheet during the first week of the course and will have a test the second week. If you do not reach the required level you will have another test after school the following week.

Any problems please email h.evans@wgswitney.org.uk

Key Word	Definition
	The number of times greater an image is than the object.
	The ability to distinguish two separate points that as distinct from each other.
	The use of a chemical or computer imaging to provide contrast between different parts of a cell for identification.
	The detailed structure of the internal components of cells as revealed by the electron microscope rather than by the light microscope.
	Nuclear division that results in the formation of two cells that are genetically identical to the parent cell.
	Nuclear division that results in the formation of four cells that each containing half the number chromosomes of the parent cell (Haploid)
	A Linear DNA molecule wrapped around histone proteins found in the nucleus.
	A short sequence of DNA that carries the code for the synthesis of one specific polypeptide (protein)
	Deoxyribonucleic acid – a polymer of nucleotide molecules that form the instructions for the synthesis of proteins found within organisms.
	A membrane bound organelle responsible for the generation of ATP molecules by aerobic respiration.
	A membrane bound organelle covered with ribosomes - the site of protein synthesis.
	Protein based structure that extends from the membrane and is involved in moving the cell itself through a medium.
	A single celled organism that does not contain a true nucleus.
	A organism consisting of cells that contains a true nucleus and membrane bound organelles.
	Associating with water molecules easily (water loving)
	Water repelling molecules (water hating)
	A protein pore that spans the membrane, through which very small ions and water soluble molecules may pass.

Key Word	Definition
	The net movement of molecules or ions in a gas or liquid from an area of high concentration to an area of lower concentration.
	The movement of water molecules from a region of high water potential to a region of lower water potential across a partially permeable membrane.
	The movement of substances across membranes against a concentration gradient, requires the use of energy in the form ATP via transport proteins.
	The passive movement of molecules across membranes down a concentration gradient, aided by transport proteins.
	A globular protein molecule with 3D structure that acts as a biological catalyst.
	The particular shape of a molecule.
	When two molecules have (matching) shapes which allow them to bind together (Lock and Key)
	A cell with specific receptors on the cell surface membrane which can receive a signal molecule (like a hormone).
	The process of taking materials into a cell by surrounding them with part of the plasma membrane, which then pinches of to form a vesicle inside the cell. This is an active process requiring ATP.
	The process of removing materials from a cell by fusing vesicles with the plasma membrane. This is an active process requiring ATP.
	Endocytosis of large solid materials such as microorganisms or cell fragments.
	Diploid cell made from fusion of male and female gametes.
	The development and changes seen in cells as they mature to form specialised cells.
	A group of similar cells that perform a particular function.
	A collection of tissues that work together to perform a specific overall function or set of functions.
	All the chemical reactions that take place in the cells of an organism.
	The outside surface of an organism or cell.
	A chemical that can reduce the surface tension of a film of water.
	A type of muscle (involuntary muscle) found mostly in certain internal organs and involved in involuntary movements such as peristalsis.
	Ability to stretch and recoil.
	Muscles between the ribs responsible for moving the ribcage during breathing.
	Transport system in which blood travels twice through the heart for each complete circulation of the body.

Key Word	Definition
	The surface area of an organism compared with its overall volume.
	The process in which energy is released form complex molecules, such as glucose, within a cell and transferred to molecules of ATP.
	One of the upper chambers in the heart.
	The lower chambers in the heart.
	Arteries that carry blood to the heart muscle.
	The pressure created by a fluid pushing against the sides of a container.
	The period when the heart muscles in the ventricles are relaxing and blood pressure is at its lowest.
	The stage in the heart cycle when heart muscles contract to pump blood.
	A region in the right atrium from which the wave of excitation is initiated.
	Muscular contractions of muscle layers of gut to squeeze food along.
	A cavity found on the inside of a vessel eg in xylem vessels or blood vessels.
	The amount of oxygen in the air expressed as the pressure created by the presence of oxygen (measured in kilopascals.)
	A plant tissue containing vessels that are used to transport water (and dissolved minerals) in a plant and to provide support.
	A plant tissue containing vessels that are used to transport dissolved sugars and other substances.
	A ring of cells between the cortex of the root and the area housing the xylem and phloem in a plant.
	Plant tissue in the stem and root that contains dividing cells
	A fine strand of cytoplasm that links the protoplasm of adjacent plant cells through a thin area of cell wall called a pit.
	The loss of water vapour from the aerial parts of a plant due to evaporation.
	A plant specially adapted to living in dry areas.

Using the link below read through the cells information and make an annotated diagram of the cell with information on all structures within the cell.

https://publications.nigms.nih.gov/**insidethecell/pdf/inside_the_cell.pdf**

Units, measurements and standard form (please read through the following sections and make sure you are comfortable with the information.

Units are very important part of biology. The common units you should know are (fill in the blanks):

unit	name	Measurement of
m		Distance or length
kg		mass
A	amps	
	Seconds*	time
^{o}C		temperature
	Molar	concentration
	Joule	energy

**Notice 's' is the abbreviation for seconds, not 'sec'.*

[1]You may come across the unit K (Kelvin). To convert a K temperature to ^{o}C, take away 273. E.g. 373K = 100^{o}C

However, there are several units derived from these basic units that you will come across commonly in biology. These are:

unit	name	Measurement of
	centimetres cubed	Volume, usually solids and gases*
ml	millilitres	
	millimetres	length
µm		length
	nanometres	length
mV	millivolts	

Notice that cm^{3} and ml are an equal measure i.e. 1cm^{3} = 1ml

What happened to litres?

Instead of using litres (l), at A level you will be expected to use dm^3 (decimetres cubed). This avoids confusing l for litres with a number 1. Millilitres are still represented as ml.

'Per'

At GCSE, you would have written metres per second like this:

m/s

A levels use a different notation:

ms^{-1}

There is a mathematical reason for this, but you don't need to know it (unless you are desperate to find out!).

The minus sign when present in units tells you that it should be read as 'per', e.g.

kg per second kgs^{-1}

bubbles per minute bubbles min^{-1}

per litre dm^{-3}

Prefixes

These go before a unit to alter its magnitude. You are familiar with some of them already.

symbol	prefix	meaning	Example
M	Mega	x 1,000,000 (million)	MJ
k	kilo	x 1,000	kg
m	milli	÷ 1000	mV
µ	micro	÷ 1,000,000 (millionth)	µm
n	nano	+ 1,000,000,000 (billionth)	nm

Millivolts are often used in measuring voltage in cells.
µm are commonly used in measurements of cells and organelles.
nm are used in measuring wavelengths of light.

<u>Standard form</u>
Biology often uses numbers that are too large to be written down conveniently. Standard form is a short hand way for writing large or small values.

Instead of 1400 m standard form would be 1.4 x 10^3 m
This is the same as saying 1.4 x 10 x 10 x 10. If you work this out, it is the same as 1400 m. You can use 1.4km which is the same thing, but as you will see below, it is good practice to get used to using standard form. Notice that the first value will be a number between 1 and 9, so that:

1450 m is 1.49x10^3 m

Another way to think about it is by moving the digits along, so: 1.49x10^3m move the digits 3 places to the left of the decimal point:

			1	**.**	**4**	**9**
1	4	9	0	.	0	0

However, you will be much more likely to come across small values is biology. In standard form, a minus sign is used, so that:

0.003m is $3x10^{-3}$ m

This time, you move the digits 3 places to the right of the decimal point:

3	**.**				
0	.	0	0	3	

It gets easier when you start to recognise the relationship between standard form and the prefixes:

Standard form	Same as	
$x10^{3}$	kilo	x1000
$x10^{-3}$	milli	÷10000
$x10^{-6}$	micro	÷1,000,000
$x10^{-9}$	nano	÷1,000,000,000

<u>Notes.</u>

Gramme is the English variant of gram, but you will commonly see gram used.

There is a space between the number and the unit e.g. 3 m, not 3m. This also applies to % sign. The exception is degrees ^{o} which does not require a space.

Spaces can be used instead of commas for large numbers e.g. 10 000 000 rather than 10,000,000.

Open University Course

As part of your 'bridging the gap' work you need to complete one of the courses available to you from The Open University. I have made some suggestions here. If you find a course related to biology that you would prefer to complete on there please just let me know first by dropping me an email.

Once completed print out the certificate and bring it along to our first lesson as evidence.

Infection and immunity
https://www.open.edu/openlearn/health-sports-psychology/infection-and-immunity/content-section-overview?active-tab=description-tab

A tour of the cell
https://www.open.edu/openlearn/science-maths-technology/science/tour-the-cell/content-section-0?active-tab=description-tab

Understanding antibiotic resistance
https://www.open.edu/openlearn/science-maths-technology/understanding-antibiotic-resistance/content-section-overview?active-tab=description-tab

Metals in Medicine
https://www.open.edu/openlearn/science-maths-technology/metals-medicine/content-section-0?active-tab=description-tab

Understanding cardiovascular diseases
https://www.open.edu/openlearn/science-maths-technology/biology/understanding-cardiovascular-diseases/content-section-0?active-tab=description-tab