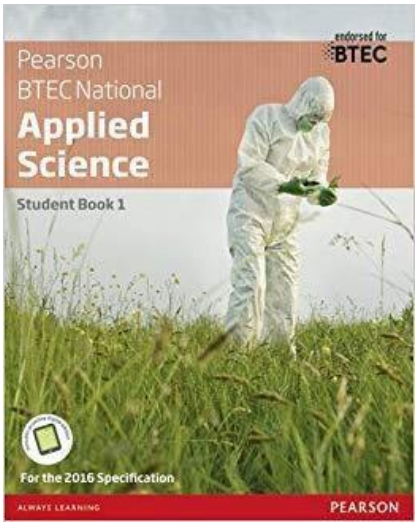
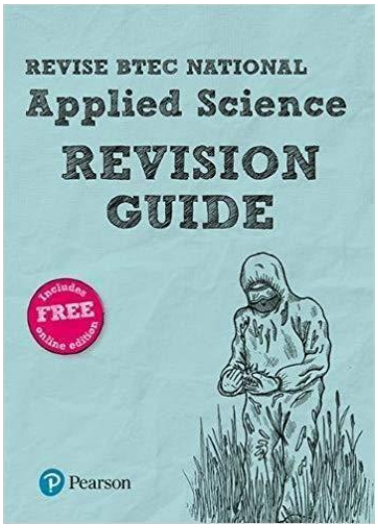
Welcome to
BTEC Level 3 Applied Science





Welcome to BTEC Applied Science.

As you transition from GCSE to Level 3 studies, you may find you are expected to do more independent reading, revision, and research outside of lessons. This task will help you to make a start.

There are <u>THREE tasks</u> for you to complete.

TASK ONE: Report writing task

The BTEC Level 3 Applied Science course includes units that are assignment-based. In preparing these assignments, you will need to write and produce several reports. To do this, you will need to successfully research, find and extract relevant information from many sources, both internet-sourced and non-internet sourced (e.g., books, journals, or personal contacts, for example).

You will need to structure and summarise this information and produce a coherent and logical report avoiding any plagiarism or copy and paste! Please visit & go through the following websites for guidance on summarising and avoiding plagiarism

http://www.buowl.boun.edu.tr/students/avoidingplagiarism.htmhttps://qualifications.pearson.com/content/dam/pdf/Support/Quality%20Assurance/Plagiarism-Factsheet.pdf

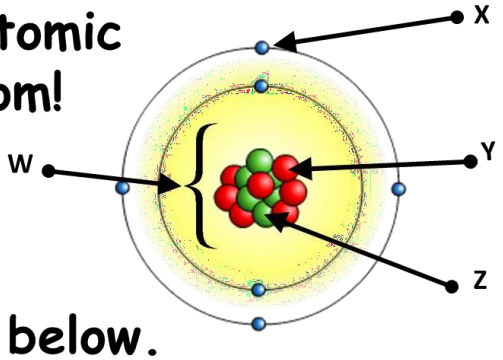
Complete one of the **WebQuests** on the sheet attached.

TASK TWO: Exam practice questions

Chemistry questions:

Q1 – Atomic structure

1: Label the sub-atomic particles on the atom!



2: Copy and complete the table below.

Particle	Relative Mass	Relative Charge
Proton		
Neutron		
Electron		

Particle	Atom or ion	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Electronic structure
$^{23}Na^{+}$	ion	11	23	11	12	10	$[2,8]^{+}$
^{23}Na							
$^{40}Ca^{2+}$							
	atom	9	19				
				17	20	18	
				17	18	18	
		19	39			18	
				18	22	18	
		1	1			0	
					5		$[2]^{2+}$

Atoms are the basic building blocks of matter. They are not the smallest of particles, and within Chemistry, we are interested in the sub-atomic particles, especially the ***electron***.

Using a periodic table, draw the ***electronic configuration***, as well as identifying ***how many sub-atomic particles*** there are for the following atoms and its corresponding ions:

Hydrogen  **Number of:** **p:** **e:** **n:**	**Nitrogen** **Number of:** **p:** **e:** **n:**	**Calcium** **Number of:** **p:** **e:** **n:**
Hydrogen ion, H^+ **Charge:** **Number of:** **p:** **e:** **n:**	**Nitrogen ion** **Charge:** **Number of:** **p:** **e:** **n:**	**Calcium ion** **Charge:** **Number of:** **p:** **e:** **n:**

*Don't forget brackets for ions

Q2 – Bonding and Dot cross diagrams

You would have covered ionic and covalent bonding in your GCSE. Using your knowledge:
- **Draw** the dot cross diagrams for the following compounds, showing only **outer electrons**.
- State the **type** of **bonding** involved (ionic, covalent, metallic)

Oxygen gas	Sodium chloride
Magnesium oxide	Water
Carbon dioxide	Calcium chloride

Q3 - Rearranging Formulae

When solving chemistry problems you will often be required to **rearrange** an equation to solve for an unknown. You would have seen this in Physics when trying to calculate speed.

Speed (m/s) = distance (m) / time (s)

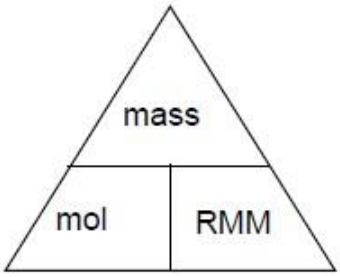
We can re-write this to show distance and time as follows:

Distance (m) = speed (m/s) x time (s) Time (s) = distance (m) / speed (m/s)

You will encounter the following equations in the first topic.

Rearrange the following:

a)

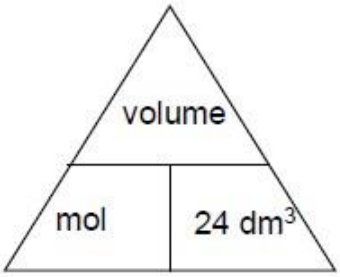


mass =

mol =

RMM =

b)



Volume =

mol =

c) **Rearrange**:

$$n = c\,v$$

c =

v=

The units of ***n*** is mol and the unit for ***v*** is dm^3. **Write** down the units for *c*:

Q4 – Balancing equations

Fill in the boxes with the numbers you need to balance the equation.
Note: Some boxes can be left blank.

$$\square H_2 + \square O_2 \rightarrow \square H_2O$$

$$\square H_2 + \square N_2 \rightarrow \square NH_3$$

$$\square Cr + \square O_2 \rightarrow \square Cr_2O_3$$

$$\square Al_2O_3 \rightarrow \square Al + \square O_2$$

$$\square P_4 + \square O_2 \rightarrow \square P_2O_5$$

Q5 - Relative formula mass

Use a Periodic Table to work out the relative formula mass of the following compounds:

e.g., NaOH: Na + O + H = 23 + 16 + 1 = 40

a) F_2 .....

b) Fe .....

c) H_2SO_4 .....

d) Al_2O_3 .....

e) $Mg(OH)_2$ .....

f) $Al(NO_3)_3$ .....

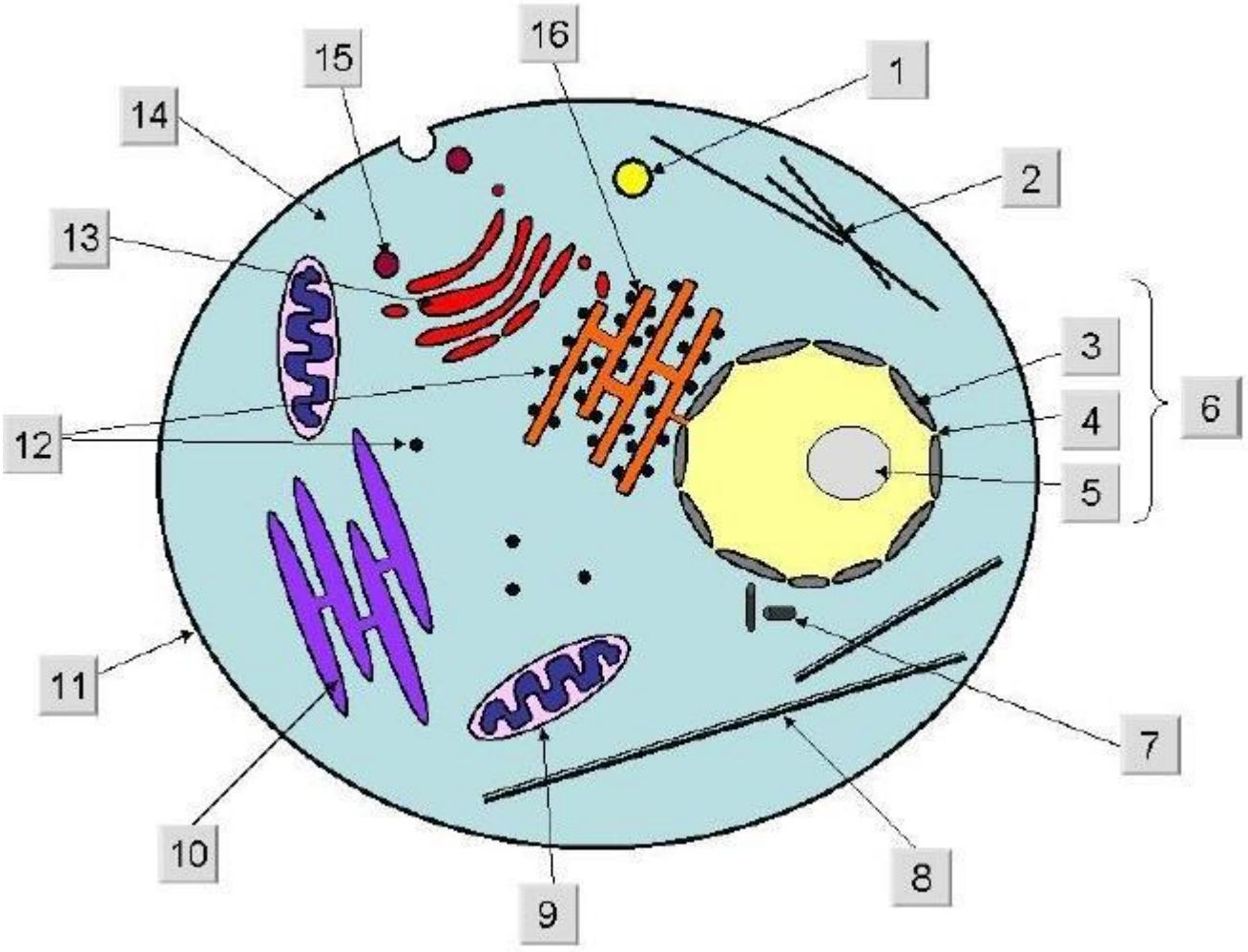
Biology questions:

Q1 - Cell Structure

Watch the video from the link below

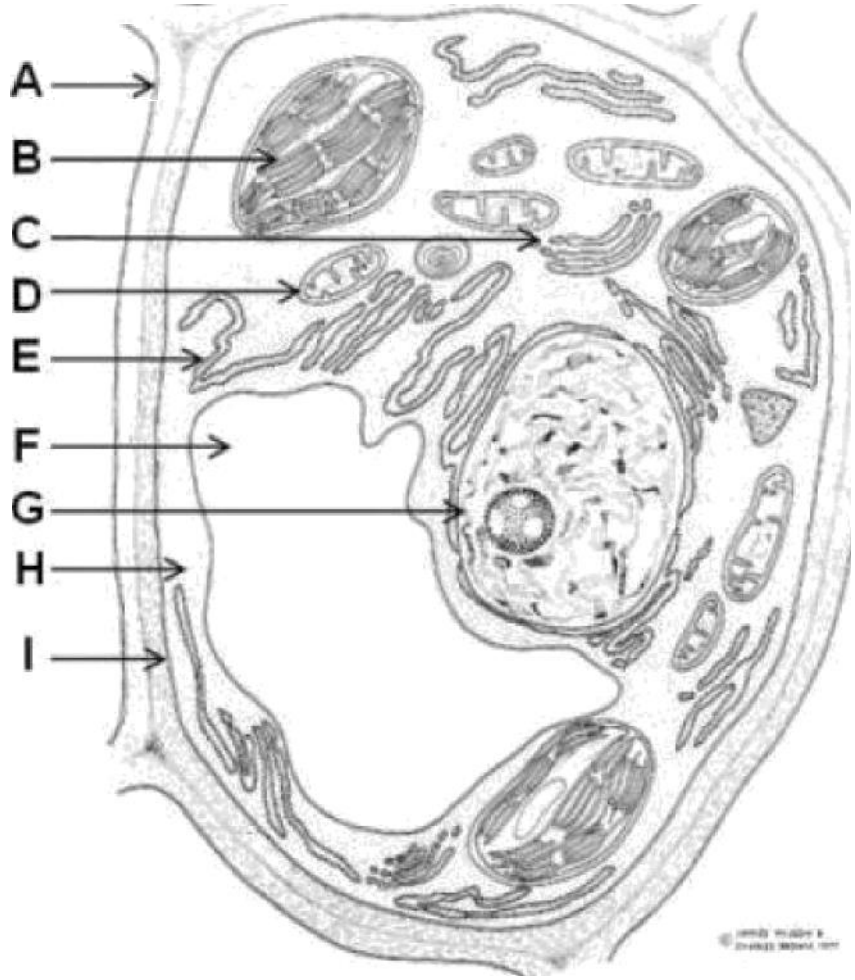
Video: https://www.youtube.com/watch?v=cj8dDTHGJBY

a) This is a diagrammatical representation of an **animal cell** showing its ultrastructure. Try to identify structures 1-16



1)	9)
2)	10)
3)	11)
4)	12)
5)	13)
6)	14)
7)	15)
8)	16)

b) This is a diagrammatical representation of a plant cell showing its ultrastructure. Try to identify strictures A-I



A)

B)

C}

D)

E)

F)

G)

H)

I)

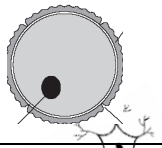
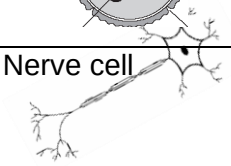
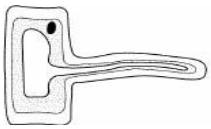
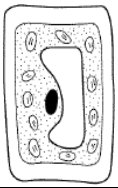
Q2 – Organelle structure and function

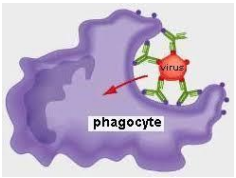
Match the cell structure with its function in the table below. Record your answers in the table below.

Structure	Function
1. Plasma membrane	a. Releasing energy
2. Golgi body	b. Making proteins from amino acids
3. Lysosome	c. Controlling what enters and leaves the cell
4. Nucleus	d. **Modifying**, enclosing and dispatching proteins
5. Cytoplasm	e. Breaking down and recycling bacteria and worn out organelles
6. Centrioles	f. Making, storing and transporting proteins
7. Smooth endoplasmic reticulum (SER)	g. Surrounding the nucleus
8. Rough endoplasmic reticulum (RER)	h. Organising the spindle in cell division
9. Ribosomes	i. Controlling the activities in the cell
10. Mitochondrion	j. Making and transporting fats

Answers (write the correct letter (Function) next to the corresponding number(Structure))				
1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

Q3 – Specialised cells – complete the table about the cells below:

Picture	Plant/Animal?	Function (it's job) & features
Red blood cell 		Contains haemoglobin to carry oxygen to the cells.
Sperm cell 		
Egg cell 		
Nerve cell 		
Epithelial cell		
Root hair cell 		
Palisade cell 		These cells are packed with…

White blood cell  		

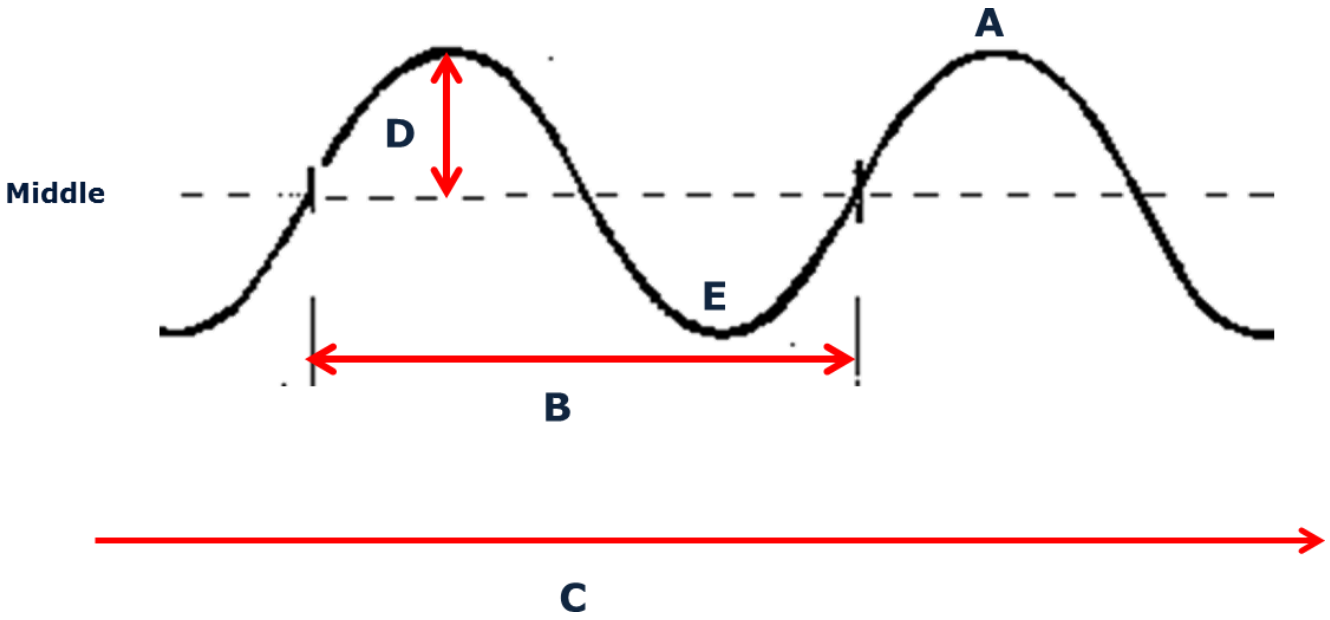
Physics questions:

Q1 – Wave features

A transverse wave has five key terms you need to know and be able to label on a diagram.

1. **Wavelength** – This is the distance of one complete wave.
2. **Wave direction** – This is the direction the wave is travelling.
3. **Peak** – The top of the wave.
4. **Trough** – The lowest part of the wave.
5. **Amplitude** – The height of the peak, or the depth of the trough from the middle.

Task: Label the key features of a wave below on the diagram.



Q2 – Types of Waves

Waves may be longitudinal or transverse.

Describe the differences between longitudinal waves and transverse waves.

(3)

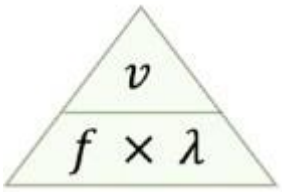
Name **one** type of wave that may be either transverse or longitudinal.

.....

(1 mark)

Q3 – The Wave equation

The wave equation is:



v = velocity
f = frequency
λ = wavelength

Rearrange the following:

v

=

f

=

ƛ =

What are the units for each symbol?

TASK THREE:

Learn these definitions and, write them out and learn them word for word!!

https://olsc.org.uk/wp-content/uploads/2017/10/BTEC-Command-Verbs.docx