



Saint Benedict
Catholic Voluntary Academy

2026

BE
PREPARED

Applied
Science



St Ralph
Sherwin
Catholic Multi Academy Trust

Understanding the specification and the assessments

Please follow the link below to the specification, which can be downloaded.

<https://qualifications.pearson.com/content/dam/pdf/btec-aaqs/applied-science/2025/specification-and-sample-assessments/btec-national-in-applied-science-specification.pdf>

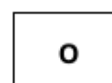
The subject content is split between 5 units of work, 4 mandatory units and 1 final optional unit.

Key

Externally assessed units
are shown in bold



Mandatory
units



Optional
units

Unit (number and title)	Unit size (GLH)	Certificate (180 GLH)	Extended Certificate (360 GLH)
1 Principles and Applications of Biology	60	M	M
2 Principles and Applications of Chemistry	60	M	M
3 Principles and Applications of Physics	60	M	M
4 Practical Scientific Procedures and Techniques	90		M
5 Science Investigation Skills	90		O
6 Contemporary Issues in Science	90		O

External assessment

50% of the total qualification GLH is made up of external assessment. A summary is given below. See the unit content and sample assessment materials for more information.

Unit	Type	Availability
Unit 1: Principles and Applications of Biology	• An external examination set and marked by Pearson. • 50 marks.	January and May/June First assessment May/June 2026
Unit 2: Principles and Applications of Chemistry	• An external examination set and marked by Pearson. • 50 marks.	January and May/June First assessment May/June 2026
Unit 3: Principles and Applications of Physics	• An external examination set and marked by Pearson. • 50 marks.	January and May/June First assessment May/June 2026

Useful Links

Websites

<https://www.chemguide.co.uk/>

[Advanced Level Chemistry Revision Notes A level exams AQA A Level chemistry Edexcel A level chemistry OCR A level chemistry Salters A level chemistry WJEC CCEA US grade 11 grade 12 K12 AP honors IB WJEC IB AS examinations doc brown's chemistry](#)

<http://www.knockhardy.org.uk/sci.htm>

<https://studyrocket.co.uk/revision/level-3-applied-science-btec/principles-and-applications-of-science-i/how-applications-of-electromagnetic-waves-in-communications-are-related-to-> (scroll to the bottom of the left-hand side to see the Y12 content)

Youtube:

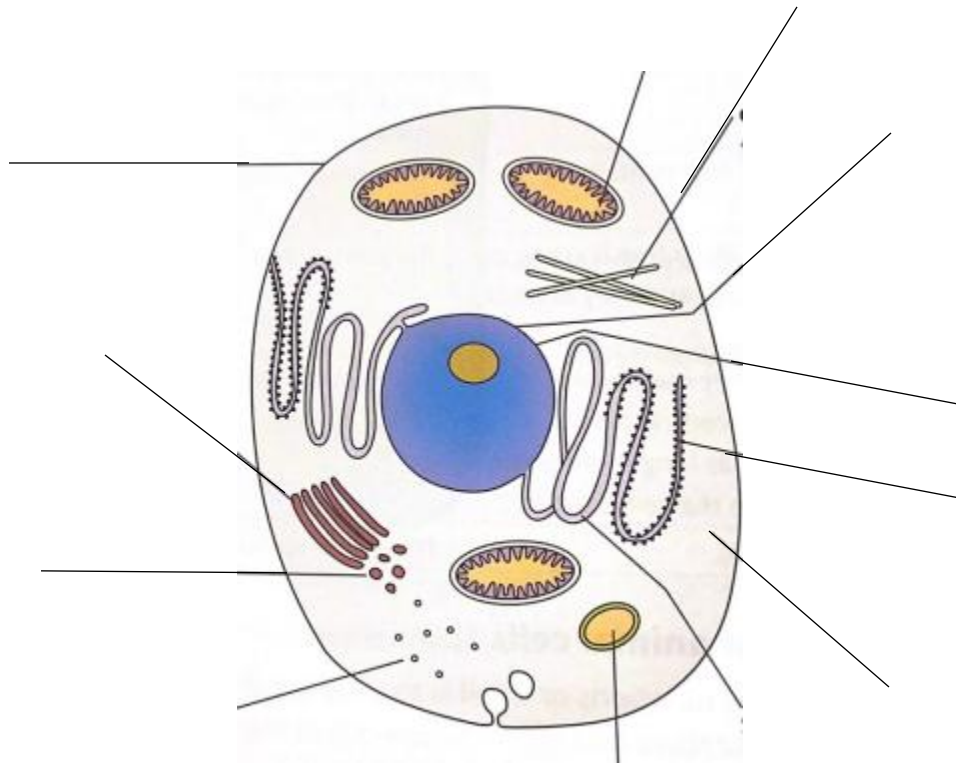
<https://www.youtube.com/@btecappliedsciencehelp> (has playlists for each exam paper)

<https://www.youtube.com/@BioTeachLondon>

Task 1 Biology – the cell ultrastructure

The cell is a unifying concept in biology, you will come across it many times during your two years of BTEC. Prokaryotic and eukaryotic cells can be distinguished on the basis of their structure and ultrastructure

Label the diagram of a Eukaryotic cell.



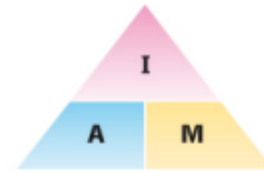
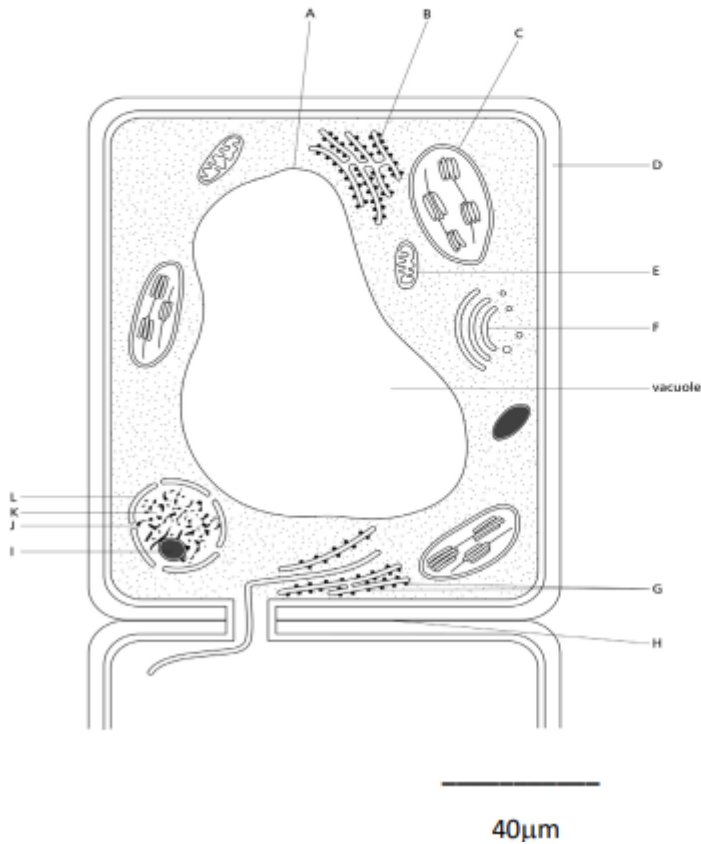
Complete the table below for each organelle identified, adding a diagram (electron micrograph) and explanation of their role. Remember this is not GCSE content.

Organelle	Role
Cytoplasm	
Nucleus	
Nucleolus	
Ribosomes	
Rough endoplasmic reticulum	
Smooth endoplasmic reticulum	
Mitochondria	
Centrioles	
Lysosomes	
Golgi apparatus	
Chloroplast	

Task 2

Microscopy

The diagram below shows the general structure of a plant cell when viewed under and electron microscope.



$$\text{Actual size} = \frac{\text{Image size}}{\text{Magnification}}$$

$$\text{Magnification} = \frac{\text{Image size}}{\text{Actual size}}$$

- 1) Calculate the magnification factor of the diagram
- 2) Calculate the thickness of the cellulose cell wall.
- 3) Calculate the length of the cell.
- 4) Calculate the length of structure C.

Task 3 – Chemistry

Electronic structure, how electrons are arranged around the nucleus

A periodic table can give you the proton / atomic number of an element; this also tells you how many electrons are in the atom.

At GCSE, you will have used the rule of electrons shell filling, where: The first shell holds up to 2 electrons, the second up to 8, the third up to 8 and the fourth up to 18 (or you may have been told 8). However, electron structure is more complex than this, and can be used to explain the lot of the chemical properties of elements. The shells can be broken down into orbitals, which are given the letters, s, p and d.

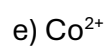
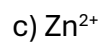
Go to the website below to learn more about orbitals before attempting the task.

<http://www.chemguide.co.uk/atoms/properties/atomorbs.html#top>

Write out the electronic configuration in the $1s^2 2s^2$ etc format for the following elements:

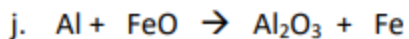
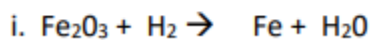
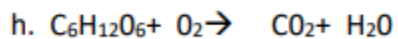
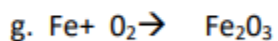
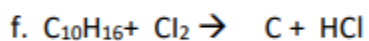
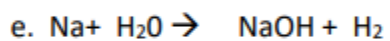
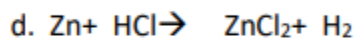
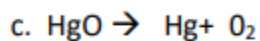
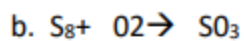
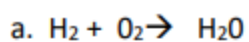
- a) Ca
- b) Al
- c) S
- d) Cl
- e) Ar
- f) Fe
- g) V
- h) Ni
- i) Cu
- j) Zn
- k) As

Write out the electron configuration for the following ions:



Task 4 – Chemistry

Balancing equations – Show your workings out and complete on lined paper

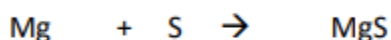


Task 5 - Chemistry

Moles

The **mole** is the chemists equivalent of a dozen, atoms are so small that we cannot count them out individually, we weigh out chemicals.

For example: magnesium + sulfur $\rightarrow$ magnesium sulfide



We can see that one atom of magnesium will react with one atom of sulfur, if we had to weigh out the atoms we need to know how heavy each atom is.

From the periodic table: Mg = 24.3 and S = 32.1

If I weigh out exactly 24.3 g of magnesium this will be 1 mole of magnesium, if we counted how many atoms were present in this mass it would be a huge number (6.02×10^{23} !!!!), if I weigh out 32.1g of sulfur then I would have 1 mole of sulfur atoms.

So 24.3g of Mg will react precisely with 32.1g of sulfur, and will make 56.4g of magnesium sulfide.

Answer these questions on LINED paper – show your workings out.

- How many moles of phosphorus pentoxide (P_4O_{10}) are in 85.2g?
- How many moles of potassium in 73.56g of potassium chlorate (V) (KClO_3)?
- How many moles of water are in 249.6g of hydrated copper sulfate(VI) ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)? For this one, you need to be aware the dot followed by $5\text{H}_2\text{O}$ means that the molecule comes with 5 water molecules so these have to be counted in as part of the molecules mass.
- What is the mass of 0.125 moles of tin sulfate (SnSO_4)?
- If I have 2.4g of magnesium, how many g of oxygen (O_2) will I need to react completely with the magnesium? $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$

Task 6 – Physics Waves

Define the following key terms - **use LINED paper**

- periodic time
- speed
- wavelength
- frequency
- amplitude
- oscillation.

Task 7 – Physics Waves in communication

Produce a wall display (poster or PowerPoint) for your classroom that explains how **electromagnetic radiation** is used in communications.

Your display should include images, keywords and simple explanations to link frequencies to uses, including mobile phones, Wi-Fi, IR, Bluetooth and satellite communications.

Your work should also be Harvard referenced (this is the style of referencing that is commonly used at university). Use the following website to help you. Please also read the article below about plagiarism. During this course there will be lots of opportunities to reference other scientists' work but we must ensure that it is not plagiarized.

<https://www.neilstoolbox.com/articles/checking-plagiarism.htm>

<https://www.neilstoolbox.com/articles/harvard-reference-generator.htm>

<https://www.neilstoolbox.com/>

The Periodic Table of Elements

[illegible]