

St Paul's Catholic School and Sixth Form



Transition Work for Sixth Form

"Let your light shine before others." – Matthew 5:16
Sixth Form, the St Paul's way — with Christ at the heart of it all.

Level 3 AAQ in Applied Science (Extended Certificate)

at St Paul's Catholic School and Sixth Form

The purpose of completing the task below is to re-visit and build upon your knowledge of Cell Structure, Structure & Bonding and Waves.

After completing the task, you will be able to:

- Explain what is meant by a eukaryotic cell and the defining characteristics.
- Explain the different physical properties associated with different bonding types.
- Identify the characteristics of waves and carry out wave calculations.

Due date: Monday 1st September 2025

Task 1

Task 1 will include researching the ultrastructure of a eukaryotic cell to enhance your knowledge on cell biology.

Task 2

In Task 2 you will be looking at the fundamentals of chemistry including atomic structure and structure, bonding & properties.

Task 3

Finally in Task 3, you will be looking at the characteristics of waves and calculations associated with them.

Specification: Level 3 AAQ in Applied Science (Extended Certificate)

Links to websites: [AAQ in Applied Science Specification](#)

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Task

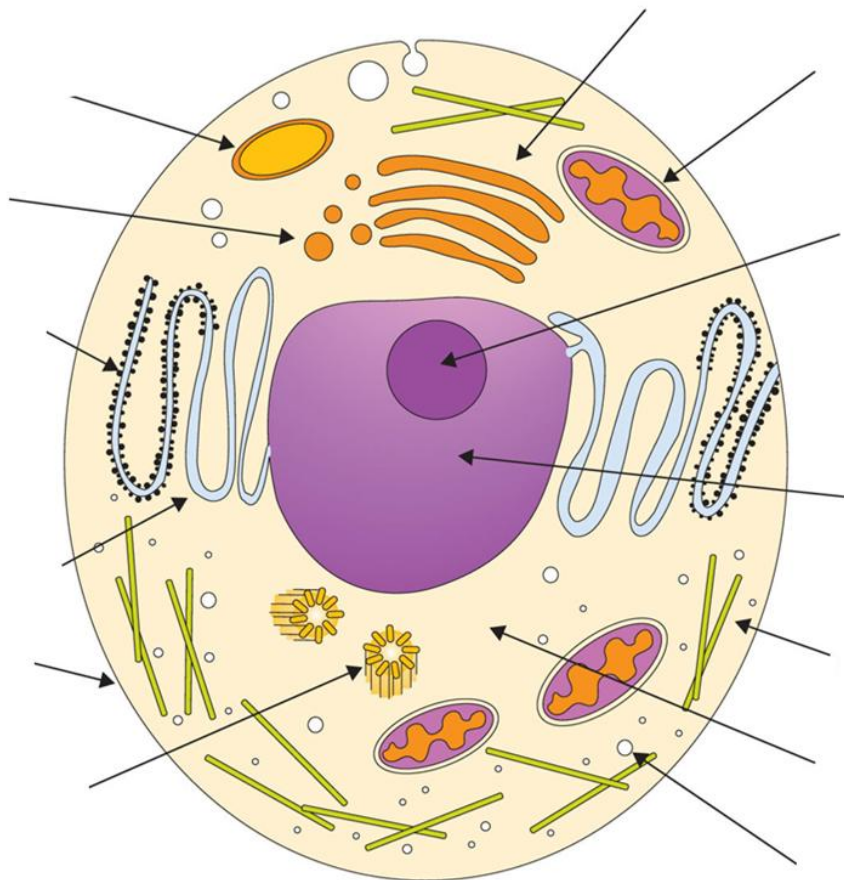
1

Biology Cell Structure & Function

Task 1 will include researching the ultrastructure of a eukaryotic cell to enhance your knowledge on cell biology.

Watch the video from the link:

Q1 Use the information in the video link to help you to table the Eukaryotic cell below:



Q2 Complete the table listing all the 13 parts of the cell (organelles), adding a description of the structure, and stating its function.

[illegible]

Q3 Comparison of light vs electron microscopy. Research and complete the table below including similarities and differences between light and electron microscopy.

Light Microscope	Electron Microscope



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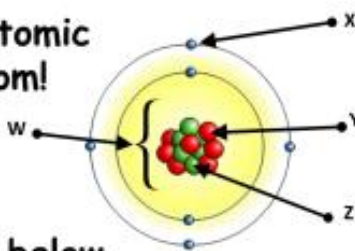
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Task 2

In Task 2 you will be looking at the fundamentals of chemistry including atomic structure and structure, bonding & properties.

Q1

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



2: Copy and complete the table below.

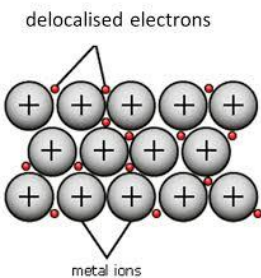
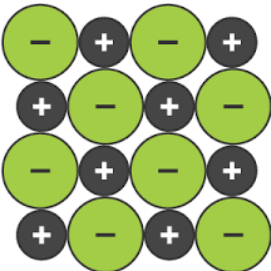
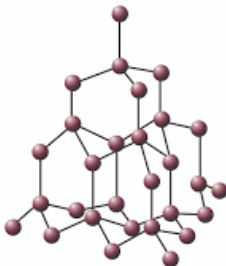
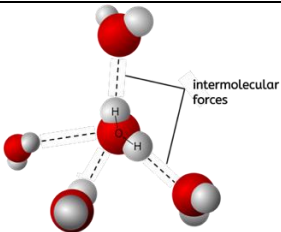
Particle	Relative Mass	Relative Charge
Proton		
Neutron		
Electron		

Q2 Using the 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

Q3 Structure & Bonding: Complete the table to show the different properties for structure and bonding with explanations for each of the properties.

Name	Giant Metallic Structure	Giant Ionic Structure	Giant Covalent Structure	Simple molecular Structure
Diagram				
Melting point (with explanation)				
Electrical conductivity (with explanation)				
Solubility in water (with explanation)				



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Task 3

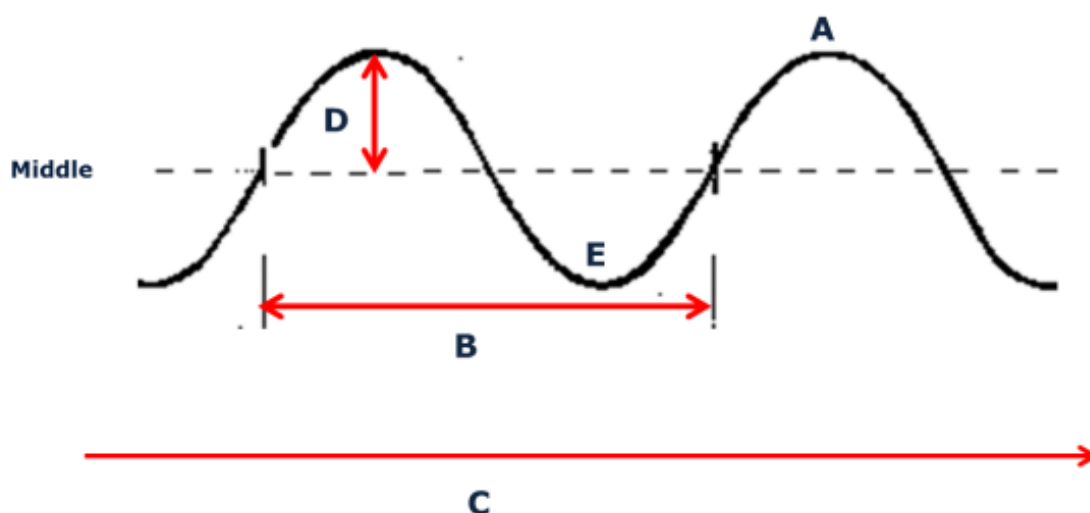
Finally in Task 3, you will be looking at the characteristics of waves and calculations associated with them.

Task 3 – Physics Waves

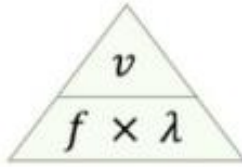
Q1. A transverse wave has five key terms you need to know and be able to label on a diagram.

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 main features of a wave below on the diagram.



Q2. Rearrange the equation and add units for velocity, frequency and wavelength.



v = velocity
 f = frequency
 λ = wavelength

Rearrange the following:

v =

f =

λ =

What are the units for each symbol?

Q3. Wave Equation Calculations

Basics - Substitute values

- 1 Use wave speed = frequency $\times$ wavelength to calculate wave speed for:
- (a) frequency = 20 Hz wavelength = 4.0 m
 - (b) frequency = 0.040 Hz wavelength = 30 m
 - (c) frequency = 1200 Hz wavelength = 0.8 m

Pass - Rearrange equation and substitute

- 2 Calculate the missing values.
- (a) frequency = 500 Hz **wavelength = ?** wave speed = 120 m/s
 - (b) **frequency = ?** wavelength = 60 m wave speed = 3000 m/s
 - (c) frequency = 240 Hz wavelength = 0.25 m **wave speed = ?**
 - (d) frequency = 0.40 Hz **wavelength = ?** wave speed = 35 m/s
 - (e) frequency = 70 Hz wavelength = 2.2 m **wave speed = ?**
 - (f) **frequency = ?** wavelength = 1.4 m wave speed = 560 m/s

Merit - Rearrange and/or convert units

- 3 In water, sound travels at a speed of 1.5 km/s. Calculate the wavelength of an underwater sound wave of frequency 440 Hz.
- 4 A wave on a slinky has wavelength of 80 cm and travels at a speed of 1.8 m/s. Calculate its frequency.
- 5 An earthquake wave travels at a speed of 6.0 km/s and its wavelength is 5.0 km. Calculate the frequency of the wave.
- 6 Radio waves travel at a speed of 3.0×10^8 m/s. An FM radio station broadcasts using radio waves of frequency 97.7 MHz. Calculate the wavelength of these radio waves.
- 7 A tsunami wave travels at 0.22 km/s. Its frequency is 5.0×10^{-3} Hz. Calculate its wavelength.
- 8 An ultrasound wave is used for a pre-natal scan. It has frequency 20 MHz and wavelength 0.08 mm. Calculate the speed of the wave.