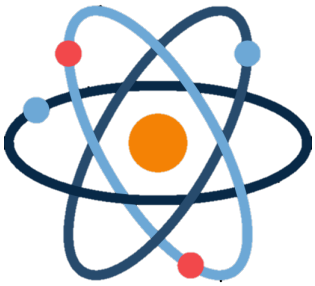


Welcome to Level 3 BTEC Extended Certificate

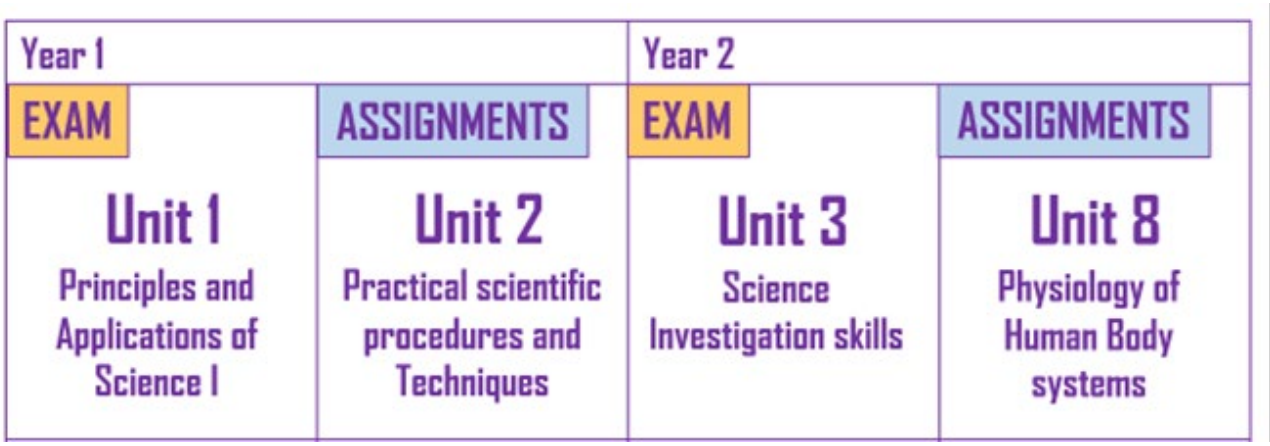
Applied Science

Name: ……

Please complete all tasks in the booklet and bring to your first lesson in September, together with the equipment needed for the course:

- Scientific calculator
- A4 loose white lined paper 2-hole punched
- A4 2-ring binder
- Black, red and green pens
- Pencil, rubber and sharpener
- 30cm ruler

Wyke 6TH FORM COLLEGE



Helpful links For Unit 1 Tasks:

Cell structure, magnification, microscopes - https://www.bbc.co.uk/bitesize/guides/z84jtv4/revision/1

Cell Transport - https://www.bbc.co.uk/bitesize/guides/zc7k2nb/revision/1

Respiration - https://www.bbc.co.uk/bitesize/guides/zcjy97h/revision/1

Watch the video clip to remind yourself of the differences between eukaryotic and prokaryotic cells

https://www.youtube.com/watch?v=HBZcpzr5B2g

Structure of the atom – Atomic number, mass number and isotopes - GCSE Chemistry (Single Science) Revision - BBC Bitesize

Balanced chemical equations - Introducing chemical reactions - OCR Gateway - GCSE Chemistry (Single Science) Revision - OCR Gateway - BBC Bitesize

Describing Waves

Transverse and Longitudinal Waves

Reflection and Refraction

Unit 1 Biology Tasks

Sketch an animal cell and label the following:

- Cell membrane
- Nucleus
- Cytoplasm
- Mitochondria
- Ribosomes

Sketch a plant cell and label the following:

- Cell wall
- Cell membrane
- Nucleus
- Mitochondria
- Ribosomes
- Vacuole
- Chloroplasts
- Cytoplasm

Sketch and label a sperm cell.

Describe how it is adapted to its function

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Sketch and label a red blood cell.

Describe how it is adapted to its function

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Unit 1 Chemistry Tasks

Atomic Structure
Draw a basic atom and label with the following:

- Protons
- Neutrons
- Nucleus
- Electrons

Complete the table to give the relative mass and charge of sub atomic particles and where they are located in the atom.

Particle	Relative Mass	Relative Charge	Location
Proton			
Electron			

What is ionic bonding?

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What is covalent bonding?

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What is metallic bonding?

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……

Draw a dot cross diagram to show the bonding in sodium chloride, NaCl. (Na has 11 electrons, Cl has 17)

Draw a dot cross diagram to show the bonding in water, H_2O. (H has 1 electron, O has 8)

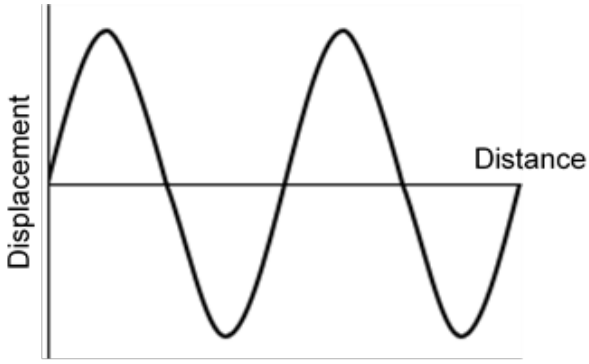
Balance the following equations

$$Mg + O_2 \rightarrow MgO$$

$$N_2 + H_2 \rightarrow NH_3$$

Unit 1 Physics Tasks

Label the image on the right to show the amplitude and wavelength.



How would you define the amplitude of a wave?

……

……

How would you define the frequency of a wave and what are the units of frequency?

……

…… Units: ……

The wave shown is a transverse wave. What is the other type of wave called?

……

Wave speed can be calculated using the equation:

$$n = f \times \lambda$$

- n is the wave speed in m/s
- f is the frequency in Hz
- λ is the wavelength in m

Use this information to calculate the following:

- The speed of a wave with a frequency of 10 Hz and a wavelength of 2 m

- The speed of a wave with a frequency of 0.4 Hz and a wavelength of 0.06 m

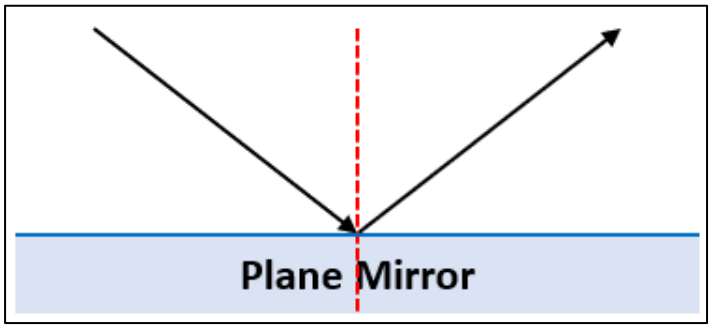
- The frequency of a wave with a wave speed of 120 m/s and a wavelength of 30 cm

Complete the table to compare the two types of waves

Type of Wave	**Transverse**	
Direction of vibration		
Example		

Add the following labels to the image of reflected light shown on the right

- Normal Line
- Angle of incidence
- Reflected light



Energy	**Frequency**	**Wavelength**	**Radiation type**	**Typical use**
Lowest	Lowest	Longest	Radio waves	
				Cooking, mobile phones
			Infrared	Optical fibre communication
			Visible light	
				Detecting forged bank notes
				Medical images of bones
Highest	Highest	Shortest	Gamma radiation	

Unit 2 Assignment Task

Aim

Use colorimetry to identify concentration of Fe^{3+} in 3 samples of effluent rivers and determine if the content of Fe^{3+} is above the one allowed for water quality standards.

The three samples used belong to fictional rivers:

Sample A: Crystal River

Sample B: Skyblue River

Sample C: Pristine River

Equipment and materials

- Colorimeter
- 4 cuvettes
- 3 pipettes
- 3 boiling tubes containing ammonium thiocyanate solution
- 3 boiling tubes containing samples A, B and C for different rivers

Health and safety

Make sure you wear labcoats and safety glasses during your practical work.

Do not pour any chemicals down the sink, there is a residues beaker to dispose them.

Always make sure you follow teacher's instructions, do ask if you are unsure of anything. We are here to help you!

Method

1. Add one of the ammonium thiocyanate solutions contained in a boiling tube to your sample A. Repeat same procedure with tubes containing samples B and C respectively.
2. Use one pipette to fill the first cuvette with sample A. Repeat procedure with your samples B and C. Prepare the fourth cuvette with your blank (distilled water)
3. You can now use your colorimeter. Double check that filter 580n is on (ask your teacher to check if unsure).
4. Place the blank cuvette in the colorimeter and press the R button. It should give you 0.00 Abs.
5. Place the cuvette with sample A in the colorimeter and press the T button. Record the value of Absorbance in the table provided below. Repeat with samples B and C.
6. Pour all contents for your boiling tubes and cuvettes in the residues beaker provided.
7. Place the boiling tubes and cuvettes used in the washing up bowl.

SUMMER WORK: practical report writing up

As part of your Summer work, you need to write a report with the method and results for the practical you carried out during your Wyke Start.

If you did not attend Wyke Start, you will use the results below and feel free to use internet resources to help you complete the report:

Sample	A	B	C
Absorbance	1.25	0.37	0.01
Concentration (ppm)	35	10	0

Your report should be about 2 sides of A4 and contain the following sections:

1. **Introduction and Aims**

   You need to explain how you will find out if the samples have been contaminated by an iron leak from one of the nearby factories using colorimetry.
2. **Method**

   You need to explain, using your own words, the steps that you did in order to complete the practical. Copy and pasting the method in this booklet is not suitable.
3. **Results (with table)**

   You can use the table provided as an example to use. Make sure you include units in your headings.
4. **Conclusion**

   You need state the quality of water for each of the samples.
5. **Evaluation (you can only complete this if you did the practical)**

   You should reflect on how the practical went, considering your own ability in the laboratory. Think about what you did well and what you need to improve.

UNIT 2 SUMMER WORK (you can use this template for your work)

Practical: using colorimetry to identify the concentration of Fe^{3+} in three samples of effluent in rivers

INTRODUCTION AND AIM:

METHOD:

RESULTS:

Sample	A	B	C
Absorbance			
Concentration (ppm)			

CONCLUSION:
Sample A: Sample B: Sample C:
EVALUATION:

References: