BTEC L3 Applied Science – Year 11 Transition Work

Unit 1is the first area of study and covers the three main areas of Science. The following tasks are based around the knowledge and understanding of some of the key concepts in this unit. The bullet points indicate the detail of the content and explanation that you need to include. The information should be clearly laid out with headings where appropriate. You should include diagrams to help convey information. Your work should be clearly referenced.

Chemistry

Produce a report/poster/info leaflet on the following things:

1. **Understanding ionic bonding:**

o why there is a strong electrostatic attraction between oppositely charged ions (explain how this works)

o how ions are formed in terms of electron loss or gain (give some specific examples and explanations)

o electronic configuration diagrams of cations and anions (draw dot and cross diagrams to show examples of each and explain what they show)

2. **Understanding covalent bonding:**

o explain why there is a strong electrostatic attraction between two nuclei and the shared pair(s) of electrons between them

o draw dot and cross diagrams to show electrons in simple covalent molecules, including those with multiple bonds (named examples of diatomic molecules and compounds needed)

3. **The Periodic table**

- review the reactivity of elements in Group 1, Group 7 and Group 0. This should include the trends and patterns within each group – melting points/boiling points, reactivity of each element with oxygen, water and acids

Biology

Produce a report/poster containing labelled diagrams of plant and animal cells to include the organelles listed below. You also need to explain/define the words ***prokaryote*** and ***eukaryote*** and ***organelle***.

Next, you need to explain the function of each of the organelles listed below.

o prokaryote cells (bacterial cell) – nucleoid, plasmids, capsule, cell wall

o eukaryotic cells (plant and animal cells) – plasma membrane, cytoplasm, nucleus, nucleolus, endoplasmic reticulum (smooth and rough), Golgi apparatus, vesicles, lysosomes, mitochondria, centrioles

o eukaryotic cells (plant-cell specific) – cell wall, chloroplasts, vacuole, tonoplast, amyloplasts, plasmodesmata

Websites:

BBC Bitesize is good to review your basic GCSE knowledge of key chemistry concepts

https://www.bbc.co.uk/bitesize/subjects/zp266yc

Seneca Learning has good detail on cell theory at A Level standard

https://app.senecalearning.com/classroom/course/d0ce0c30-6417-11e8-8edc-d9cd1c890408

Physics

The physics topic is on Waves and communication and follows on from this topic at GCSE.

Task 1: Introduction to waves

- Produce a poster/ presentation (you may do this on computer or paper.
- It must include the following information:
    - Wave diagram: including the following with explanations; amplitude, frequency, wavelength.
    - Types of wave with an explanation of their properties and difference: Longitudinal wave and transverse wave.
- Complete exam questions using this link: https://tyyuveo.exampro.net/

Task 2: Wave equation

You have covered the wave question at GCSE and this is again important in BTEC. Watch these video clips to refresh your memory.

- GCSE Physics (9-1) Properties of waves: https://www.youtube.com/watch?v=ITe6snlZBp8
- All of AQA waves in 19 mins: https://www.youtube.com/watch?v=g0JGEmbfSiE
- Waves the Basics. Longitudinal and transverse waves: https://www.youtube.com/watch?v=aCu4VRKMstA

- Write out the following equations from GCSE (with units):
    - Wave speed = Wavelength X Velocity
    - Period = 1 / frequency
- Answer the exam questions attached to this link:
    - https://uesyyao.exampro.net/

Task 3: Electromagnetic waves

Produce a presentation on the electromagnetic spectrum of waves and their properties.
Watch these video clips to help you

- Electromagnetic waves: https://www.youtube.com/watch?v=7v2gs8rdQzU
- Radio waves: https://www.youtube.com/watch?v=Ldnh0XlMVc0
- GCSE Science Physics (9-) Electromagnetic waves: https://www.youtube.com/watch?v=u5vkYjV1V1A

You must include:

- Types of wave and their uses.
- Properties of the waves.
- Wavelength and frequencies
- Dangers of ionising radiation

Complete exam questions using this link: https://vafakus.exampro.net/