



## **BTEC Applied Science Transition work for Year 12**

Thank you for showing an Interest in continuing with your science studies through the BTEC Applied science course. To make the transition from GCSE to BTEC smoother, there are specific areas and skills, which are the foundation for all scientific processes. It is recommended that you begin to do some preparation work, which

will benefit your learning in year 12 and successful completion would be advantageous to your entry into the course.

The BTEC course is based on assignments, both practical skills and research and also exams. The course also covers all three sciences:

### **Chemistry**

#### **1. Atomic Structure**

Atoms are the fundamental building blocks in chemistry

- Which 3 fundamental particles are atoms made from, and what are the properties of each?
- What do the atomic and mass numbers tell us?
- What are isotopes?
- How does the electron configuration of an atom give us information about its position in the periodic table?
- How does the reactivity of group 1 and group 7 elements depend on the electron configuration?

**Extension** – Show how relative atomic mass is calculated from information about the relative amount of each isotope of an atom. Use a worked example in your answer

#### **2. Bonding**

The 4 main types of bonding and structure are ionic, simple covalent molecular, macromolecular covalent and metallic

- Explain why some compounds are ionic, but others are covalent
- Research each type of bonding and structure and detail the physical properties typically associated with each type (melting point, electrical conductivity etc.)
- Explain why the bonding leads to these physical properties and include images of the structures in your answer

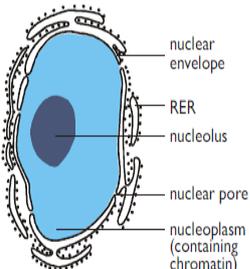
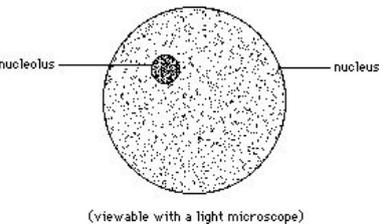
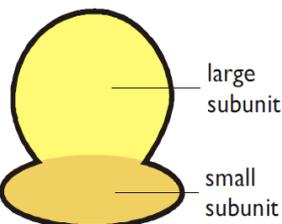
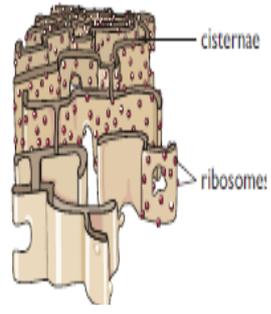
**Extension** – Describe the structure and bonding in graphene, and research why there is a lot of interest in graphene as a new material



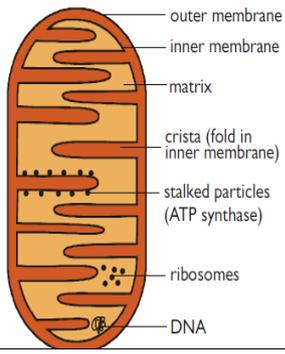
**Applied Science**

**Biology**

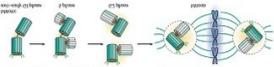
**Cell structure and function**

| <u>Structure</u>   | <u>Description</u> | <u>Role</u> |
|--|--------------------|-------------|
| <p><b>Cytoplasm</b></p>  |                    |             |
| <p><b>Nucleus</b></p>                                   |                    |             |
| <p><b>Nucleolus</b></p>                                |                    |             |
| <p><b>Ribosomes</b></p>                               |                    |             |
| <p><b>Rough and smooth endoplasmic reticulum</b></p>  |                    |             |

**Mitochondria**



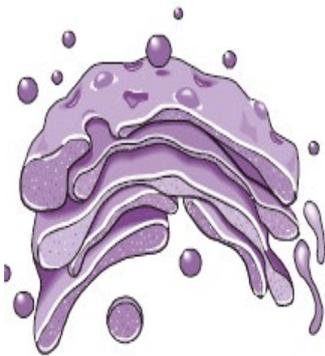
**centrioles**



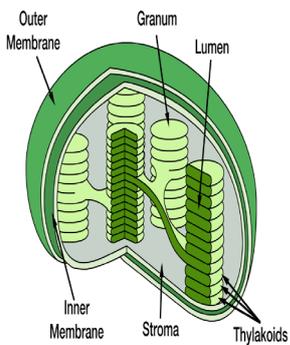
**Lysosomes**



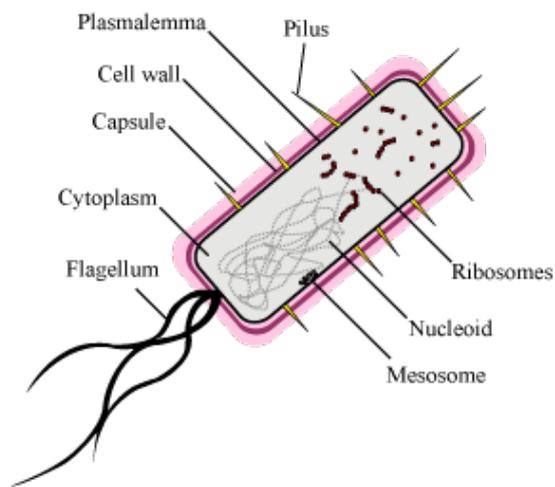
**Golgi Apparatus**



**Chloroplast**



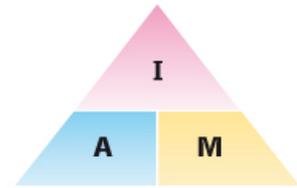
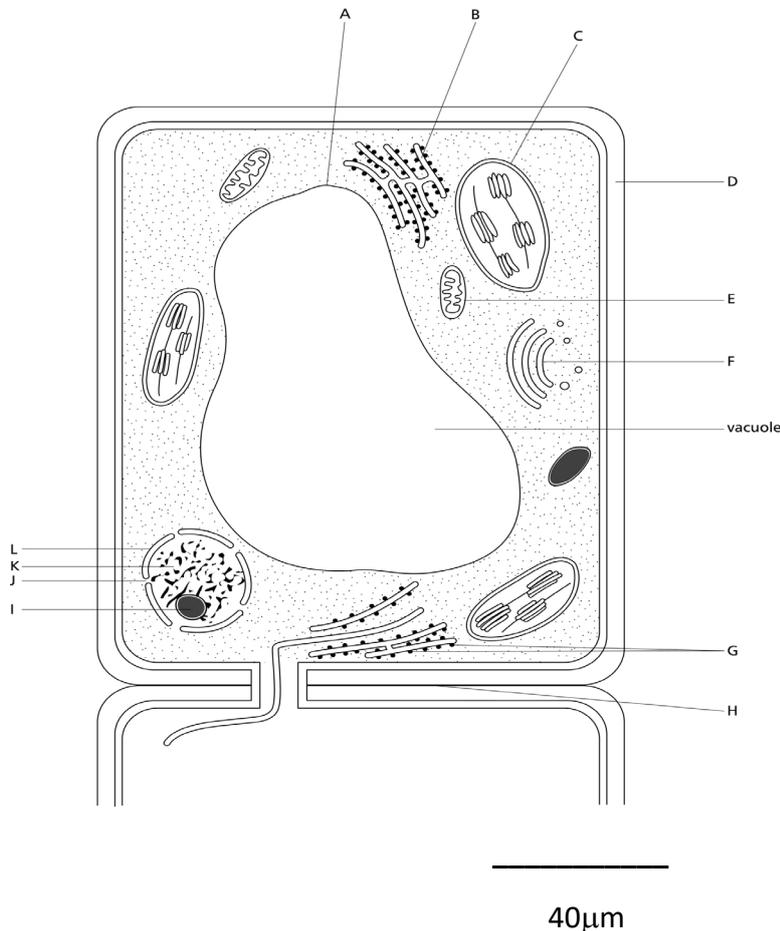
### Prokaryotic Cell



| <u>Structure</u> | <u>description</u> | <u>Function</u> |
|------------------|--------------------|-----------------|
| Cell wall        |                    |                 |
| Capsule          |                    |                 |
| Plasmid          |                    |                 |
| flagellum        |                    |                 |
| ribosomes        |                    |                 |
| Circular DNA     |                    |                 |

## Microscopy

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



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

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

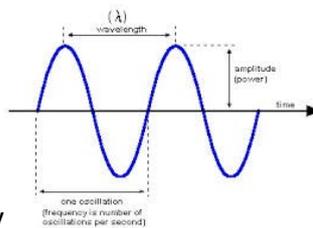
- 1) Calculate the magnification factor of the diagram
- 2) Calculate the thickness of the cellulose cell wall.
- 3) Calculate the length of the cell.
- 4) Calculate the length of structure C.
- 5) Calculate the length of the vacuole.

## Physics

### Waves

#### Waves

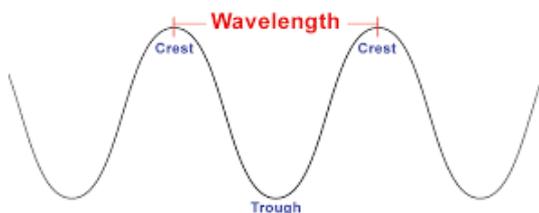
1. What do waves transfer?



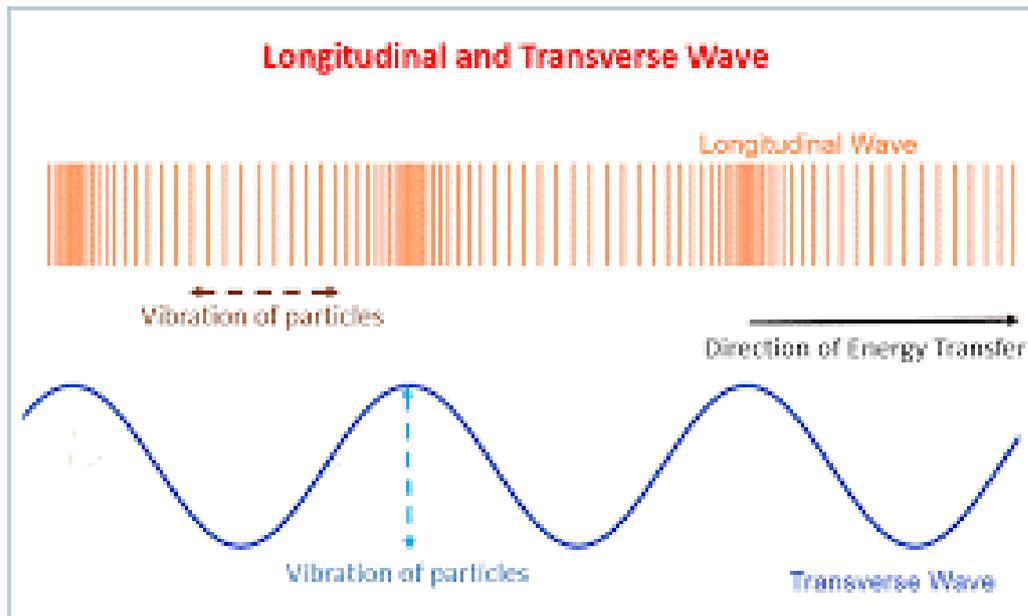
2. Define the term Frequency
3. Write down the equation for Frequency
4. What unit is Frequency measured in?
5. What is the period of a wave measured in?
6. What is amplitude, when referring to a wave?
7. What is the wavelength of a wave?
8. What units are amplitude and wavelength measured in?
9. In a transverse wave, what is the wavelength?

#### **Working with waves**

1. Write down the formula for wave speed
2. What are the units for waves speed?
3. Define the term phase difference.
4. State two ways that phase difference can be measured?



## Longitudinal and Transverse



Explain the difference between longitudinal and transverse waves and give examples (12 marks)

To support your studies there are various websites, you tube videos and online books you can access (only use A level standard resources):

1. [Seneca](#)
2. [Khan Academy](#)
3. [BTEC unit 1 specification](#)