

# **BTEC Applied Science Summer Work Booklet**



PETERBOROUGH KEYS  
ACADEMIES TRUST

# BTEC Applied Science

## Transition Booklet

### Structure of the course:

During this two-year course you will complete 5 coursework units. Each unit will include 3-4 different assignments. You must complete these to high standard first time, but you will receive guidance to assist you. You will also sit 3 external exams that will contribute to your final grade.

### Task 1: Command Words in Assignments and Exams

Understanding the command words is vital for success. Write the definition of the command words in the table below and bring them to your first lesson.

Useful support: <https://www.aqa.org.uk/resources/science/gcse/teach/command-words>

Command Word	Definition
Name	
Write	
Design	
Identify	
Plot	
Calculate	
Estimate	
Describe	
Predict	
Choose	
Show	
Label	
Use	
Measure	
Compare	
Draw	
Sketch	
Justify	

Suggest	
Complete	
Give	
Plan	
Define	
Evaluate	
Explain	

## Task 2: Revision mind-maps on some important GCSE Combined Science topics

In September you will complete an induction test on some of the fundamental topics from GCSE Combined Science. Use the suggested links (or other similar revision resources) to help you write some revision mind-maps on the following topics. You will also have a couple of revision sessions during your first week of lessons.

### BIOLOGY

Prokaryotic and Eukaryotic cells

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/cell-biology/eukaryotes-and-prokaryotes/>

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/cell-biology/animal-cells/>

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/cell-biology/plant-cells/>

Blood, blood vessels and the heart

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/organisation/the-heart-and-circulation/>

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/organisation/arteries-veins-and-capillaries/>

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/organisation/the-blood/>

Microscopes, magnification, and the Microscope required practical.

<https://www.freesciencelessons.co.uk/gcse-biology-paper-1/cell-biology/required-practical-1-microscopes/>

[https://www.youtube.com/watch?v=5X6mow1AExl&list=PLAd0MSIZBSsF3vV\\_uxzbcNHuDrQ6Hc-UI&index=7](https://www.youtube.com/watch?v=5X6mow1AExl&list=PLAd0MSIZBSsF3vV_uxzbcNHuDrQ6Hc-UI&index=7)

### CHEMISTRY

Atomic structure and the periodic table

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/atomic-structure-and-the-periodic-table/>

Bonding

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/structure-and-bonding/>

Quantitative chemistry

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/quantitative-chemistry/conservation-of-mass/>

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/quantitative-chemistry/relative-formula-mass/>

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/quantitative-chemistry/calculating-percentage-by-mass/>

<https://www.freesciencelessons.co.uk/gcse-chemistry-paper-1/quantitative-chemistry/concentration-of-solutions/>

### PHYSICS

The properties of waves.

<https://www.freesciencelessons.co.uk/gcse-physics-paper-2/waves/transverse-and-longitudinal-waves/>

<https://www.freesciencelessons.co.uk/gcse-physics-paper-2/waves/properties-of-waves/>

The wave equation and how to calculate wave-speed experimentally.

<https://www.freesciencelessons.co.uk/gcse-physics-paper-2/waves/the-wave-equation/>

[https://www.youtube.com/watch?v=OY0IXHPo\\_nM&list=PLAd0MSIZBSsF3vV\\_uxzbcNHuDrQ6Hc-UI&index=20](https://www.youtube.com/watch?v=OY0IXHPo_nM&list=PLAd0MSIZBSsF3vV_uxzbcNHuDrQ6Hc-UI&index=20)

The Electromagnetic Spectrum and its uses.

<https://www.freesciencelessons.co.uk/gcse-physics-paper-2/waves/electromagnetic-waves/>

<https://www.freesciencelessons.co.uk/gcse-physics-paper-2/waves/uses-of-em-waves/>

**Task 3: Answer these recall questions and bring them to your first lesson.**

**BIOLOGY**

1. How do the cells of eukaryotes (animal/plants) differ to prokaryotes (bacteria)?
2. What are plasmids?
3. State the role of the....
  - a. Nucleus
  - b. Cytoplasm
  - c. Cell membrane
  - d. Mitochondria
  - e. Ribosomes
  - f. Cell wall
  - g. Chloroplasts
  - h. Permanent vacuole

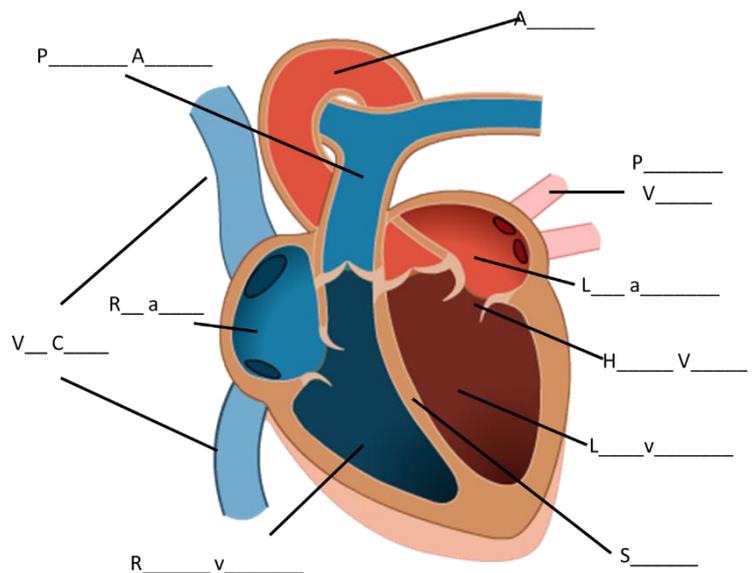
4. Identify which organelles are only found in plant cells.

5. Express the following in metres....

- a. 1nm
- b. 1mm
- c. 1cm
- d. 1 $\mu$ m.

6. What is the equation for magnification?

7. Label this diagram of the heart:



8. State the function of arteries and describe how they are adapted to carry out this function.

9. State the function of veins and describe how they are adapted to carry out this function.

10. Describe the route of deoxygenated blood around the heart and lungs.

11. State the role of...

- a. red blood cells
- b. white blood cells
- c. platelets
- d. plasma

12. What do stents do?

13. What factors can increase the risk of developing coronary heart disease?

## CHEMISTRY

1. In the periodic table where would you find...
  - a. The metals?
  - b. The non-metals?
  - c. The transition metals?
  - d. The Halogens?
  - e. The Alkali Metals?
  - f. The Noble gases?
2. Where in an atom would you find the...
  - a. Protons?
  - b. Electrons?
  - c. Neutrons?
3. What is the relative charge of.....
  - a. A proton?
  - b. An electron?
  - c. A neutron?
4. What is the relative mass of...
  - a. A proton?
  - b. An electron?
  - c. A neutron?
5. How many electrons can fit in the first shell? How many in each shell after that?
6. How many protons, electrons and neutrons are there in  $^{19}\text{F}$ ?
7. Write the electron configuration of a fluorine atom.
8. Define the following terms:
  - a. Element
  
  - b. Compound
  
  - c. Mixture
9. What type of bonding occurs between...
  - a. Non-metals?
  - b. A non-metal and a metal?
  - c. Metals?

10. Explain why....

- a. Metals can conduct electricity.
- b. Sodium chloride will not conduct electricity when it is in the solid state.
- c. Diamond has a high melting point.
- d. Fluorine molecules have a low boiling point.

11. Draw the dot and cross diagrams for....

- a.  $F_2$
- b.  $CH_4$
- c.  $NaCl$
- d.  $CaCl_2$

12. Calculate the  $M_r$  of...

- a.  $H_2$
- b.  $NaCl$
- c.  $CH_4$
- d.  $Mg(OH)_2$

13. Calculate the concentration in  $g/dm^3$  when 15g of a solid is dissolved in  $0.5dm^3$  of water.

## PHYSICS

1. Draw a transverse wave and label the wavelength, amplitude, peak and trough.
2. State an example of a transverse wave.
3. Complete this sentence: In a transverse wave the vibrations are \_\_\_\_\_ to the direction of wave travel.
4. Draw a longitudinal wave and label a rarefaction and a compression.
5. State an example of a longitudinal wave.
6. Complete this sentence: In a longitudinal wave the vibrations are \_\_\_\_\_ to the direction of wave travel.
7. Define the following words....
  - a. Frequency
  - b. Wavelength
  - c. Amplitude
8. State the equation that links period and frequency.
9. State the equation that links wave-speed, frequency, and wavelength.
10. Complete the list of waves in the electromagnetic spectrum and state a use for each.

Electromagnetic Wave	Use
Radio Waves	
Visible Light	
X-rays	

11. Which waves in the electromagnetic spectrum have....
  - a. The highest frequency?
  - b. The lowest frequency?
  - c. The highest energy?
  - d. The lowest energy?
  - e. The shortest wavelength?
  - f. The longest wavelength?