



Transition to BTEC Applied Science Students name:





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Introduction

The aim of this booklet is to provide you with the information you need to start next year as prepared as possible for the BTEC Applied Science course. The BTEC course is through Pearsons which has developed the content of this BTEC in collaboration with employers and representatives from higher education and relevant professional bodies. In this way, they have ensured that content is up to date and that it includes the knowledge, understanding, skills and attributes required in the sector. Each qualification in the suite has its own purpose. The mandatory units provide a balance of breadth and depth, while the coursework units have been chosen for individual learners to study in relation to the taught units to allow them to make greater use of their own notes and minimise duplication. You are expected to complete all the transition tasks set out here and bring them to your first BTEC lesson on our return.

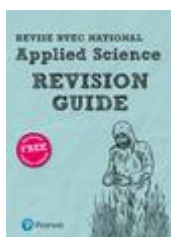
We presently run a single course with Pearson BTEC Level 3 National Extended Certificate in Applied Science. Both year 12 and year 13 are heavily weighted to the taught elements. While Year 12 completes unit 1 & 3 during the course of the year, Year 13 would be completing unit 2 & 8. There is usually an End of Unit Exam paper at the end of each unit. Each paper will form part of the formal teachers assessment for the unit. Coursework units are marked and graded as Pass, Merit or Distinction. The average length of units does vary. For example the average size of Biology pieces of course work is 30-35 slides. You would be required to submit all coursework via google docs which allows for plagiarism and use of A1 to check all work. You will be given a Specification sheet and an Assignment brief before each unit in order to give you a clear guideline as to what is expected of you.

The link to the specification is here.

<https://qualifications.pearson.com/content/dam/pdf/BTEC-Nationals/Applied-Science/2016/specification-and-sample-assessments/BTEC-L3-Nat-ExtCert-in-Applied-Science-Spec.pdf>



Recommended resources



BTEC National Applied Science Revision Guide

Publisher: Pearson

Author: David Brentnall, Ann Fullick, Karlee Lees, Chris Meunier, Carol Usher

ISBN: 9781292150048



BTEC National Applied Science Student Book 1

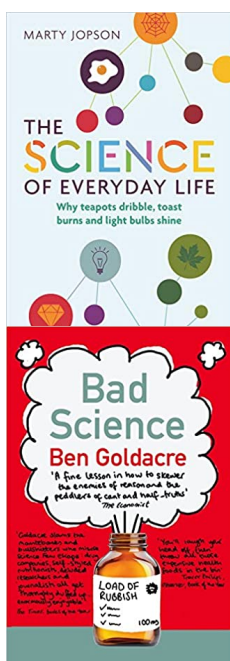
Publisher: Pearson

Author: Joanne Hartley, Frances Annets, Chris Meunier, Roy Llewellyn, Sue

Hocking, Alison Peers, Catherine Parmar

ISBN: 9781292134093

Additional Reading



The Science of Everyday Life

Publisher: Michael O'Mara (14 Jun. 2018)

Author: Marty Jopson

ISBN: 978-1782439608

In this fascinating scientific tour of household objects, *The One Show's* resident scientist Marty Jopson explains the answers to all of these, and many more, baffling questions about the chemistry and physics of the stuff we use every day.

Bad Science

Publisher: Fourth Estate (GB); Reprint edition (1 April 2009)

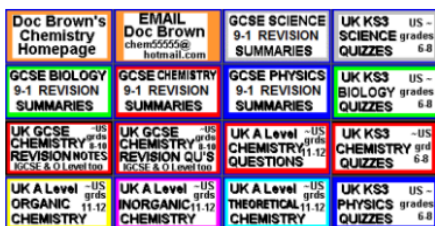
Author: Ben Goldacre

ISBN-13: 978-0007284870

Since 2003 Dr Ben Goldacre has been exposing dodgy medical data in his popular *Guardian* column. In this eye-opening book he takes on the MMR hoax and misleading cosmetics ads, acupuncture and homoeopathy, vitamins and mankind's vexed relationship with all manner of 'toxins'. Along the way, the self-confessed 'Johnny Ball cum Witchfinder General' performs a successful detox on a Barbie doll, sees his dead cat become a certified nutritionist and probes the supposed medical qualifications of 'Dr' Gillian McKeith.



Useful Websites



Doc Brown is a website dedicated to all three science subjects; physics, chemistry and biology. It provides the user with summarised notes (useful for making flash cards) and practice questions to further their knowledge and understanding. The site provides resources from a wide range of exam boards including AQA, Edexcel, Chemistry, CCEA, OCR, WJEC, CIE and Salters from GCSE level to A2.

<http://www.docbrown.info/>



The free revision website for students studying GCSE and Alevels. S-cool provides revision guides, question banks, revision timetable and more

<https://www.s-cool.co.uk/alevel/chemistry>



Tons of awesome courses in one awesome channel! Check out the playlists for past courses in physics, philosophy, games, economics, U.S. government and politics, astronomy, anatomy & physiology, world history, biology, literature, ecology, chemistry, psychology, and of course, chemistry!

<https://www.youtube.com/user/crashcourse/featured>



Bringing medicines to *life*

The Applied Science section provides a range of useful resources from the Biology units 8 and 9 to walkthroughs of various scientific Laboratories and Pilot plants that it would be impossible to see first hand. This will be an essential resource for your course.

<https://www.abpischools.org.uk/age-range/16-19>



Transition Activities - Chemistry

A1 Structure and Bonding

You should be familiar with the three types of Bonding from your GCSE Chemistry lessons. Explain in simple terms the three main properties of ionic, covalent and metallic bonding in terms of electrons, attractions and properties.

Ionic:

Covalent:

Metallic:



Just knowing the properties of the bonds is a start but you should also be able to draw diagrams to illustrate these bonds as they form.

Ionic



Covalent





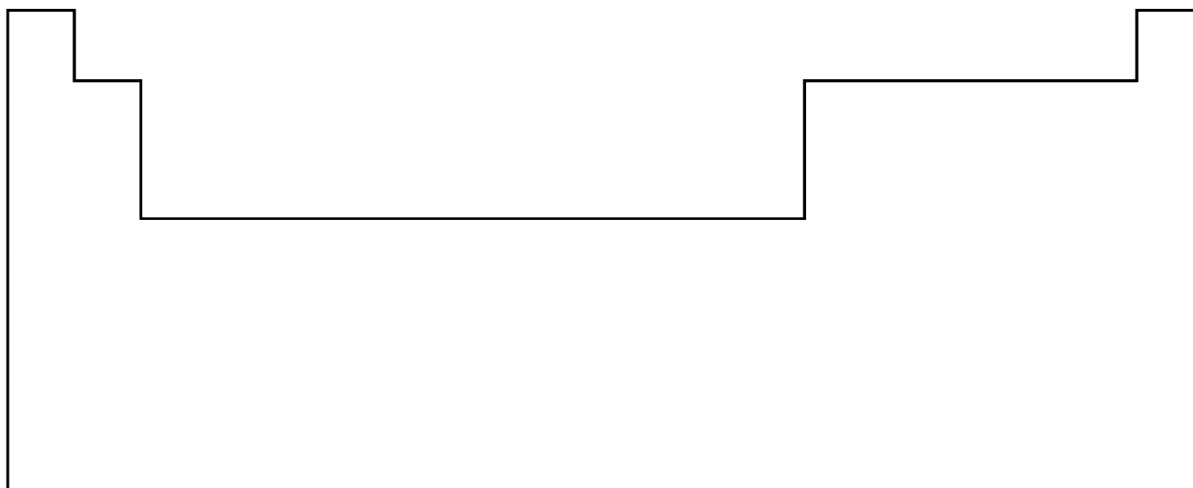
A2 - Production and uses of substances in relation to properties

The properties of the elements on the periodic table can be worked out by looking at their group and their period. You will be expected to learn how the element properties change as they move either down a group or across a period

Annotate on the diagram below

a.) the effect of the moving along a period (horizontally) on the atomic radius, melting point and type of bonding the elements have.

b.) the effect of moving down groups 1 and 7 (vertically) and explain why the reactivity changes as you move down the groups





Considering the types of bonding between elements metallic, giant covalent and simple covalent. Carry out some research to find out the types of bonding that exist between the elements from period two (Lithium to Fluorine), the first one is done for you.

Why is there no point in trying to describe the bonding between Neon atoms?

Element	Bonding	Explanation
Lithium:	<i>Metallic</i>	<i>Both atoms will lose their outer electrons forming Cations and Delocalised electrons</i>
Beryllium:		
Boron:		
Carbon:		
Nitrogen:		
Oxygen:		
Fluorine:		



Transition Activities - Biology

B1 Cell Structure and Function

The Cell diagrams you are used to from GCSE are a start but you will be expected to know a lot more of the organelles of Animal and Plant cells as well as those of Bacterial cells.

Hand draw an annotated diagram of the following cells below (do not cut and stick a picture from the internet). With each organelle make sure you write its function.

Animal



Plant



Bacterial Cell



B2 - Cell Specialisation

There are 6 specialised cells you will need to be familiar with.

- 2 sex cell types
- 2 plant cell types
- 2 blood cell types

Draw a diagram of each one in the space below. Annotate any key features you find of each one.

Sperm

Egg

Palisade

Root Hair

Red Blood Cell

White Blood Cell



B3 - Tissue Structure and Function

The cell is the smallest living structure capable of life but in complex organisms these cells are arranged into tissues. A tissue is a group of identical cells all performing the same function.

There are several tissue types you will need to learn and understand.

Do some research and find out what the following tissue types do and where they are found and give an example of each one

Epithelium tissues

Role:

Location:

Example:

Endothelium tissues

Role:

Location:

Example:

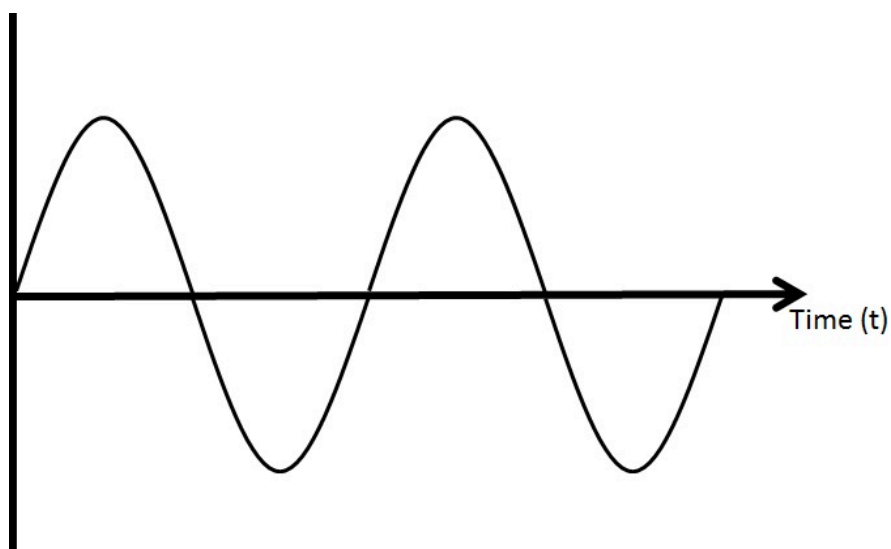


Transition Activities - Physics

C1 - Working with Waves

The first part of the Physics topic of Unit 1 is understanding the properties of waves and wave functions.

Draw on the graph below of a transverse wave all of the key terminology (periodic time, speed, wavelength, frequency, amplitude, oscillation).



Draw out below a representation of a Longitudinal wave and again annotate it with as many of the labels as you can.



Wave Speed Equation

Write out the equations for Wave Speed.

Use the Equation to calculate either the wave speed, wavelength or frequency.

1. If the wavelength of a wave is 25m and the frequency is 50Hz, what will be the wave speed?
2. If the wavelength is 0.75m and the frequency is 20Hz, what will be the wave speed?
3. If the wavelength is 50cm and the frequency is 75Hz, what will be the wave speed?
4. If the wave speed is 250m/s and the wavelength is 2m what will be the frequency?
5. If the wave speed is 500m/s and the wavelength is 50cm what will be the frequency?
6. If the frequency of a wave is 30Hz and it has a wave speed of 350m/s what will be the wavelength?



C2 - Waves in Communication

Fibre optic cables are used in high speed broadband communication but they also have many other uses. Your Assignment is to produce a leaflet explaining how fibre optic cables work and go on to describe how they are used in both Medicine and Communication.

Pass level task - Describe how fibre optic cables transmit light.

Merit level task - In addition to the pass task the learner also compares the uses of fibre optics in both medicine and communications

Distinction level task - In addition to the pass and merit tasks the learner goes further to evaluate the uses of fibre optics in medicine and communication and highlighting the benefits and drawbacks of using these methods.



C3 - The Uses of Electromagnetic waves in Communication.

What are the 7 parts of the electromagnetic spectrum?

Produce a diagram below to illustrate all of the parts. Include a picture to represent the part, the wavelength range of that part, the uses and hazards of the parts as well.



Literacy in Science

Here are a few interesting science in the News links;

BTecs 2024: What are they and how are they graded?

<https://www.bbc.co.uk/news/education-49279219>

BBC uncovers 6,000 possible illegal sewage spills in one year

<https://www.bbc.co.uk/news/articles/c4nn46rjej6o>

Call for UK agency to regulate harmful chemicals

<https://www.bbc.co.uk/news/articles/cpdd4dzt40ro>

Crossbows and eerie silences- following Antarctic whales for climate change clues

<https://www.bbc.co.uk/news/articles/cj770nrx0x9o>

Chimpanzees 'Self-medicate' with healing plants

<https://www.bbc.co.uk/news/articles/ce994dv9q4eo>

<https://www.bbc.co.uk/future/article/20240510-change-6-is-just-the-tip-of-chinas-space-ambitions>