

Year 12 Bridging Work: BTEC Applied Science

The Course

The course you will be following is the Pearson BTEC National Diploma in Applied Science (2016). It is equivalent to 2 A'levels, and provides an excellent option for students who wish to take their studies in Science beyond GCSE. It covers work from all three of the sciences, with a heavy emphasis on practical work and the application of scientific practices. It also includes a unit on forensic evidence collection and analysis. The link below takes you to the Pearson website where you can find out more about the course.

<https://qualifications.pearson.com/en/qualifications/btec-nationals/applied-science-2016.html>

Assessment

The course is assessed through a combination of three externally assessed examinations and five internally assessed units. The units are a combination of written and practical work and are assessed through a series of assignments. You will be fully prepared before starting your assignments, and given clear guidance on the relevant success criteria.

Organising your work

Please purchase a large, strong lever arch file complete with file dividers and lined A4 paper. You will be expected to bring this file with you to all lessons, together with any books you are provided with. You will also need a calculator. We may ask to look at your file at any time and if it is not up to date we will ask you to attend supported study to ensure it is an adequate record of your work.

We will be setting regular independent study work which must be completed on time if you are to reach your potential in this course. It is your responsibility to meet deadlines – if you are aware of a reason why a deadline cannot be met you need to discuss this with your teacher in advance.

The following 3 tasks make up the Bridging Unit between GCSE and BTEC Applied Science. You should work on these tasks over the summer break and bring your work to your first lesson.

TASK 1 (Required knowledge for unit 1):

The first unit of the BTEC course builds upon the scientific knowledge and understanding you gained at GCSE. To help you prepare for this we want to make sure that your knowledge of some key ideas from your GCSEs is sound. To do this, you will be producing 3 posters, 1 for each of biology, chemistry and physics, to cover criteria set out below. It is up to you whether it is handwritten, done electronically or a mixture of both. There is no minimum / maximum size for the poster but the best pieces will be displayed in the BTEC classrooms for reference so ideally the larger, the better. The information you use must be clearly referenced using at least 3 different sources and be your own work.

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In order to pass your GCSE to BTEC bridging assignment you must meet all parts of the criteria outlined below for each subject.

To help you complete these assignments you could use some of the following resources:

- your books / notes from GCSE
- GCSE revision guides
- Seneca learning
- Kerboodle online text books if your school has access to them
- BBC Bitesize GCSE science

Biology assignment: Cells

Cells are the building blocks of life and any Biologist must have a firm grasp of the organelles and structures which make them up. You will have already studied the cell as the fundamental building block of organisms at GCSE. In order to study organisms in more detail we need to ensure our knowledge of the functions of different organelles within cells is spot on. Scientists who work with living things need to be able to predict the outcome of substances on different organisms at a cellular level. Whether this is in drug development, pioneering research into the use of therapeutic STEM cells or genetic engineering, an in depth knowledge of cell workings is essential.

To prepare you for your first unit in your level 3 BTEC, you must revisit your knowledge of Eukaryotic cells from GCSE and produce an information poster. This research task will help you review these organelles, gain an insight into the relative sizes of cells and organelles and provided an introduction to the equipment we use to study them.

Criteria:

- Introduce Eukaryotic cells
- Describe the different types of Eukaryotic cell
- List cell organelles stating structure and functions
- Use diagrams to illustrate your work
- Compare the relative sizes of organelles
- Describe ways in which organelles can be viewed
- Include references for the sources of your information

Chemistry assignment: Types of structure

One of the key concepts you will be examined on in Chemistry is atomic structure and bonding. Scientists and technicians working in the chemical industry need to have an understanding of atoms and electronic structure. This allows them to predict how chemical substances will react in the production of a wide range of products – anything from fertilisers in the farming industry to fragrances in the perfume industry. Metals play an important role in the construction industry, in providing structure to building, as well as in electrical wiring. So understanding the chemical and physical properties of metals is essential when selecting building materials.

To prepare you for your first unit in your level 3 BTEC, you must revisit your knowledge on atomic structure and bonding from GCSE and produce an information poster on the 3 different types of bonding; ionic, covalent and metallic.

Criteria

- Introduce bonding by considering the structure of an atom and why atoms form bonds
- Use diagrams to show the structure of each of the three types of bonding
- State whether each type of bonding occurs between metals, non-metals or both
- Give examples of substances with each type of bonding

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- Describe the properties of each type of structure
- Explain the different properties you have described
- Include references for the sources of your information

Physics assignment: The electromagnetic spectrum

One of the key concepts you will be examined on in Physics is waves. Knowledge of waves is essential in a wide range of industries and organisations. In the communication industry, scientists and technicians apply their knowledge of the electromagnetic spectrum when designing mobile phone and satellite communication, and fibre optics are used to transmit telephone and television signals. Fibre optics are also used in diagnostic tools in medicine. To prepare you for your first unit in your level 3 BTEC, you must revisit your knowledge on the electromagnetic spectrum and produce an information poster on the different parts of the spectrum, their dangers and their uses.

Criteria

- Introduce the electromagnetic spectrum and explain why they are described as transverse waves.
- Use diagram(s) to show wavelength, amplitude and frequency of a transverse wave
- Annotate a diagram showing the electromagnetic spectrum, including the typical wavelengths and frequencies for each region of the spectrum.
- Explain how frequency and wavelength are related in the wave speed equation.
- Describe two ways that each part of the spectrum can be used (e.g. microwaves are used for cooking, and also in mobile phones).
- With the exception of radio waves, explain the possible dangers to the human body for each region of the spectrum
- Include references for the sources of your information

TASK 2 (review of practical skills):

For the unit 2 task you will be producing a summary of the practical skills that you have acquired during your GCSE science studies. Learning aim D of unit 2 is “Review personal development of scientific skills for laboratory work”. As part of your analysis and evaluation of the skills that you will develop as part of the BTEC applied science course you will need to consider the skills that you have already gained from your science education so far. You will need to produce a report summarising your skill development across all the practical work in your science GCSE. It is up to you to choose whether it is handwritten or typed up on a computer; and how you wish to display the information – you might prefer to use a table or bullet points rather than writing paragraphs. You should include equipment from all 3 sciences, for example, measuring cylinders, stopwatches, Bunsen burners, balances, microscopes, quadrats, electrical circuits and lenses. This list isn’t complete and you should include all the skills that you have learnt, not just those listed.

Criteria:

For each skill you should include

- A description of what the skill is used for eg. a measuring cylinder is used for accurately measuring out volumes of liquids
- A method on how to carry out the skill
- An explanation of how you can make sure you are using the apparatus correctly, eg read to the bottom of the meniscus and make sure the scale is in line with the eye to avoid parallax error

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- A description of any safety requirements that need to be considered eg place measuring cylinder on a flat surface away from the edge of the bench

TASK 3 (Maths skills):

As you know from your studies at GCSE, a sound knowledge of maths is essential in science and its applications. Whether it is calculating concentrations of solutions for making medicines, working out mean values from investigations into the resistance of a wire, or calculating the rate of growth of bacteria from a biological sample it is essential that scientists can apply their maths skills to the task in hand. At this stage we would not be expecting you to do anything more advanced than what you have already covered in GCSE science or maths; but you should be competent in the skills listed below. If not, you need to spend time on BBC Bitesize, Seneca learning or use your maths revision guides / book / notes to help you.

- Carry out calculations using numbers in both ordinary and standard form
- Round the answer to a calculation to a given number of significant figures
- Calculate a mean
- Use ratios, fractions and percentages
- Change the subject of an equation
- Plot a graph using suitable axes and drawing a line of best fit.