

Sixth Form Handbook
BTEC Level 3 National Foundation
Diploma in Applied Science

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About the course

The BTEC Level 3 National Foundation Diploma in Applied Science is a two-year course to help students develop strong and specialist practical skills and understanding in science across the three scientific disciplines of biology, chemistry and physics.

This one and a half A-Level equivalent course focuses on the application of science in the world of work. More and more employers are looking for well-qualified young people to work in the fields of science, technology and engineering.

BTEC Applied Science is widely recognised by industry and higher education as a leading vocational qualification at Level 3. Well over 100,000 BTEC students apply to UK universities every year and are accepted into over 150 UK universities and higher education institutes. For both Year 12 and Year 13 all the assignments created will have assessment tasks and activities which will enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria

The course is made up from 6 units – 2 of these units are assessed externally by examination and the other 4 are assessed internally through assignments.

Topics include

- Unit 1 Principles and Applications of Science (Year 12 – externally assessed)
- Unit 2 Practical Scientific Procedures and Techniques (Year 12 – internally assessed)
- Unit 4 Laboratory Techniques and their Applications (Year 12 – internally assessed)
- Unit 3 Science Investigation Skills (Year 13 – externally assessed)
- Unit 8 Physiology of Human Body Systems (Year 13 – internally assessed)
- Unit 15 Electrical Circuits and their Applications (Year 13 – internally assessed)

How you will be assessed

There are three mandatory units, one internally assessed and two externally assessed. Learners must complete and achieve at least a pass grade or above for all these units.

All units are assessed using a grading scale of Distinction, Merit, Pass and Unclassified. All mandatory and optional units contribute proportionately to the overall qualification grade. The BTEC Nationals attract UCAS points.

Year One

Unit 1:

Assessed by exams. Two hours long.

Units 2:

Assessed by internal assignments.

Units 4:

Assessed by internal assignments.

Year Two

Unit 3:

Assessed by external scientific investigation.

Unit 8:

Assessed by internal assignments

Unit 15:

Assessed by internal assignments

Practical Work

The BTEC in Applied Science places a strong emphasis on practical work and you will find your skills improving throughout the year. Assessment of these skills will be through written questions in the exams (Units 1 and 3) and through written assignments (units 2, 4, 8 and 15) over the two years.

Lab books

We expect all students to maintain a clear lab book providing evidence for the assignments.

- Each page should be numbered and dated.
- Write in ink. Pencil should not be used for anything other than graphs and diagrams.
- Cross out mistakes (single line through) and re-write i.e. do not overwrite, erase, or use Tippex.
- Printed information, graphs, photographs and flat “data” such as chromatograms or TLC plates should be stuck in flat and not folded. No work should be covered.
- Complete a table of contents for additional practicals. You will provided a list of required practicals.

Lab books may contain:

- title and date of experiment
- objectives
- risk assessments
- apparatus, with sketches/photos of set up
- method, including all measurements
- data and observations input to tables (or similar) while carrying out the experiment
- calculations, including uncertainty – annotated to show thinking
- graphs
- analysis and conclusions
- cross-references to earlier data and references to external information

Lab Health & Safety

You are more likely to suffer a minor injury - a cut, burn or scald - in a kitchen than in a laboratory. We know there are hazards involved in working in a laboratory so Risk Assessments are made for every experiment and protective measures are taken to control those risks. In biology lessons most risks arise from the use of chemicals, but some other

practical activities have associated hazards e.g. heating, cutting. Laboratory safety is about minimising exposure to risk, as well as protecting yourself from the results of mishaps.

You will be healthy, safe and successful in your laboratory work provided you plan your work taking note of the health and safety information provided, you wear eye protection and whatever else is recommended and you carry out all instructions thoughtfully and correctly.

All the experiments in this course have been checked for health and safety implications, but you will be expected to carry out a Risk Assessment (and have it checked before starting any practical work) for some.

A risk assessment is nothing more than a careful examination of what, in your experiment or investigation, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. The important things you need to decide are whether a hazard is significant, and whether you have it covered by satisfactory precautions so that the risk is small.

Hazard means anything that can cause harm. **Risk** is the chance, high or low, that somebody will be harmed by the hazard.

Good laboratory practice

As well as the specific protective measures to be taken when hazardous chemicals are being used, there are also general procedures to be observed in all laboratories at all times.

- Long hair** should be tied back and you should not wear 'wet look' hair preparations, which can make hair unusually flammable.
- A **long sleeves** should be worn to avoid damage to arms.
- Closed shoes** should be worn to avoid damage to feet.
- Eating, drinking and chewing** are not permitted in laboratories.
- Eye protection** should be worn whenever a Risk Assessment requires it, or whenever there is any risk to your eyes. This includes, for example, washing up at the end of the lesson and even when you have finished practical work, as long as other students are still working.
- Chemicals that you use will be **clearly labelled** with the name of the chemical, any hazards, and the date of acquisition or preparation. When taking liquids from a bottle, remove the stopper with one hand and keep the stopper in your hand whilst pouring from the bottle. This way, the stopper is likely to be replaced at once and to remain uncontaminated. Pour liquids from the opposite side to the label, so that it does not become damaged by corrosive chemicals.
- Study carefully the best techniques for **safely heating** chemicals. Small quantities of solid can be heated in test tubes; liquids present greater problems, because of the risk of 'bumping' and 'spitting'. Boiling tubes are safer than test tubes (because of their greater volume), but should be **less than one-fifth full**. You are likely to point test tubes away from your own face, but do remember the need to do the same for your neighbours. **Use a water bath to heat flammable liquids; NEVER use a naked flame.**
- You must always **clear up chemical spillages straight away**. Whilst a few spills may need chemical neutralisation or similar treatment, most minor spills can be wiped up using damp green paper towels.



- In the event of getting a chemical in your eye, or on your skin, **flood the area with large quantities of water at once**. Keep the water running for at least 10 minutes (20 minutes for alkalis in the eye). Even if the chemical reacts exothermically with water, provided a large quantity of water is used, the heating effect will be negligible. We have eye wash stations in each laboratory.
- A heat burn from apparatus, scalding liquids or steam is treated by **immersing the area in cool water** for at least 10 minutes. Preferably use running water from rubber tubing, fixed to a tap.
- **Report all accidents at once.**

Plagiarism

For the assignments you will need to carry out research. You must cite sources of information using the Harvard referencing system

- To reference a quotation in the body of your work you put quotation marks “...” around the section that you have taken from someone else’s work. After the last quotation mark you put the reference in brackets. For books it should include the surname of the writer, the year they wrote it and the page number you took the quote from.
- You then have to include the full reference at the end of your report in a ‘References’ section e.g. Kennedy, D. (1987) *‘Islands of White: Settler society and culture in Kenya and Southern Rhodesia, 1890-1939’* (2nd Edition) Durham: Duke University Press.
- Websites also require referencing in a similar way e.g. Mooney, A. and Blackburn, T. (2003) *Children’s views on childcare* [online] Available from: www.childlink.co.uk Accessed [6th June 2007]. If the website has no known author, simply skip to “The title of the website” and carry on from there.

Please visit & go through the following websites for guidance on summarising and avoiding plagiarism:

<http://www.buowl.boun.edu.tr/students/avoidingplagiarism.htm>

<http://owl.english.purdue.edu/owl/resource/563/03/>

Our Expectations of You

At the beginning of the course, you will be required to sign a form to confirm that you have fully read and understood the course expectations.

Course requirements

BTEC Applied Science builds on the knowledge, understanding and skills that you obtained in your GCSEs (including Maths and English). If you are feeling a little rusty you need to dust off your revision guide.

The BTEC requires a **considerably** more independent approach than you experienced at GCSE. You will need to make sure you consolidate knowledge outside of lessons and ask whenever help is required. You will not attain a good grade by simply cramming at the

end. You will need to actively participate and concentrate fully in lessons from day one. You can expect to receive flipped learning tasks before each lesson that you must complete before arriving in class.

Your Notes

We expect all students to maintain a well-organised folder. These will be spot checked at times during the course.

Your folder should include a minimum of:

- Notes of theory
- Flipped learning tasks.
- Topic overview sheets.
- Completed independent study tasks and questions – with corrections.
- End of topic tests – with corrections and next steps.

All assignments are to be completed and submitted through google classroom.

Independent Study

To achieve a good grade it is imperative that you work outside of lessons to prepare, consolidate and develop the ideas covered during lessons. **It is our expectation that from the start of the course, for each lesson at least 1 hour of independent study is completed.**

At the beginning of a topic you can expect a topic overview sheet. This details the lessons, success criteria and resources. You will also receive flipped learning tasks, essentially, **preparation work that must be carried out before the lesson.** If you do not prepare for the lesson you will often be unable to participate as fully and gain the most from the lesson. Continued lack of preparation will result in disciplinary action.

The independent work you may carry out (but are in no way limited to):

- preparation work from the topic overview and flipped tasks.
- reading/watching videos around the subject.
- extra notes as necessary to ensure full understanding, taken after the lesson.
- writing up experiments.
- completing past paper questions.
- acting on feedback from independent assessments and in class assessments.
- answering questions from the book.
- completing the workbook.
- attending drop in sessions on offer by the department to get 1:1 help.

Course Reading List & Materials

Books

You will be lent a copy of the BTEC National Applied Science Student Book 1 ISBN 9781292134093

Other books that will help include:

BTEC National Applied Science Revision Guide ISBN 9781292150048

BTEC National Applied Science Revision Workbook ISBN 9781292258171

The Prep Room Organiser (Association for Science Education, 2003) ISBN 9780863572838

Journals

CLEAPSS publications

Laboratory News

New Scientist

Useful websites

www.ase.org.uk The Association for Science Education

www.explorer.bio-rad.com Bio Rad science education

www.genetics.gsk.com/virtual.htm GlaxoSmithKline virtual tour of genetics laboratories

www.hhmi.org/biointeractive/vlabs Howard Hughes Medical Institute virtual laboratory tours

www.infomat.net/infomat/rd_staffroom/rd1/database/ cleapps CLEAPSS

www.iob.org.uk The Institute of Biology

www.iop.org.uk The Institute of Physics

www.istonline.org.uk Institute of Science Technology:

www.mhra.gov.uk Medicines and Healthcare products Regulatory Agency

Physics and Maths Tutor

<http://www.physicsandmathstutor.com/biology-revision/a-level-aqa/>

Website contains additional notes and questions.



Please remember to use the Harvard system for referencing.

Trips and Visits

Students will visit outside laboratories and science centres. Guest speakers will visit students to enhance the learning experience.

Tasks before September

You are expected to complete the tasks below. If you have a problem with this please see Mrs Storey. Your work will be checked during the first lesson of the year.

I look forward to teaching you in September. Enjoy ☺

As you make the transition from GCSE to Level 3 studies you may find that you are expected to do much more independent reading, revision and research outside of lessons. These tasks will help you to make a start.

There are three tasks for you to complete before the start of the course.

Task one: Report writing task:

BTEC Level 3 Applied Science involves writing a number of assignments and compiling reports. To do this, you will need to successfully research, find and extract relevant information from a number of sources both internet-sourced and non-internet sourced (e.g. books, journals or personal contacts for example).

You will need to structure and summarise this information and produce a coherent and logical report avoiding any plagiarism or copy and paste!

Your Task:

Produce a 250 word report on: "The Development of the Theory of Evolution".

A good strategy in summarising a text you have read is:

- Read the text several times but do not make any notes. During your first reading you may be tempted to take extensive notes, but later you may find out that you do not need them. Therefore, read without making notes but interacting with the author. That is, familiarise yourself with the text, the author, the main ideas and arguments, etc.
- List the key ideas and supporting arguments
- Rank them in order of importance before writing them up

Please include a word count at the end (to show how many words are in your report). The word count should be within 10% of the recommended 250 words.

Remember to list the websites that you have used in preparing your report.

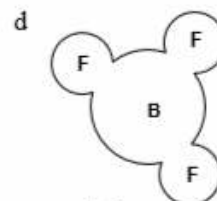
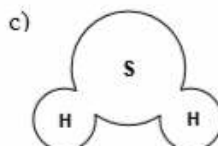
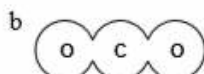
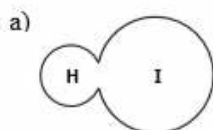
Microsoft Word has a 'references' menu. In this is a drop down menu for 'citations and bibliography' – this is a good way to insert reference citations in the text and produces a bibliography that can be inserted at the end of the report – give it a go!

Task two: preparation for working with chemicals:

Please complete each of the following tasks, this is to give an idea of what you have been taught and understood from your GCSE programme.

Section 1

1 What is the formula for each molecule shown below:



2 Which of the following substances are elements and which are compounds?

- a) He b) H₂ c) CO d) Cl₂ e) S₈ f) NBr₃

Section 2

Write the full balanced chemical equation for each of the following reaction:

Chemical reaction	Equation
sodium hydroxide (NaOH) + dilute hydrochloric acid (HCl)	
sodium hydrogencarbonate (Na ₂ CO ₃) + dilute nitric acid	

Section 3

- a) What is the name given to a chemical reaction when an equal volume of acid reacts with alkali?
- b) What is the chemical name for common salt?
- c) Which salts are produced by i) Hydrochloric acid, ii) Sulfuric acid, iii) Nitric acid?

Section 4

Complete the following table with the missing terms: Magnesium, 3, 1.00, 650, fairly strong, 0.26, 1, Sodium.

Metal	Number of electrons in the last shell	Melting Point (°C)	Electrical conductivity	Strength of metallic bonding in the metal
		98		Weakest
	2		0.42	
Aluminium		661		Strongest

Task three: communicating:

Induction work

Complete a presentation on an area of personal interest this could be any of the following: e.g. your mobile phone/sport/drama/music/employment/family

1. Your Presentation will need to be a maximum of 5 slides you can use either windows PowerPoint or Prezi <http://prezi.com/> (for the latter you will need to register)
2. One key idea/slide (each slide should have a maximum of 5 sentences)
3. Each sentence should be 5 words maximum
4. You can include images/diagrams/animations/video clips
5. Include references (if required) including the date when the information was accessed using a referencing system such as the Harvard system as instructed using the following link:- <http://www.neilstoolbox.com/bibliographycreator/index.htm> You can use the references dropdown menu in Microsoft Office to do this.
6. Your PowerPoint presentation should be a maximum of 5 slides
7. Save your presentation on a memory stick or in a cloud based application e.g. <https://www.icloud.com> or dropbox-<https://www.dropbox.com/>
8. You will be doing a presentation in your first lesson please let the Mrs Storey know if there is a problem with doing the presentation.
9. Write your presentation notes.
10. Bring this with you to the first lesson along with the following:-
 - a. Pen, pencil case
 - b. Scientific calculatorAnd a memory stick with your presentation on it...

Who can I contact for help?

Mrs Storey (BTEC Science Co-ordinator) e.storey@poolehigh.poole.sch.uk

Room tbc