Hopwood Hall College

## Level 3 Applied Science

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## Our Vision:

 the best in you!

## Our Values

## (v) INTEGRITY

## (P) NURTURING

## (8) AMBITION

## Preparing for College:

## A message from the Principal:

Thank you for applying to study at Hopwood Hall College. We look forward to welcoming you soon. We want to help make sure that you are as well prepared as possible so that you feel at home here from day one.

We understand that the transition from school to college can be daunting but there's no need to worry! We have plenty of pre-enrolment activities which will help to prepare you and make your transition as smooth as possible.
Before you join the College in September, we want you to begin to develop your skills. We have brought together some subject-specific information, signposting to helpful reading and relevant websites and some activities for you to complete.

Don't worry if you get stuck on anything, just try to complete as much as you can. I the meantime, if you have any questions please contact our Student and College Services Team on 01616437560 who will be happy to help.
I look forward to welcoming you to your college very soon.

## Julia Heap

Principal and Chief Executive


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## Introduction

The transition from GCSE to BTEC can be a big step and to make this smoother and to give you the best possible start, we have prepared this pack for you. You are expected to read through the resources and complete all activities.

It is to be used after you complete your GCSEs throughout the remainder of the Summer term and over the Summer Holidays. In September you will be given a baseline test to check your knowledge of the Pre-knowledge topics. Progression onto the BTEC Applied Science course is dependent on:

- Meeting the course entry requirements
- Completing all the activities contained in this pack
- Passing the baseline test in September


## Useful resources/links

BBC Bitesize combined science www.bbc.co.uk/bitesize/examspecs/ zqkww6f
Pearson Active Learn
Online Student Books:
www.pearsonactivelearn.com/app/Home

## Interesting Reading

Relax this summer with a good read.
The books below are all popular science books and brilliant for extending your understanding of Science...

Junk DNA: Our DNA is so much more multifaceted than you probably realise, this book will really develop your understanding of all the work you will do on Genetics. Available at amazon.co.uk.

## Surely, You're Joking Mr Feynman:

Adventures of a Curious Character ISBN - OO9917331X - Richard Feynman was a Nobel Prize winning Physicist. Feynman truly epitomises what a Physicist is. Reading this books you will gain a perception into his life's work including the design of the first atomic bomb and his bongo playing adventures and his work in the field of particle physics. (Also available on Audio book).
A Short History of Nearly Everything:
A whirlwind tour through many facets of history starting with the Big Bang to present times. This is a really manageable read that will acquaint you with common concepts and introduce you to some of the more colourful characters from the history of science! Available at amazon. co.uk
Bad Science: (Paperback) Ben Goldacre Here Ben Goldacre dismantles anyone who published bad / misleading or dodgy science - this book will make you think about everything the advertising industry tries to sell you by making it sound 'scientific'.
Take a journey, read a book...


A Short History of Nearly Everything


## Film Recommendations

We all love a good story and everyone
loves great science stories.
Here are some of the best films and
television, based on real life scientists and
discoveries.


Cosmos: A Spacetime Odyssey (Series TV)
An excellent Science documentary which tries to cover a huge chunk of our Scientific discoveries throughout history. It's throughout history. It's presented by Neil deGrasse Tyson, produced by Seth Macrame) and it's on Nemy Guy fame) and it' Watch this now


Chemistry: A volatile Histo (Series 2010)
a fascinating three-part ser by theoretical physicist Jim Khaliil, exploring everything from the history of the lements to the rivalries an lements to the rivalries an controversies that bedev cientific progress to the to split matter.

The Martian (2015) Great to watch or read; it depicts an astronaut's lone struggle to survive on Mars after being left on Mars after being left escue him, and bring and bring him home to Earth

## Transition Tasks

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. This task will help you to make
a start. There are THREE tasks for you to complete.

TASK ONE: Report Writing
Task - Your Challenge
The BTEC Level 3 Applied Science course includes units that are assignment-based. In preparing these assignments, you will need to write/produce a number of reports. To do this, you will need to successfully research, find and extract relevant information from a number of sources both internet-sourced and noninternet sourced (e.g. books, journals or personal contacts)
You will need to structure and summarise this information and produce a coherent and logical report avoiding any plagiarism or copy and paste! Please visit \& go through the following websites for guidance on summarising and avoiding plagiarism:
http://www.buowl.boun.edu.tr/students/ avoidingplagiarism.htm
qualifications.pearson.com/content/dam/ pdf/Support/Quality\%20Assurance/ PlagiarismFactsheet.pdf

## CHECK LINK

Prepare a 250-word written report based on one of the following questions.
You will carry out your own research and then hand your work in during the first lesson back in September. Your work can be presented in any format of your choice.
Remember, you are demonstrating your ability to work independently and produce work to the standard required at post 16.

## Choose from:

Biology:

1. The history of the microscope
2. The differences between light and electron microscopes

## Physics:

1. The application of fibre optics in medicine (to include endoscopes)
2. The application of fibre optics in communication (to include analogue-todigital conversion and broadband).

You can start your research by reading parts of Unit 1 in the Pearson Online Book (see how to log in, on page 3).

## TIPS:

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. n 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

## Exam practice questions

Chemistry questions：Q1－Atomic structure
1：Label the sub－atomic
particles on the atom！
2：Copy and
complete the table below．

| Particle | Relative Mass |
| :---: | :---: |
| Proton |  |
| Electron |  |

3：Complete the table showing the number of sub－atomic particles for each element

| Particle | Atom or ion | Atomic number | Mass number | Number of <br> protons | Number of <br> neutrons | Number of <br> electrons | Electronic <br> structure |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }^{23} \mathrm{Na}^{+}$ | ion | 11 | 23 | 11 | 12 | 10 | $[2,8]^{+}$ |
| ${ }^{23} \mathrm{Na}$ |  |  |  |  |  |  |  |
| ${ }^{40} \mathrm{Ca}^{2+}$ |  |  |  |  |  |  |  |
|  | atom | 9 | 19 |  |  |  |  |
|  |  |  |  | 17 | 20 | 18 |  |
|  |  |  |  | 17 | 18 | 18 |  |
|  |  | 19 | 39 |  |  | 18 |  |
|  |  |  |  | 18 | 22 | 18 |  |
|  |  | 1 | 1 |  |  | 0 |  |
|  |  |  |  |  | 5 |  | $[2]^{2+}$ |

A periodic table has been provided to help you，on page 8．Use Student book 1 （Unit 1 to help you research and revise the exam questions）

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[^0]＊The Lanthanides（atomic numbers $58-71$ ）and the Actinides（atomic numbers $90-103$ ）have
Relative atomic masses for $\mathbf{C u}$ and Cl have not been rounded to the nearest whole number．

Atoms are the basic building blocks of matter. They are not the smallest of particles, and within Chemistry, we are interested in the sub-atomic particles especially the electron. Using a periodic table, draw the electronic configuration, as well as identifying how many sub-atomic particles there are for the following atoms and its corresponding ions:


Q2 - Bonding and Dot cross diagrams You would have covered ionic and covalent bonding in your GCSE. Using your knowledge: - Draw the dot cross diagrams for the following compounds, showing only outer electrons. - State the type of bonding involved (ionic, covalent, metallic).

| Oxygen gas Sodium chloride |  |
| :--- | :--- |
| Magnesium oxide |  |
| Water |  |
| Carbon dioxide |  |

## Q3 - Rearranging Formulae

When solving chemistry problems you will often be required to rearrange an equation to solve for an unknown. You would have seen this in Physics when trying to calculate speed.

Speed $(\mathrm{m} / \mathrm{s})=$ distance $(\mathrm{m}) /$ time $(\mathrm{s})$
We can re-write this to show distance and time as follows:
Distance $(\mathrm{m})=$ speed $(\mathrm{m} / \mathrm{s}) \times$ time $(\mathrm{s}) \quad$ Time $(\mathrm{s})=$ distance $(\mathrm{m}) /$ speed $(\mathrm{m} / \mathrm{s})$

You will encounter the following equations in the first topic.

## Rearrange the following:

a)

mass =
$\mathrm{mol}=$
RMM =
b)

c) Rearrange:

$$
c=
$$

$$
n=c v
$$

$\mathrm{v}=$

The units of $\boldsymbol{n}$ is mol and the unit for $\boldsymbol{v}$ is $\mathrm{dm}^{3}$. Write down the units for $c$ :

## Q4 - Balancing equations

Fill in the boxes with the numbers you need to balance the equation Note: Some boxes can be left blank.

$$
\begin{aligned}
& \square \mathrm{H}_{2}+\square \mathrm{O}_{2} \rightarrow \square \mathrm{H}_{2} \mathrm{O} \\
& \square \mathrm{H}_{2}+\square \mathrm{N}_{2} \rightarrow \square \mathrm{NH}_{3} \\
& \square \mathrm{Cr}+\square \mathrm{O}_{2} \rightarrow \square \mathrm{Cr}_{2} \mathrm{O}_{3} \\
& \square \mathrm{Al}_{2} \mathrm{O}_{3} \rightarrow \square \mathrm{Al}+\square \mathrm{O}_{2} \\
& \square \mathrm{P}_{4}+\square \mathrm{O}_{2} \rightarrow \square \mathrm{P}_{2} \mathrm{O}_{5}
\end{aligned}
$$

## Q5 - Relative formula mass

Use a Periodic Table to work out the relative formula mass of the following compounds:
e.g. $\mathrm{NaOH}: \mathrm{Na}+\mathrm{O}+\mathrm{H}=23+16+1=40$
a) $F_{2}$
b) Fe
c) $\mathrm{H}_{2} \mathrm{SO}_{4}$
d) $\mathrm{Al}_{2} \mathrm{O}_{3}$
e) $\mathrm{Mg}(\mathrm{OH})_{2}$
f) $\mathrm{Al}\left(\mathrm{NO}_{3}\right)_{3}$
Video: B.
hwww.youtube.com/watch?v=cj8dDTHGJBY
a) This is a diagrammatical representation of an animal cell showing its ultrastructure. Try to identify structures 1-16


| 1. | 9. |
| :--- | :--- |
| 2. | 10. |
| 3. | 11. |
| 4. | 12. |
| 5. | 13. |
| 6. | 14. |
| 7. | 15. |
| 8. | 16. |

b) This is a diagrammatical representation of a plant cell showing its ultrastructure. Try to identify structures A-I


Q2 - Organelle structure and function
Match the cell structure with its function
in the table below. Record your answers in
the table below.

| Structure | Function |
| :--- | :--- |
| 1. Plasma <br> membrane | a. Releasing energy |
| 2. Golgi body | b. Making proteins from amino acids |
| 3. <br> Lysosome | c. Controlling what enters and leaves <br> the cell |
| d. Modifying, enclosing and <br> dispatching proteins |  |
| Nucleus <br> Cytoplasm | e. Breaking down and recycling <br> bacteria and worn out organelles |
| 6. <br> Centrioles | f. Making, storing and transporting <br> proteins |
| 7. Smooth endoplasmic reticulum <br> (SER) | g. Surrounding the nucleus |
| 8. Rough endoplasmic reticulum (RER) | h. Organising the spindle in cell <br> division |
| 9. <br> Ribosomes | i. Controlling the activities in the cell |
| 10. Mitochondrion | j. Making and transporting fats |


| Answers (write the correct <br> Ansmber(Structure)) | letter (Function) next to the | corresponding |
| :--- | :--- | :--- | :--- | :--- |
| numb |  |  |


| Picture | Plant/Animal? | Function (it's job) \& features |
| :--- | :--- | :--- |
| Red blood cell |  | Contains haemoglobin to carry oxygen to the cells. |
| Sperm cell |  |  |
| Nerve cell |  |  |
| Palisade cell |  |  |

## Q1 - Wave features

A transverse wave has five key terms you need to know and be able to label on a diagram.

1. Wavelength - This is the distance of one complete wave.
2. Wave direction - This is the direction the wave is travelling.
3. Peak - The top of the wave
4. Trough - The lowest part of the wave.
5. Amplitude - The height of the peak, or the depth of the trough from the middle.

Task: Label the main features of a wave below on the diagram.


C

## Q2 - Types of Waves

Waves may be longitudinal or transverse.
Describe the differences between longitudinal waves and transverse waves.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

Name one type of wave that may be either transverse or longitudinal.
(1 mark)

## Q3 - The Wave equation

The wave equation is:


$$
\begin{aligned}
& \mathrm{v}=\text { velocity } \\
& \mathrm{f}=\text { frequency } \\
& \lambda=\text { wavelength }
\end{aligned}
$$

## Rearrange the following:

v =
$\mathrm{f}=$
$\lambda=$

## What are the units for each symbol?

## TASK THREE:

Definitions, write them out and learn them word for word!
olsc.org.uk/wp-content/uploads/2017/10/
BTEC-Command-Verlbs.docx

| Command or term | Definition |
| :--- | :--- |
| Add/label | Learners label or add to a stimulus material given in the question, <br> for example labelling a diagram or adding units to a table. |
| Assess | Learners give careful consideration to all the factors or events that <br> apply and identify which are the most important or relevant. Make <br> a judgement on the importance of something and come to a <br> conclusion where needed. |
| Calculate | Learners obtain a numerical answer, showing relevant working. <br> If the answer has a unit, this must be included. |
| Comment on | Learners synthesise a number of variables from data/ information <br> to form a judgement. More than two factors need to be <br> synthesised. |
| Compare | Learners look for the similarities and differences of two (or more) <br> things. Should not require the drawing of a conclusion. Answer <br> must relate to both (or all) things mentioned in the question. The <br> answer must include at least one similarity and one difference. |
| Complete | Learners complete a table/diagram. |
| Criticise | Learners inspect a set of data, an experimental plan or a scientific <br> statement and consider the elements. Look at the merits and/or <br> faults of the information presented and back up judgements made. |
| Deduce | Learners draw/reach conclusion(s) from the information provided. |

# Please bring the work with you to your first lesson in Applied Science! 

AND remember to bring pen, pencil, ruler, eraser, calculator and paper too!

## See you there.....



## College safety starts With Youl <br> Wear Your ID Badge!

All students and staff MUST wear their ID badge while on College premises. If you forget it you'll miss out on all this...

- Our Bistros and Refectory use
cashless information stored in your ID card for payment of food and drink - FREE buses - you need your ID badge to get on
- Our printers and photocopiers us your ID badge for identification
Exams - to prove that you are a
Exams - to prove t
- Security - no ID no access to College

To top up your ID card visit our website. If you forget it...go to reception for a temporary sticker
Thank you
$\frac{1}{2000}$


Free buses to Middleton and Rochdale campuses 2018/19


Rochoale campuses $201: / 19$
H3 FROM BURY $\quad$ H4 FROM MILNRO




[^0]:    

