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Hopwood Hall College Level 3 Applied Science





Our Vision: Bringing out the best in you!

Our Values

INTEGRITY

NURTURING

SUSTAINABILITY

ENJOYMENT

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. In the meantime, if you have any questions, please contact our Student and College Services Team on 0161 643 7560 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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Command Terms, Definitions What you will need to bring on your first day Bus routes and timetables 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 - 009917331X - 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...



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 presented by Neil deGrasse Tyson, produced by Seth MacFarlane (Yes, from Family

Guy fame) and it's on Netflix;

Watch this now!



Chemistry: A volatile Histo (Series 2010)

a fascinating three-part ser by theoretical physicist Jim Khalili, exploring everything from the history of the elements to the rivalries an controversies that bedeville scientific progress to the latest bleeding-edge attem 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 behind, and efforts to rescue him, and bring him home to Earth



M D V IC TINC

Inherit The Wind (1960) Great if you can find it. Based on a real life trial of a teacher accused of the crime of teaching Darwinian evolution in school in America. Does the debate rumble on today?



Gorillas in the Mist (1988)

An absolute classic that retells the true story of the life and work of Dian Fossey and her work studying and protecting mountain gorillas from poachers and habitat loss. A tear jerker.

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-to-digital 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. 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!

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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	Relative Charge
Proton		
Neutron		
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 protons	Number of neutrons	Number of electrons	Electronic structure
²³ Na*	ion	11	23	11	12	10	[2,8] ⁺
²³ Na							
40Ca2+							
	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)

													-
0	4 Helium 2	20 Ne	10	Ar	argon 18	<mark>א</mark> 8	krypton 36	131 Xe	54	[222] Rn	nadon 86	been	
7		1 9	fluorine 9	35.5 CI	chlorine 17	80 Br	bromine 35	127 I	iodine 53	[210] At	astatine 85	16 have cated	
9		9 0	oxygen 8	32 S	sulfur 16	79 Se	selenium 34	128 Te	tellurium 52	[209] Po	polonium 84	authenti	
2		7 Z	nitrogen 7	5 9	phosphorus 15	75 As	arsenic 33	122 Sb	antimony 51	209 Bi	bismuth 83	numbers not fully a	
4		₽u	carbon 6	28 Si	14 14	73 Ge	germanium 32	119 Sn	20 1	207 Pb	lead 82	atomic I	tted.
e		₽œ	5 5	27 A I	aluminium 13	70 Ga	31 31	115 n	indium 49	204 TI	thallium 81	nts with report	een omi
						65 Zn	30 30	112 Cd	cadmium 48	201 Hg	mercury 80	Eleme) have b
						63.5 Cu	copper 29	108 Ag	silver 47	197 Au	plog 79	[272] Rg 111	0 - 103)
						29 20	nickel 28	106 Pd	palladium 46	1 95	platinum 78	[271] Ds darmstadtium 110	mbers 9
						ი მ მ	cobalt 27	R 103	45	192 Ir	iridium 77	[268] Mt 109	tomic nu
	hydrogen 1					56 Fe	iron 26	101 Ru	ruthenium 44	190 Os	osmium 76	[277] Hs hassium 108	nides (a
		, 		1		55 Mn	manganese 25	^{98]}	technetium 43	186 Re	rhenium 75	[264] Bh ^{bohnium} 107	the Acti
		c mass nbol	number			ن 2	chromium 24	96 90	molybdenum 42	184 W	tungsten 74	[266] Sg 106	71) and
	Key	/e atomi	(proton)			< 21	vanadium 23	80 80 80	41	181 Ta	tantalum 73	[262] Db dubnium 105	ers 58 -
		relativ ato	atomic			H 48	titanium 22	7	zirconium 40	178 Hf	hafnium 72	[261] Rf nutherfordium 104	ic numb
						45 Sc	scandium 21	89	yttrium 39	139 La*	lanthanum 57	[227] Ac* 89	s (atom
2		о 8	beryllium 4	24 Mg	magnesium 12	40 Ca	calcium 20	88 Sr	strontium 38	137 Ba	barium 56	[226] Ra 88	nthanide
-		۲ Li	3 3	23 Na	11	es ×	otassium 19	85 Rb	a7 37	<mark>3</mark> 33	caesium 55	[223] Fr francium 87	The La

Relative atomic masses for Cu and CI have not been rounded to the nearest whole number.

Insert for Applied General Science (TVQ01028, TVQ01020 For use in exams from the January 2017 Series onwards v

The Periodic Table of Elements

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:

Hydrogen Nitrogen Calcium Number of: Number of: Number of: p: p: p: e: e: e: n: n: n: Hydrogen ion, H* Nitrogen ion Calcium ion Charge: Charge: Charge: Number of: Number of: Number of: p: p: p: e: e: e: n: n: n:

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
Ĵ.	
Carbon dioxide	Calcium chloride

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 (m/s) = distance (m) / time (s)

We can re-write this to show distance and time as follows:

Distance (m) = speed (m/s) x time (s)

Time (s) = distance (m) / speed (m/s)

You will encounter the following equations in the first topic.



Q4 – Balancing equations

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

$\Box H_2 + \Box O_2 \rightarrow \Box H_2 O$
$\Box H_2 + \Box N_2 \rightarrow \Box NH_3$
$\Box Cr + \Box O_2 \rightarrow \Box Cr_2 O_3$
$\Box AI_2O_3 \rightarrow \Box AI + \Box O_2$
$\Box P_4 + \Box O_2 \Box P_2 O_5$

Q5 - Relative formula mass

Use a Periodic Table to work out the relative formula mass of the following compounds:

e.g. NaOH : Na + O + H = 23 + 16 + 1 = 40

a)	F ₂	
b)	Fe	
c)	H_2SO_4	
d)	AI_2O_3	
e)	Mg(OH) ₂	
f)	AI(NO ₃) ₃	

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

А.

В.

C.



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

- D. E. F. G.
- G. H.
- п.
- I.

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



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

Answers (w. number(Structur	rite the correct re))	letter (Fr	unction) next to the	corresponding
1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

Picture	Plant/Animal?	Function (it's job) & features
Red blood cell		Contains haemoglobin to carry oxygen to the cells.
Sperm cell		
S		
Egg cell		
Nerve cell		
Epithelial cell		
Root hair cell		
[]		
Palisade cell		These cells are packed with
White blood cell		
Prayote		

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.



Q2 – Types of Waves

Waves may be longitudinal or transverse.

Describe the differences between longitudinal waves and transverse waves.

Q3 – The Wave equation The wave equation is:



v = velocity f = frequency $\lambda =$ wavelength

Rearrange the following:

- v =
- f =

= ג

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-Verbs.docx

Command or term	Definition
Add/label	Learners label or add to a stimulus material given in the question, for example labelling a diagram or adding units to a table.
Assess	Learners give careful consideration to all the factors or events that apply and identify which are the most important or relevant. Make a judgement on the importance of something and come to a conclusion where needed.
Calculate	Learners obtain a numerical answer, showing relevant working. If the answer has a unit, this must be included.
Comment on	Learners synthesise a number of variables from data/ information to form a judgement. More than two factors need to be synthesised.
Compare	Learners look for the similarities and differences of two (or more) things. Should not require the drawing of a conclusion. Answer must relate to both (or all) things mentioned in the question. The 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 statement and consider the elements. Look at the merits and/or 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 You! Wear Your ID Badge!

STUDENT

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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 use your ID badge for identification
 Exams - to prove that you are a
- Hopwood student
- 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



Interactive Travel Link

www.google.com/maps/d/viewer?mid=14pofjI-azEQTO1dHNtmNJUI77U0&II=53.53425711 887462%2C-2.1519096966667417&z=13



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Free buses to Middleton and Rochdale campuses 2018/19

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H6 FROM RAWTENSTALL

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Sudden (Tesco)
Newgate (Rochdale Campus)
Sheriff Street
Bentley Street, Shawclough
Healey Corner, Shawclough Rd
Market Street, Shawforth
Bacup Centre
Rawtenstall (opposite bus station: J sl Bacup Road, Junction with James St,
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RETURN JOURNEY

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H3 FROM BURY

H7 FROM SADDLEWORTH

H4 FROM MILNROW

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Kiln Lane, opposite Tim Bobbin7:45 0116 3LH
Hollingworth Road, Smithybridge7:50
Lake Bank7:52
Littleborough Centre, (Wheatsheaf Pub) . 7:55
Halifax Road, Dearnley8:00
Birch Road8:05
Wardle Road 8:10
Halifax Road8:20
Newgate (Rochdale Campus) 8:25
Manchester Road, Sudden8:30
Manchester Road, Slattocks8:35
Middleton Campus8:40

H8 FROM NORDEN

07:25

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For more information please contact Yelloway on 0161 287 2233