

APPLIED
SCIENCE

SUMMER PROJECTS
YEAR 11 STUDENTS

APPLIED SCIENCE :
CHEMISTRY
BIOLOGY
PHYSICS



HEART OF
WORCESTERSHIRE
COLLEGE

KICK START YOUR STUDY AT HOW COLLEGE WITH ONE OF OUR CURRICULUM BRIDGING PROJECTS

Tasks 1 - Chemistry

Background

In year 1 of the Applied science course, we will be revisiting some of the basic concepts in chemistry that you will have learnt for GCSE. You will already be familiar with the periodic table and understand the way elements are arranged within it into groups and periods, and how to read it such that you can work out the number of protons, neutrons and electrons each element contains. At level 3 we go into further detail with regards to the arrangement of those components, and what this means in terms of bonding.

What you should hand-in

You will design a poster to explain atomic theory to a younger student. Your poster should contain a labelled diagram of a hydrogen atom. You should then pick one element from each of three different groups of the periodic table, draw out their atomic structures and describe how the number of electrons in each atom's outer shell affects their reactivity. Finally, using a dot-cross diagram, show how electrons behave in ionic bonding and covalent bonding. Give examples.

This should be A3 size, and can be done by hand on paper (you can tape two pieces of A4 paper together), or on the computer using PowerPoint or any other suitable software you might have. If you draw your poster by hand, either scan it or photograph it to hand it in.

Resources

Your GCSE notes and revision guides should help you with this task, as well as the GCSE Bitesize online resource: www.bbc.co.uk/bitesize/guides/z3sg2nb/revision/1

Group →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Period ↓	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H																	2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	57 La	* 72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89 Ac	* 104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og
				* 58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	
				* 90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	

Task 2 - Biology

Background

In year 1 of the Applied science course, we will be revisiting some of the basic concepts in biology that you will have learnt for GCSE. You will already be familiar with prokaryotic and eukaryotic cell structure, and organelles. At level 3 we explore the function of those organelles in greater depth, and relate those functions to each organelle's relative presence within different tissue types.

What you should hand-in

You will create a poster to show the difference between animal cells, plant cells, and bacterial cells. You should include diagrams, which should each be labelled and have a scale next to them.

Explain the function of each of the organelles, and justify the presence or absence of each organelle in each type of cell. This information could be presented in a table.

This should be A3 size, and can be done by hand on paper (you can tape two pieces of A4 paper together), or on the computer using PowerPoint or any other suitable software you might have. If you draw your poster by hand, either scan it or photograph it to hand it in.

Resources

Your GCSE notes and revision guides should help you with this task, as well as the GCSE Bitesize online resource: www.bbc.co.uk/bitesize/guides/z84jtv4/revision/1

Task 3 - Physics

Background

In year 1 of the Applied science course, we will be revisiting some of the basic concepts in physics that you will have learnt for GCSE. You will already be familiar with wave theory, and may have some experience with reflection and refraction. At level 3 we will take these concepts further by exploring the application of fibre optics in medicine and communication, and the use of electromagnetic waves in communication, also.

What you should hand-in

You will draw (another!) poster, with labelled diagrams of a transverse wave and a longitudinal wave. Give examples of each from our everyday lives. You will also need to explain the following terms with reference to your diagrams:

- Periodic time
- Speed
- Wavelength
- Frequency
- Amplitude
- Oscillation

This should be A3 size, and can be done by hand on paper (you can tape two pieces of A4 paper together), or on the computer using PowerPoint or any other suitable software you might have. If you draw your poster by hand, either scan it or photograph it to hand it in.

Resources

Your GCSE notes and revision guides should help you with this task, as well as the GCSE Bitesize online resources: www.bbc.co.uk/bitesize/guides/zgf97p3/revision/1 (waves) www.bbc.co.uk/bitesize/guides/z9bw6yc/revision/1 (transverse and longitudinal waves)

Indicative time for this project:

Up to 9 hours.

Instructions on how to submit this:

Please submit all work to:

Neil Tabram

Curriculum, Resource & Quality (CRQ) Leader – Hospitality and Applied Science

e. science@howcollege.ac.uk

t. 01905 743515

How will I benefit from this project:

The project will help you understand what to expect when you come to College and also give you a head start in working on topics and content that will be relevant when you begin your journey with us.

What can I expect to get back after I submit my project work:

The receipt of your work will be acknowledged and a member of the team will give you some feedback.

Key information you should include:

Your name

Your email address

A contact telephone number