



SIXTH FORM INDUCTION TASKS



Dear student,

Congratulations on your enrolment for the Sixth Form at The Heathland School.

The leap from GCSE to Post 16 study is significant and it is essential that you make a strong and committed start to your courses in September.

In order to help you do this, we have asked departments to prepare some preliminary work for you to start before your first lessons begin. There are tasks to complete for each A Level or BTEC subject you are going to study in Year 12. Teachers will refer to these tasks during the first two weeks of study.

I would also ask you to view the specification for each subject by viewing the curriculum section on the school website.

The best of luck with your Sixth Form studies – we look forward to seeing you make good progress during Year 12 and beyond.

L3 BTEC Science

Task 1

Using the Cornell notes system: <http://coe.jmu.edu/learningtoolbox/cornellnotes.html> make 1 page of notes each **for 2 of the topics below**.

- a) CERN encompasses the Large Hadron Collider (LHC) and is the largest collaborative science experiment ever undertaken. Find out about it here and make a page of suitable notes on the accelerator.

You may wish to use: <http://home.cern/about>

- b) NASA's Jet Propulsion Laboratory has lots of information on Climate Change and Engineering Solutions to combat it. Have a look and make notes on an article of your choice.

You may wish to use: <http://climate.nasa.gov/>

- c) ITO and the future of touch screen devices

ITO – indium tin oxide is the main component of touch screen in phones and tablets. The element indium is a rare element and we are rapidly running out of it. Chemists are desperately trying to find a more readily available replacement for it. What advances have chemists made in finding a replacement for it?

You may wish to use:

<http://www.cypress.com/file/95156/download>

<https://www.diamondcoatings.com/ito-coated-touch-screens/>

- d) The chemistry of fireworks

What are the component parts of fireworks? What chemical compounds cause fireworks to explode? What chemical compounds are responsible for the colour of fireworks?

You may wish to use: <http://www.compoundchem.com/2013/12/30/the-chemistry-of-fireworks/>

- e) DNA and the Genetic Code

In living organisms nucleic acids (DNA and RNA) have important roles and functions related to their properties. The sequence of bases in the DNA molecule determines the structure of proteins, including enzymes. The double helix and its four bases store the information that is

passed from generation to generation. The sequence of the base pairs adenine, thymine, cytosine and guanine tell ribosomes in the cytoplasm how to construct amino acids into polypeptides and produce every characteristic we see.

You may wish to use:

<http://www.bbc.co.uk/education/guides/z36mmp3/revision>

<http://www.s-cool.co.uk/a-level/biology/dna-and-genetic-code>

<http://ed.ted.com/lessons/the-twisting-tale-of-dna-judith-hauck>

<http://ed.ted.com/lessons/where-do-genes-come-from-carl-zimmer>

Task 2

Pick one of the experiments below. Research and write a method for it.

You must include:

- a step by step method
- what variables need to be measured
- what equipment is going to be used
- what is the uncertainty in the equipment/what errors could be made
- what calculations have to be made

Experiments to pick from:

- a) Measuring acceleration due to gravity 'g' using **light gates**.
- b) PhET create online Physics simulations when you can complete some simple experiments online. Open up the resistance of a wire html5 simulation (<https://phet.colorado.edu/en/simulations/category/html>). Conduct a simple experiment and make a one page summary of the experiment and your findings.
- c) Investigating which material makes the best insulation for a cup of tea.
- d) Investigating the optimum growing conditions for a tomato plant.
- e) Determine the molar mass of an unknown solid sample of a carbonate with the formula X_2CO_3 .
- f) Which antibiotic is the most effective at preventing the growth of bacteria?