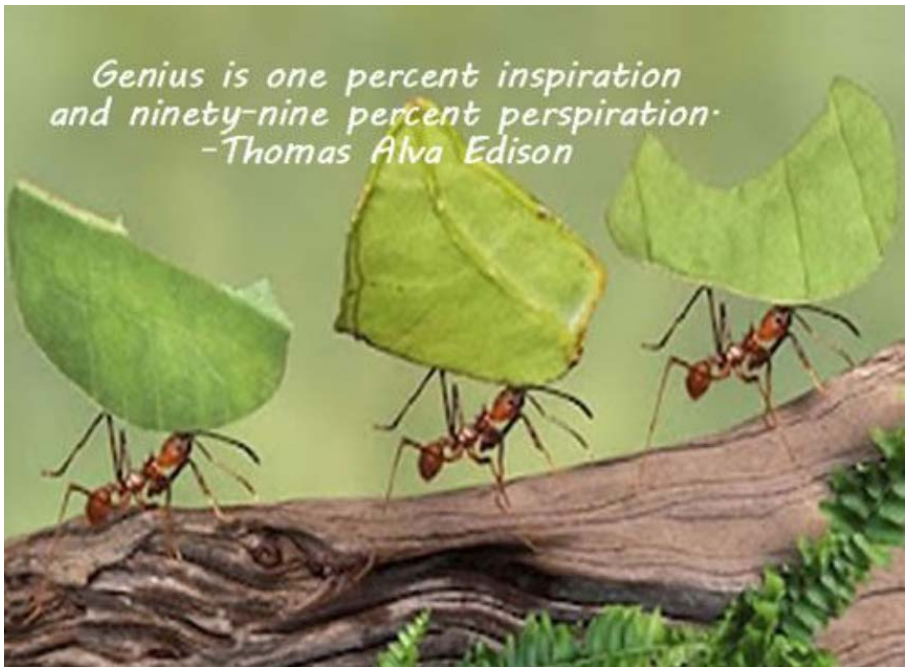
BTEC Level 3

National Extended Certificate in Applied Science

Transition Work

2017



Contents:

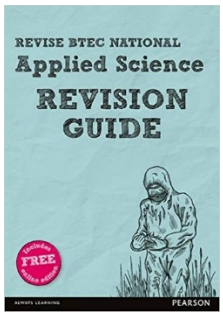
Introduction

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 GCSE 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**

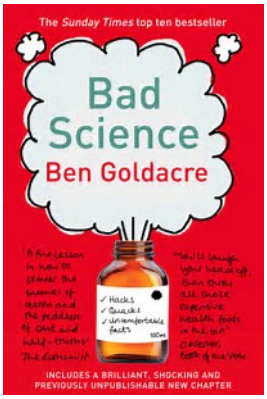
Useful Resources:

- **http://qualifications.pearson.com/en/qualifications/btec-nationals/applied-science-2016.html#tab-1**
- **BTEC Applied Science Revision Guide**

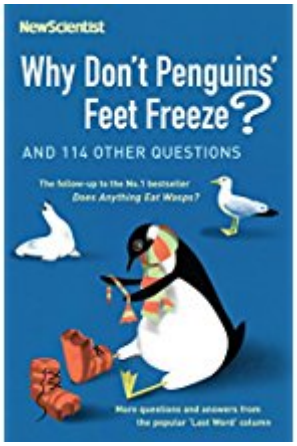


- **Revision - http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa/**

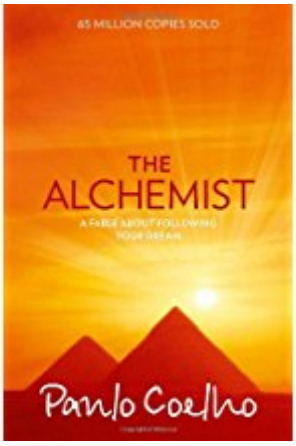
Suggested Reading



By Ben Goldacre
http://bit.ly/pixlchembook3
Here Ben Goldacre takes apart anyone who published bad or misleading science. This book will make you think about everything the advertising industry tries to sell you by making it sound 'sciency'.



By New Scientist
Why Don't Penguins' Feet Freeze? is the latest compilation of readers' answers to the questions in the 'Last Word' column of *New Scientist*, the world's best-selling science weekly.



By Paulo Coelho

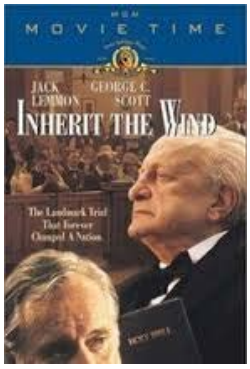
Santiago, a young shepherd living in the hills of Andalucia, feels that there is more to life than his humble home and his flock. One day he finds the courage to follow his dreams into distant lands, each step galvanised by the knowledge that he is following the right path: his own. The people he meets along the way, the things he sees and the wisdom he learns are life-changing. With Paulo Coelho's visionary blend of spirituality, magical realism and folklore, The Alchemist is a story with the power to inspire nations and change people's lives.

Movie Recommendations

Everyone loves a good story and everyone loves some great science. Here are some o
picks of the best films based on real life scientists and discoveries. You wont find Juras
on this list, we've looked back over the last 50 years to give you our top 5 films you m
have seen before. Great watching for a rainy day.

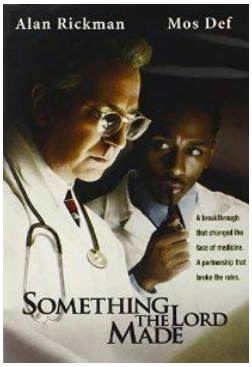
Gorillas in the Mis
An absolute classi
retells the true sto
the life and work o
Fossey and her wo
studying and prote
mountain gorillas
poachers and hab
A tear jerker.

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?



Andromeda Strain (1971)
Science fiction by the great thriller writer Michael Cricthon (he of Jurassic Park fame). Humans begin dying when an alien microbe arrives on Earth.

Lorenzo's Oil (1992)
Based on a true story. A young child suffers from an autoimmune disease. The parents research and challenge doctors to develop a new cure for his disease.



**Something the Lor
(2004)**
Professor Snape (th
great Alan Rickman
very different role.
film tells the story
scientists at the cut
edge of early heart
surgery as well as is
surrounding racism
time.

There are some great TV series and box sets available too, you might want to check out: Blue Pla
Earth, The Ascent of Man, Catastrophe, Frozen Planet, Life Story, The Hunt and Monsoon.

Movie Recommendations

If you have 30 minutes to spare, here are some great presentations (and free!) from wo leading scientists and researchers on a variety of topics. They provide some interesting and ask some thought-provoking questions. Use the link or scan the QR code to view:

A New Superweapon in the Fight Against Cancer
Available at :
http://www.ted.com/talks/paula_hammond_a_new_superweapon_in_the_fight_against_cancer?language=en
Cancer is a very clever, adaptable disease. To defeat it, says medical researcher and educator Paula Hammond, we need a new and powerful mode of attack.

Why Bees are Disappearing
Available at :
http://www.ted.com/talks/marla_why_bees_are_disappearing?lang
Honeybees have thrived for 50 mil years, each colony 40 to 50,000 in coordinated in amazing harmony. seven years ago, did colonies start en-masse?

Why Doctors Don't Know About the Drugs They Prescribe
Available at :
http://www.ted.com/talks/ben_goldacre_what_doctors_don_t_know_about_the_drugs_they_prescribe?language=en
When a new drug gets tested, the results of the trials should be published for the rest of the medical world — except much of the time, negative or inconclusive findings go unreported, leaving doctors and researchers in the dark.

Growing New Organs
Available at :
http://www.ted.com/talks/anthon growing_organs_engineering_tissu age=en
Anthony Atalla's state-of-the-art la human organs — from muscles to vessels to bladders, and more.

Preparation Tasks

All tasks must be completed and submitted to your teacher in September.

Chemistry – The Periodic Table

1. Define the following terms:

   Atom:

   Ion:

   Compound:

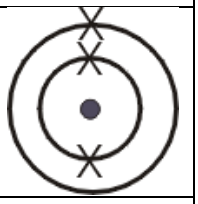
   Mixture:

   Molecule:

   Identify which are elements, compounds or molecules:

   O_2, Na, CO_2, K, Ca, H_2, H_20, CH_4, Cl_2

2. Use the Periodic table to complete the following table. The first one has been completed for you:

Element	Symbol	Mass No.	Atomic No.	No of electrons	No of protons	No of neutrons	Diagram
Lithium	Li	7	3	3	3	4	
Sodium							

Element	Symbol	Mass No.	Atomic No.	No of electrons	No of protons	No of neutrons	Diagram
Oxygen							
Chlorine							
Carbon							
Hydrogen							

3. Outline the key features of the Periodic table

   What patterns of reactivity are seen in group 1?

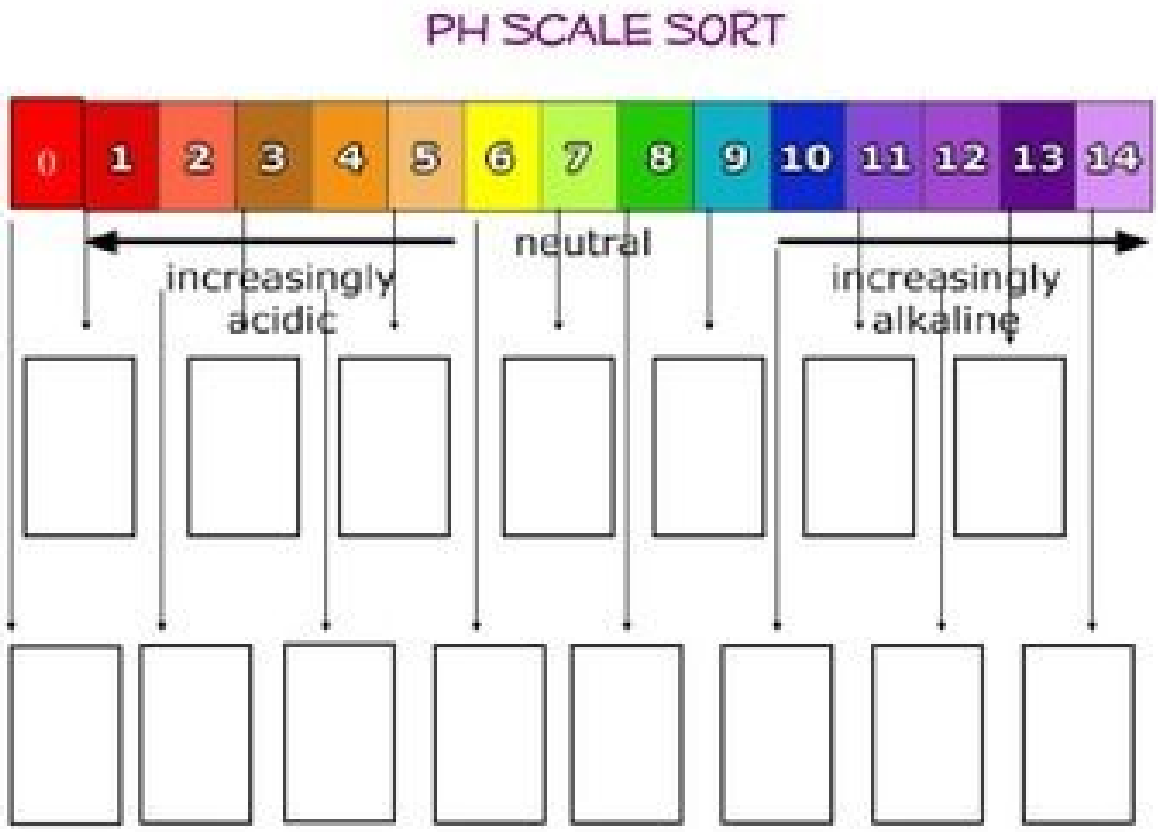
   What patterns of reactivity are seen in group 7?

   What are the key features of group 1 metals?

   What are the key features of group 7 metals?

   What are the key features of the transition metals?

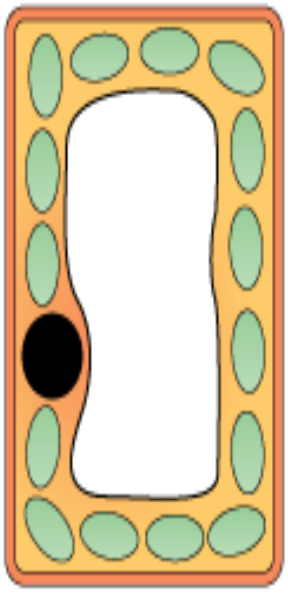
4. Acids and Alkalis – complete the diagram to show substances for each pH value.



Biology – Animal and Plant Cells

1. Draw and label a cheek cell:

2. Draw and label the palisade cell:

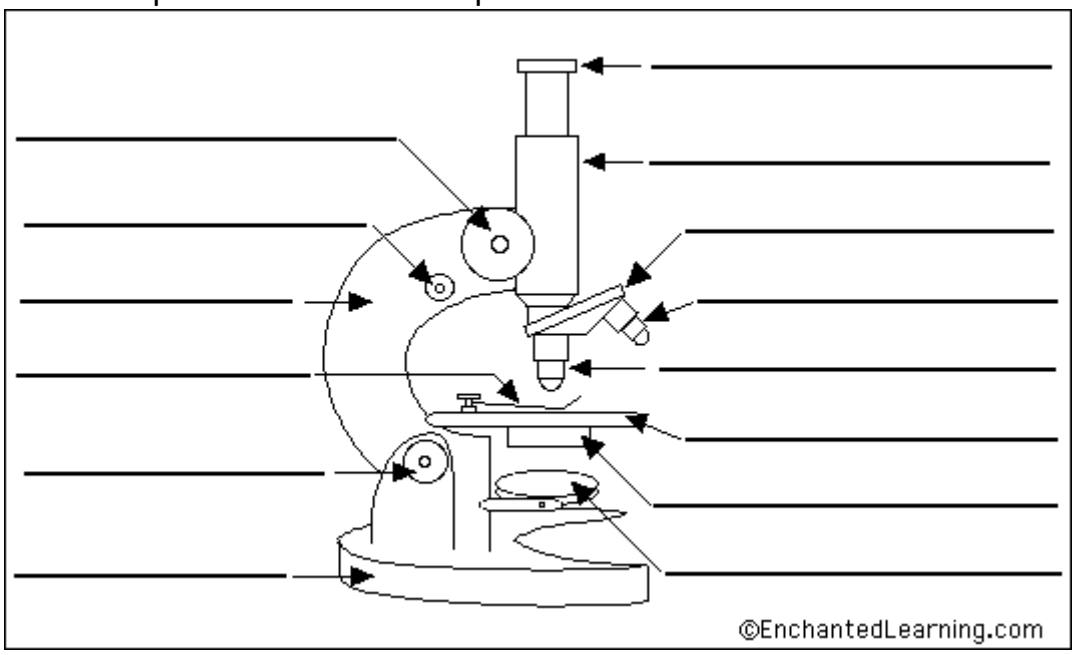


Complete the table:

Structure	**Function**	**Found in animal, plant or both?**
Nucleus		
Cell membrane		
Cell Wall		
Vacuole		
Mitochondria		

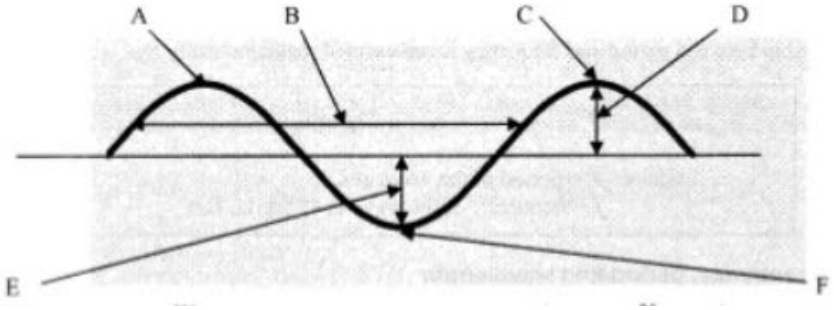
Vacuole		
Cytoplasm		
Chloroplasts		
Mitochondria		

3. Label the parts of the microscope.



Physics – Waves & The Electromagnetic Spectrum

1. Identify and label the parts of the waves shown below.



Directions: Use the word bank to answer the following questions. **be used only once.**

Crest	Frequency	Mechanical
Trough	Transverse	Radio
Wavelength	Longitudinal	Ultraviolet
Visible Light	Amplitude	Electromagnetic

1. _____ waves are used to penetrate solids and are offices and as airports.

2. _____ is the distance between one point of a wave point in the next wave.

3. _____ is the number of waves per unit of time.

4. _____ waves occur when the motion of the mediu the direction of the wave.

5. _____ waves have a color spectrum known as RO

6. _____ waves disturb matter.

7. The _____ is the top of a wave.

8. The _____ is the bottom of a wave.

9. _____ is the maximum distance that matter is dis resting position.

10. _____ waves are produced by stars and galaxies.

11. _____ waves occur when the motion of the mediu angles (perpendicular) to the direction of the wave.

12. _____ waves are often used in heat lamps.

13. _____ waves are utilized by insects to locate necta

14. _____ waves are transverse waves that disturb ele fields.

15. _____ waves have the shortest wavelength and th frequency.

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

1. Your Presentation will need to be a maximum of 5 slides you windows PowerPoint or Prezi http://prezi.com/ (for the latter y register)

2. One key idea/slide (each slide should have a maximum of 5 s

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 in accessed using a referencing system such as the Harvard sy using the following link:- http://www.neilstoolbox.com/bibliog creator/index.htm You can use the references dropdown me to do this.

6. Your PowerPoint presentation should be a maximum of 5 slid

7. Save your presentation on a memory stick or in a cloud base https://www.icloud.com or dropbox-https://www.dropbox.com

Ideas for Day Trips

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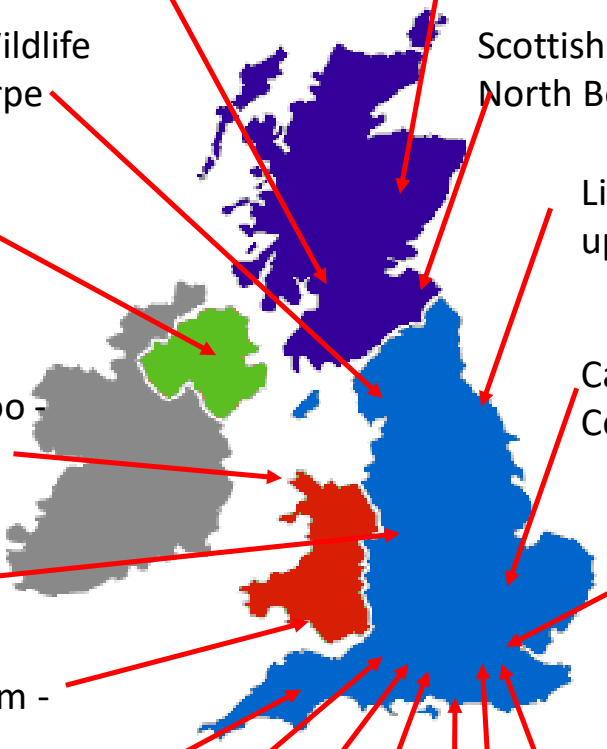
partners in excellence

If you are on holiday in the UK, or on a staycation at home, why not plan a day trip to one of these :



Glasgow Science Centre - Glasgow

Dundee Science Centre - Dundee

The Lakeland Wildlife Oasis - Milnthorpe

Scottish Seabird centre – North Berwick

W5 - Belfast

Life – Newcastle-upon-Tyne

Anglesey Sea Zoo - Anglesey

Cambridge Science Centre - Cambridge

Think-tank - Birmingham

Herriman Museum and Gardens - London

National Museum - Cardiff

The Eden Project - Cornwall

Centre of the Cell - London

Bristol Science Centre - Bristol

Royal Botanic Gardens – Kew - Edinburgh

The Living Rainforest - Newbury

Oxford University Museum of Natural History - Oxford

National Marine Aquarium - Plymouth

Ideas for Day Trips

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If you are on holiday in the UK, or on a staycation at home, why not plan a day trip to one of these :

Remember there are also lots of zoos, wildlife and safari parks across the country, here are some you may not have heard of or considered:
Colchester Zoo, Cotswold Wildlife Park, Banham Zoo (Norfolk), Tropical Birdland (Leicestershire), Yorkshire Wildlife Park, Peak Wildlife Park, International Centre for Birds of Prey (York), Blackpool Zoo, Beale Park (Reading)

There are also hundreds of nature reserves (some of which are free) located all over the country including:
RSPB sites at Lochwinnoch, Saltholme, Fairburn Ings, Old Moor, Conwy, Minsmere, Rainham Marshes, Pulborough Brooks, Radipole Lake, Newport Wetlands.
Wildlife Trust Reserves and others at Rutland Water, Pensthorpe, Insh Marshes, Attenborough Centre, Inversnaid, Skomer, Loch Garten, Donna Nook, Chapmans Well, Woodwalton Fen, London Wetland Centre, Martin Down and Woolston Eyes Reserve.

Many organisations also have opportunities for people to volunteer over the summer months, this might include working in a shop/café/visitor centre, helping with site maintenance or taking part in biological surveys. Not only is this great experience, it looks great on a job or UCAS application.

For opportunities keep an eye out in your local press, on social media, or look at the websites of organisations like the RSPB, Wildlife Trust, National Trust or Wildlife & Wetland Trust.

There are also probably lots of smaller organisations near you who would also appreciate any support you can give!

Science on Social Media

Science communication is essential in the modern world and all the big scientific companies, researchers and institutions have their own social media accounts. Here are some of our top tips to keep up to date with developing news or interesting stories:

Follow on Twitter:
Commander Chris Hadfield – former resident aboard the International Space Station @cmdrhadfield

Tiktaalik roseae – a 375 million year old fossil fish with its own Twitter account!
@tiktaalikroseae

NASA's Voyager 2 – a satellite launched nearly 40 years ago that is now travelling beyond our Solar System
@NSFVoyager2

Neil dGrasse Tyson – Director of the Hayden Planetarium in New York
@neiltyson

Sci Curious – feed from writer and Bethany Brookshire tweeting about good, bad and weird neuroscience
@scicurious

The SETI Institute – The Search for Extra Terrestrial Intelligence, be the first to know what they find!
@setiinstitute

Carl Zimmer – Science writer Carl blogs about the life sciences
@carlzimmer

Phil Plait – tweets about astronomy and bad science
@badastronomer

Virginia Hughes – science journalist and blogger for National Geographic, keep up to date with neuroscience, genetics and behaviour
@virginiahughes

Maryn McKenna – science journalist who writes about antibiotic resistance
@marynmck

Find on Facebook:
Nature - the profile page for nature.com for news, features, research and events from Nature Publishing Group

Marin Conservation Institute – publishes the latest science to identify important marine ecosystems around the world.

National Geographic - since 1888, National Geographic has travelled the Earth, sharing its amazing stories in pictures and words.

Science News Magazine - Science covers important and emerging research in all fields of science.

BBC Science News - The latest BBC Science and Environment News: breaking news, analysis and debate on science and nature around the world.

Science websites

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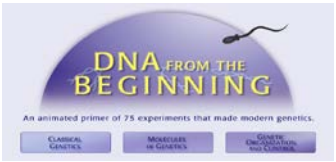
These websites all offer an amazing collection of resources that you should use again and again through out your course.

Probably the best website on Biology….
Learn Genetics from Utah University has so much that is pitched at an appropriate level for you and has lots of interactive resources to explore, everything from why some people can taste bitter berries to how we clone mice or make glow in the dark jelly fish.
http://learn.genetics.utah.edu/

ZSL
LIVING CONSERVATION

In the summer you will most likely start to learn about Biodiversity and Evolution. Many Zoos have great websites, especially London Zoo. Read about some of the case studies on conservation, such as the Giant Pangolin, the only mammal with scales.
https://www.zsl.org/conservation

At GCSE you learnt how genetic diseases are inherited. In this virtual fly lab you get to breed fruit flies to investigate how different features are passed on.
http://sciencecourseware.org/vcise/drosophila/



DNA from the beginning is full of interactive animations that tell the story of DNA from its discovery through to advanced year 13 concepts. One to book mark!
http://www.dnaftb.org/

Ok, so not a website, but a video you definitely want to watch. One of the first topics you will learn about is the amazing structure of the cell. This BBC film shows the fascinating workings of a cell… a touch more detailed than the "fried egg" model you might have seen.
http://www.dailymotion.com/video/xzh0kb_the-hidden-life-of-the-cell_shortfilms
If this link expires – google "BBC hidden life of the cell"

Science: Things to do!

Day 4 of the holidays and boredom has set in?
There are loads of citizen science projects you can take part in either from the comfort of your bedroom, out and about, or when on holiday. Wikipedia does a comprehensive list of all the current projects taking place. Google 'citizen science project'

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Bumblebee Conservation Trust

AgeGuess

OPAL EXPLORE NATURE

big butterfly count 15th July - 7th August

THE SHORE THING GET INVOLVED!

eoceans www.eoceans.org

WildlifeLog SPOT IT - SHARE IT - SAVE IT

The Big Moss Map

MOOC

Want to stand above the rest when it comes to UCAS? Now is the time to act.
MOOCs are online courses run by nearly all Universities. They are short FREE courses that you take part in. They are usually quite specialist, but aimed at the public, not the genius!
There are lots of websites that help you find a course, such as edX and Future learn.
You can take part in any course, but there are usually start and finish dates. They mostly involve taking part in web chats, watching videos and interactives.

canvas, edX, coursera, OPEN 2 STUDY, UDACITY, FUTURELEARN, KHAN, ed2go

Completing a MOOC will look great on your Personal statement and they are dead easy to take part in!