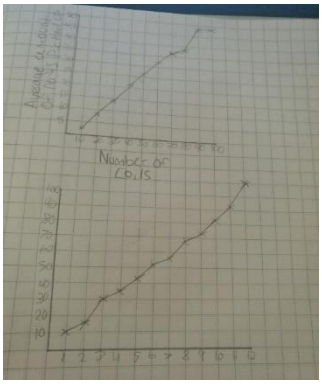
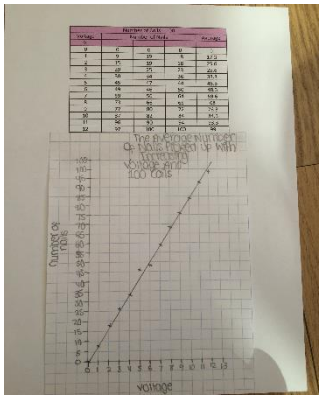
The science department

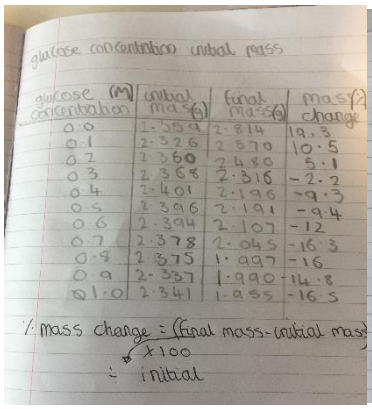
Our pupils and staff had to adapt quickly to learning and teaching from home and my worry was how this new way of working would affect a subject such as science which relies heavily on practical work. However, thanks to the creativity and resilience of the Thomas Estley family I hope that you will agree that it has been a relatively smooth process. Below are a few snapshots in to science lessons at home to show that science doesn't stop at the school gates.

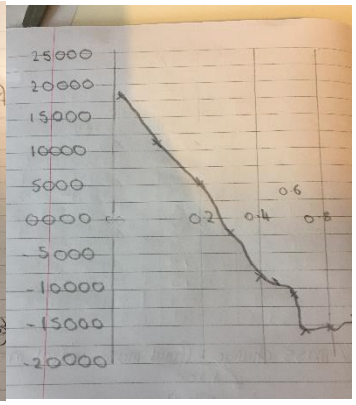
I have been very impressed with how hard students have worked since school has been closed. They have been so resilient and it is lovely to see the high-quality work they have completed.



My year 8 classes have been working on circuits and electromagnets. I have set them a variety of tasks including online experiments using an application called sunflower learning and focus eLearning website. They complete retrieval questions weekly on topics they have covered in year 8 and year 7. Some students have adapted the work and completed experiments at home, using equipment they have.

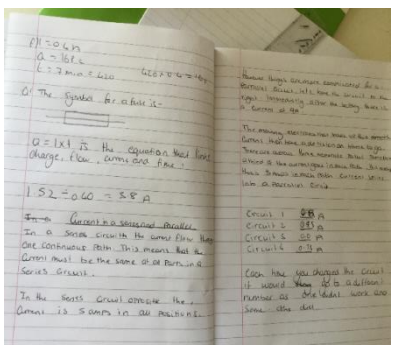


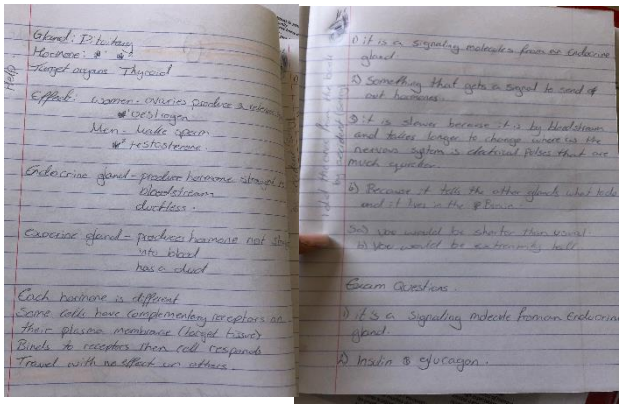




My year 9 class have started the cell biology topic. They have compared types of cells and looked at how some cells are specialised to do the role that they have. They have also looked at diffusion, osmosis and active transport. They have done a combination of written work, videos and online experiments.

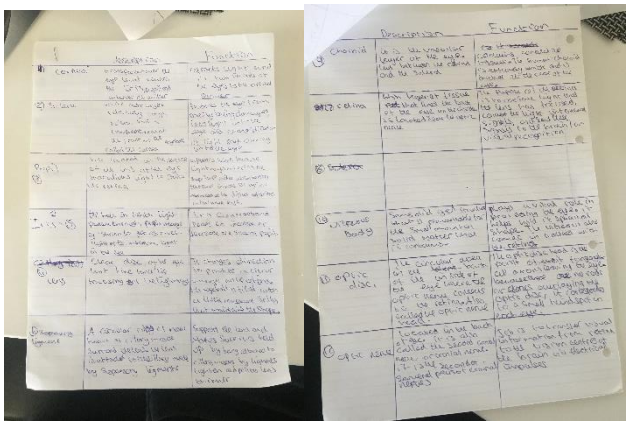
My double science year 10 class have been looking at the electricity topic. This involves lots of equations and practice at calculations, as well as online experiments.





My year 10 triple biology class have been looking at Homeostasis, how the body regulates the body. They have completed work on the eye and sight problems, hormones and maintaining blood glucose levels including work on diabetes.

A lot of students from my year 11 classes have also completed the revision tasks I have set. This shows a real devotion to learning and I am very proud of them and wish them all the very best for the future.

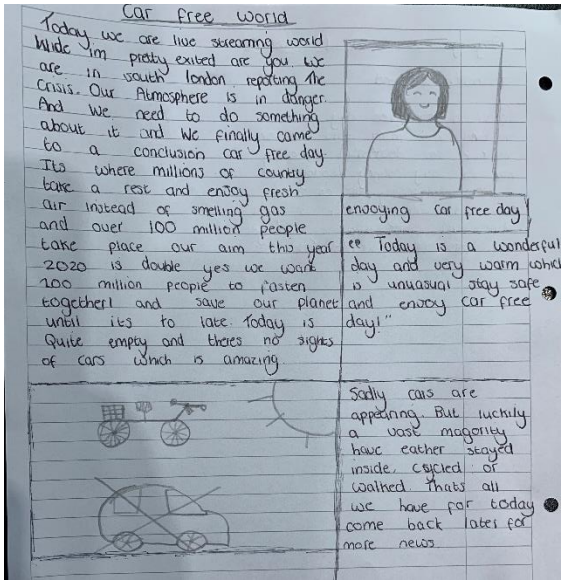


I hope you and your families are all safe and well and you are all making time to look after your wellbeing. Everything is good here for me and my family. Looking forward to seeing you all soon (hopefully). Take care.

Mrs Hart

Since the schools have closed students have continued to apply themselves extremely well in their Science lessons. Although circumstances are a little different, students have been able to access online resources and videos and some now even have the joy of being able to watch me teach remotely through recorded videos. Year 7 students are now studying the reproductive systems whilst year 8 students are focusing on plants and year 9 have started the GCSE journey and many are thriving during the Cell Biology unit. Year 10 students continue to work hard on the Rates of Reaction and Forces units in their Chemistry and Physics lessons.

Although times are a little different the resilience and determination of the students is clear to see. Year 7 students recently finished their Acids and Alkalis unit and were tasked with producing a newspaper article outlining the effects on the World if people were unable to use their cars, an example of this can be seen here.

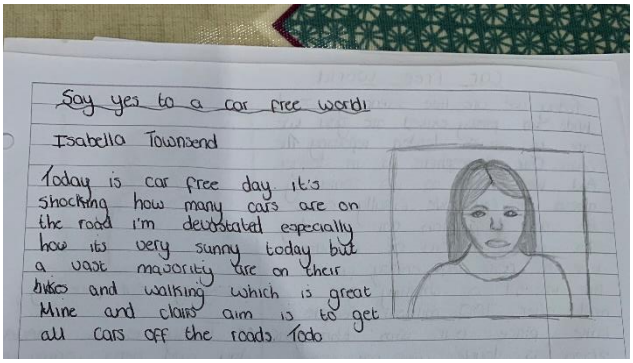

Car free world

Today we are live streaming world wide I'm pretty exited are you. We are in south london reporting the crisis. Our Atmosphere is in danger. And we need to do something about it and we finally came to a conclusion car free day. Its where millions of country take a rest and enjoy fresh air instead of smelling gas and over 100 million people take place our aim this year 2020 is double yes we want 200 million people to "listen together" and save our planet until its to late today is Quite empty and theres no sights of cars which is amazing

enjoying car free day

"Today is a wonderful day and very warm which is unusual stay safe and enjoy car free day!"

Sadly cars are appearing. But luckily a vast magority have either stayed inside, cycled or walked. Thats all we have for today come back later for more news

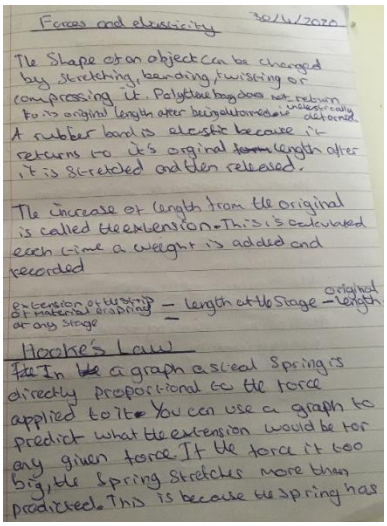

Say yes to a car free world!

Isabella Townsend

Today is car free day, it's shocking how many cars are on the road i'm devastated especially how its very sunny today but a vast majority are on their bikes and walking which is great Mine and claras aim is to get all cars off the roads Today

It will be interesting to ask the students later in the year if their thoughts on a world without cars has changed as we continue to changes in pollution levels and nature starting to reclaim some areas of the world.

Year 10 Physics students have recently had the opportunity to carry out an investigation into the effects of forces on a spring using an online virtual tool. This investigation is one which all the students get the chance to attempt at school but it was very fulfilling to see that many students had attacked the challenge with vigour. They were able to use their knowledge from the previous few weeks to draw conclusions from the experiment they had carried out. Below can be seen an excellent example of some of this work.


Forces and elasticity

30/11/2020

The Shape of an object can be changed by stretching, bending, twisting or compressing it. Polythene bags do not return to its original length after being stretched it is altered.

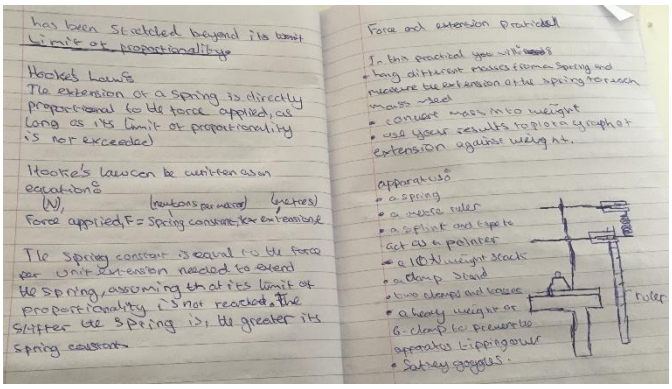
A rubber band is elastic because it returns to its orginal length after it is stretched and then released.

The increase of length from the original is called the extension. This is calculated each time a weight is added and recorded

Extension of the spring = length at the stage − original length

Hooke's Law

In a graph as load springs directly proportional to the force applied to it. You can use a graph to predict what the extension would be for any given force. If the force is too big, the spring stretches more than predicted. This is because the spring has


has been stretched beyond its limit of proportionality.

Hooke's Law

The extension of a spring is directly proportional to the force applied, as long as its limit of proportionality is not exceeded)

Hooke's law can be written as an equation

(N) (newtons per metre) (metres)

Force applied, F = Spring constant for extension × extension

The spring constant is equal to the force for unit extension needed to extend the spring, assuming that its limit of proportionality is not reached. The stiffer the spring is, the greater its spring constant.

Force and extension Practical

In this practical you will
- hang different masses from a spring and measure the extension of the spring for each mass used
- convert mass into weight
- use your results to plot a graph of extension against weight.

Apparatus
- a spring
- a metre ruler
- a splint and tape to act as a pointer
- a 10 N weight stack
- a clamp stand
- two clamps and bosses
- a heavy weight or G-clamp to prevent the apparatus tipping over
- Safety goggles.

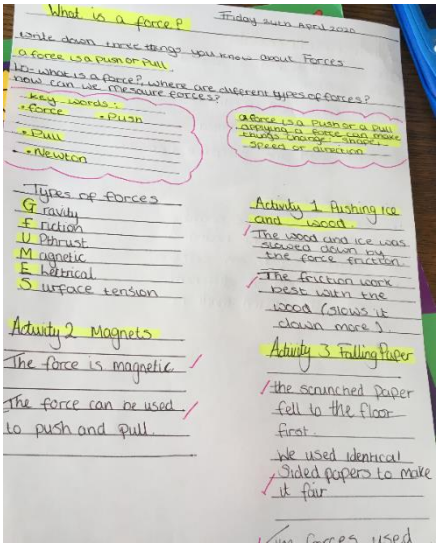
It is so pleasing to see that students are continuing to thrive in circumstances which are new to all of us and are producing some really excellent work.

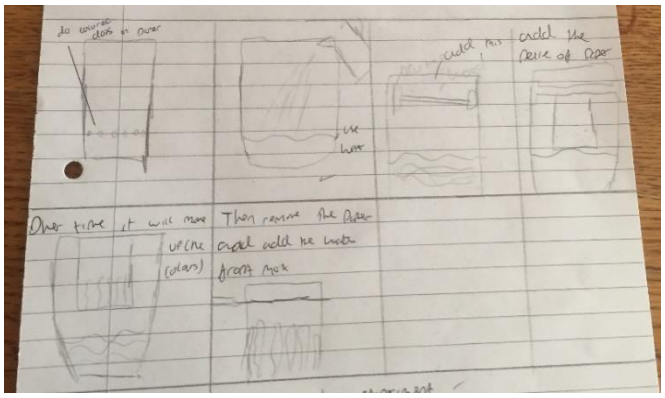
When the time is right we will be back in familiar surroundings and students will be ready to continue to produce excellent work to allow them to excel in their science lessons.

Stay safe everyone and continue to work hard whilst remaining in a positive state of mind and looking after your mental health and well-being.

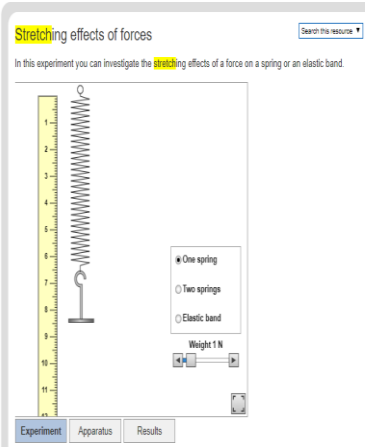
Mr. Draycott

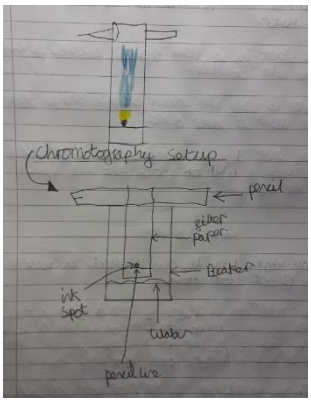
I have been really impressed with the number of Y7 students engaging with opportunities to do experiments at home. An introduction to forces had students completing a variety of simple experiments at home. This encouraged them to think about what forces are acting on objects in a variety of settings. They have also been testing out the online learning environment by trying some virtual labs on focuselearning.co.uk. Here is an example of some excellent work along with the virtual lab:





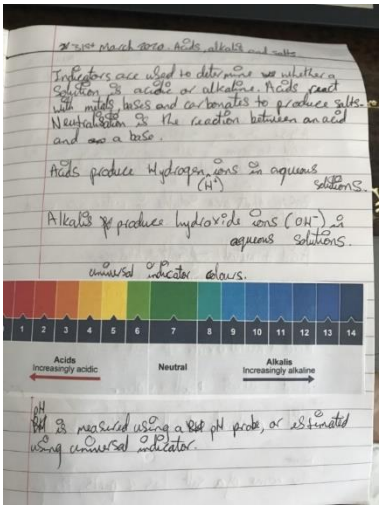
I am really proud of the work that my year 9s have been doing. We had only just transitioned into starting the first GCSE chemistry topic before the lockdown commenced. Despite the barriers to learning, students have been working really hard to understand the fundamental concepts about atoms. They have shown a willingness to adapt to this new way of learning and aren't afraid to ask for help when needed. They are regularly reviewing their knowledge in quizzes and have picked up the content quickly! They are engaging with the practical tasks at home to enable a deeper understanding of their work.

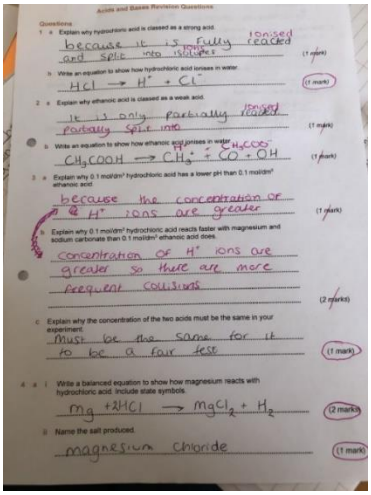




The dedication to their learning that the Y10s has displaced is something to be in awe of. Despite the pressures, they have been fully engaged in their learning and completed with to an amazingly high standard. Most importantly they have asked for help when needed and remained committed to their learning. They have responded well to feedback and shown progression in their learning.

They should be very proud of their achievements so far. They have been set a variety of tasks to try which have involved: retrieval quizzes, virtual labs, marked pieces of work (past exam questions) along side the usual classroom resources that have been adapted for online work. Their grit and determination to not let this situation we find ourselves in effect their learning is inspiring. Well done Y10s! I am very proud of you! They have all produced such amazing work that I don't want to seem biased in my choice of which pieces to share with you, I have therefore picked them completely at random!

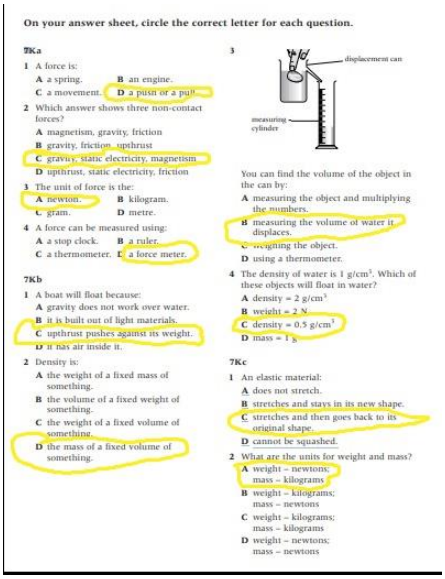


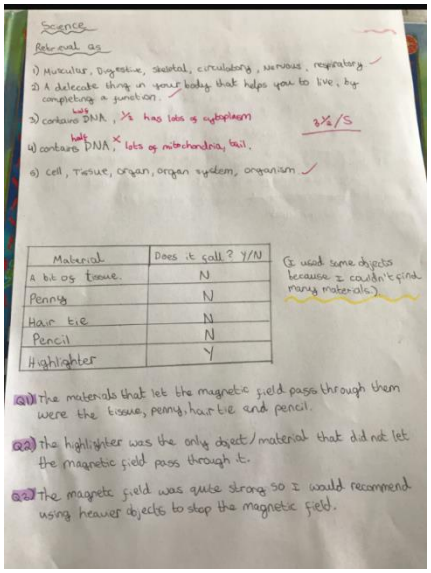


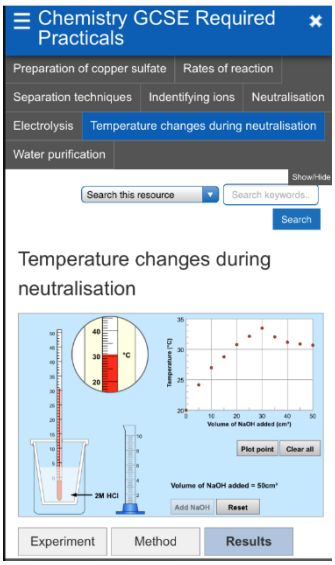
We were all very saddened to not have a proper farewell to our Y11s. Many of us will have departed school having a mixture of unwelcome feelings. This being said, our Y11 students have made us prouder than ever by continuing to be the courageous individuals. We have been setting A level bridging work alongside revision tasks to challenge those students who are going on to study A level sciences. They have continued to astound me and the department in their positive outlooks and determination to not let this affect their futures. We wish them the best in their endeavors and hope to see them at prom!

Mrs Rotimi

Year 7 have been finishing looking at their 'Infinity and Beyond' topic which covers forces, magnets and the Earth & space. They have had a variety of activities to complete including online quizzes, practicals that can be done at home, discussions with family members, short quizzes and exam style questions. They have really risen to the challenge of completing this work and their ability to manage their tasks and ask for help when needed is something the students and parents should be proud of. Well done!




Science
Retrieval as
1) Muscular, Digestive, skeletal, circulatory, nervous, respiratory
2) A delicate thing in your body that helps you to live, by completing a function.
3) contains DNA, ½ has lots of cytoplasm
4) contains DNA, lots of mitochondria, tail.
5) cell, tissue, organ, organ system, organism
Material | Does it pull? Y/N
A bit of tissue | N
Penny | N
Hair tie | N
Pencil | N
Highlighter | Y
I used some objects because I couldn't find many materials.)
Q1) The materials that let the magnetic field pass through them were the tissue, penny, hair tie and pencil.
Q2) the highlighter was the only object/material that did not let the magnetic field pass through it.
Q3) The magnetic field was quite strong so I would recommend using heavier objects to stop the magnetic field.

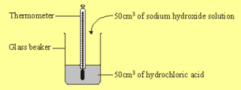


Year 10 groups have been looking at a variety of chemistry and biology topics such as Chemical Changes, Energy Changes, Homeostasis and Response and Infection and Response (which I hope will help students to gain a better understanding about our current situation.) Online software has been used to simulate practicals so students can collect and analyse results as a substitution for completing practical work in a lab. Year 10 have also completed online quizzes, watched videos and completed exam questions as part of their online learning. Being able to manage their own workload and submitting multiple tasks on time requires skills that they will no doubt find useful not only next year but in the future. Keep up the good work.

Past Exam Question – Energy Changes Lessons 4 & 5

Past Exam Question:

A student did an experiment to find the energy change when hydrochloric acid reacts with sodium hydroxide. The equation which represents the reaction is:
$HCl + NaOH \rightarrow NaCl + H_2O$
The student used the apparatus shown in the diagram.



The student placed 50 cm^3 of hydrochloric acid in a glass beaker and measured the temperature. The student then quickly added 50 cm3 of sodium hydroxide solution and stirred the mixture with the thermometer. The highest temperature was recorded. The student repeated the experiment, and calculated the temperature change each time.

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Initial temperature in °C	19.0	22.0	19.2	19.0
Highest temperature in °C	26.2	29.0	26.0	23.5
Temperature change in °C	7.2	7.0	6.8	4.5

Read the information about energy changes and then answer the questions.

(a) The biggest error in this experiment is heat loss.

Suggest how the apparatus could be modified to reduce heat loss. (1) They should add a Styrofoam cup with a lid.

(b) Suggest why it is important to stir the chemicals thoroughly. (1)So there's an even amount of heat being produced everywhere.

(c) Which **one** of these experiments was probably carried out on a different day to the others? Explain your answer. (1)Experiment 2 because the starting temperature was around 2 degrees higher so it could have been a warmer day.

(d) Suggest why experiment 4 should **not** be used to calculate the average temperature change. (1)The highest temperature hasn't been read or collected properly.

(e) Calculate the average temperature change from the first three experiments. Answer =7 ..... °C. (1)

(f) Use the following equation to calculate the energy change for this reaction.

energy change in joules = 100 × 4.2 × average temperature change

Answer = 2940..... J.
(1)

(g) Which **one** of these energy level diagrams, **A** or **B**, represents the energy change for this reaction? Explain why.

I have been very proud of my year 11 students for their commitment to completing their science work given their abrupt ending in March, the announcements to GCSE examinations and that some students are not continuing studying science next year. Students have continued to complete their online revision quizzes with great scores being achieved by many. I wish all year 11 all the best in their future.

Mrs Hutchinson

The year 7's have been busy investigating solutions, solubility and saturation. They have been exploring whether sand is soluble if it is at all possible to dissolve bread if you use lots and lots of water! There was a very exciting competition to see who could grow the biggest crystal with some amazing results! The year 7's have also been making lots of cups of tea and experimenting whether the temperature of their tea affects how much sugar will dissolve.

The year 8's have also been making cups of tea and examining the best way to cool their tea down, stirring, blowing, changing mugs? For those that prefer hot tea they have been investigating whether tea towels or newspapers make the best insulator. They have been busy in the kitchen researching the best cutlery conductors and have also been making working hot air balloons and mini lava lamps.

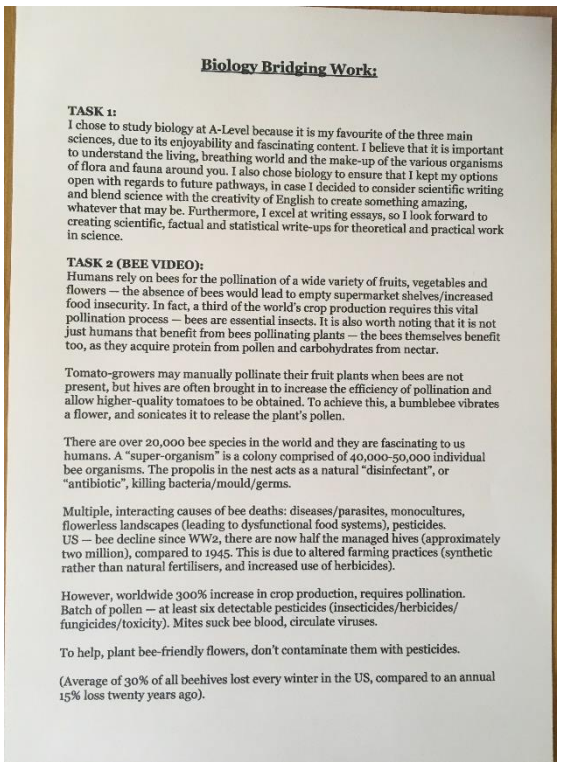
The year 9's have been exploring the world of the microscope and comparing plant cells and animal cells. They have been using perfume to study diffusion and have been researching how flaccid or turgid their chips become in different salt solutions in order to understand osmosis.

The year 10's have been investigating how exercise affects their heart rate and have hopefully been completing some home exercises in the process. They have been researching the importance of keeping the heart healthy and have been considering what can be done by our amazing NHS for unhealthy hearts…….another reason to be thankful. Pupils have been using food dye to create colourful celery and have been putting plants into bags to understand transpiration.

We have been very busy in science!

Mrs Bodycote

It has been mentioned a couple of times in the previous few pages but I really wanted to take a minute to pass on my compliments to our year 11s. Throughout the turmoil of moving to a home learning environment they have had to deal with the abrupt end of the school year and the removal of their exams. To try and make any future work relevant to them we have taken a different tack and provided the year 11s with work that will support their post-16 pathways. I have been setting chemistry, biology and physics KS5 bridging work and had many students voluntarily completing it to an incredibly high quality. Here are a couple of examples of the high quality of work I have been receiving.



Biology Bridging Work:

TASK 1:
I chose to study biology at A-Level because it is my favourite of the three main sciences, due to its enjoyability and fascinating content. I believe that it is important to understand the living, breathing world and the make-up of the various organisms of flora and fauna around you. I also chose biology to ensure that I kept my options open with regards to future pathways, in case I decided to consider scientific writing and blend science with the creativity of English to create something amazing, whatever that may be. Furthermore, I excel at writing essays, so I look forward to creating scientific, factual and statistical write-ups for theoretical and practical work in science.

TASK 2 (BEE VIDEO):
Humans rely on bees for the pollination of a wide variety of fruits, vegetables and flowers — the absence of bees would lead to empty supermarket shelves/increased food insecurity. In fact, a third of the world's crop production requires this vital pollination process — bees are essential insects. It is also worth noting that it is not just humans that benefit from bees pollinating plants — the bees themselves benefit too, as they acquire protein from pollen and carbohydrates from nectar.

Tomato-growers may manually pollinate their fruit plants when bees are not present, but hives are often brought in to increase the efficiency of pollination and allow higher-quality tomatoes to be obtained. To achieve this, a bumblebee vibrates a flower, and sonicates it to release the plant's pollen.

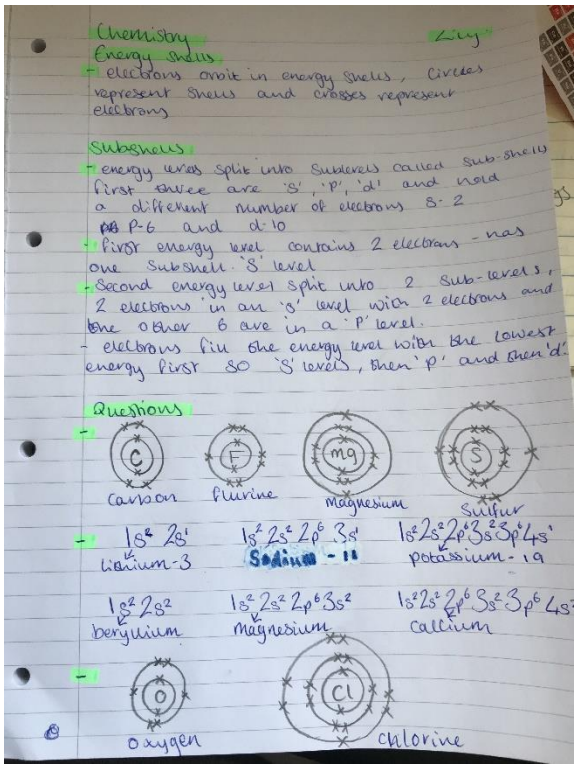
There are over 20,000 bee species in the world and they are fascinating to us humans. A "super-organism" is a colony comprised of 40,000-50,000 individual bee organisms. The propolis in the nest acts as a natural "disinfectant", or "antibiotic", killing bacteria/mould/germs.

Multiple, interacting causes of bee deaths: diseases/parasites, monocultures, flowerless landscapes (leading to dysfunctional food systems), pesticides. US — bee decline since WW2, there are now half the managed hives (approximately two million), compared to 1945. This is due to altered farming practices (synthetic rather than natural fertilisers, and increased use of herbicides).

However, worldwide 300% increase in crop production, requires pollination. Batch of pollen — at least six detectable pesticides (insecticides/herbicides/fungicides/toxicity). Mites suck bee blood, circulate viruses.

To help, plant bee-friendly flowers, don't contaminate them with pesticides.

(Average of 30% of all beehives lost every winter in the US, compared to an annual 15% loss twenty years ago).



Chemistry
Energy shells
- electrons exist in energy shells, circles represent shells and crosses represent electrons

Subshells
- energy levels split into subleveLs called sub-shells first three are 's', 'p', 'd' and hold a different number of electrons s-2 p-6 and d-10
- first energy level contains 2 electrons - has one subshell 's' level
- second energy level split into 2 sub-levels, 2 electrons in an 's' level with 2 electrons and the other 6 are in a 'p' level.
- electrons fill the energy level with the lowest energy first so 's' levels, then 'p' and then 'd'

Questions
Carbon
Fluorine
Magnesium
Sulfur
Lithium-3
Sodium-11
Potassium-19
Beryllium
Magnesium
Calcium
Oxygen
Chlorine

I hope that this glimpse into home-based science makes you smile as much as it does me. I love the idea that despite the challenges that the current situation brings, families are learning that science isn't just possible at home but in fact it belongs there. Keep experimenting and stay safe!

Mr Ansley