Brixham College: Year 9 PHYSICS

Lesson	Summary of content	Date
1	**States of matter and kinetic theory** Read page 114 – 115 exploring science 8 Copy solid, liquid and gas diagrams and make notes Answer Q in full sentences.	**September**
2	**Investigate: Does the volume of a liquid affect its final temperature after 2 minute of heating?** Draw and name the equipment needed for this experiment Write a detailed method in steps e.g 1. Measure 20ml of water using a measuring cylinder 2. Pour water into a beaker	
3	**Conduction** Read page 106 + 107 exploring science 8. Make notes and answer Q Copy diagram page 107	
4	**Temperature scale** Read page 108 exploring science 8. Make notes and answer Q Copy diagram page 108	
5	**Expansion and contraction** Read page 109 exploring science. Make notes and answer Q. Copy diagram page 109	
6	**Convection currents** Read page 110 exploring science 8 Copy diagram of a convection current- Make notes and answer Q	
7	**Radiation 1** Read page 111 exploring science 8. Make notes and answer Q.	**October**
8	**Saving energy** Read pages 112 – 113 exploring science 8. Answer Q and make notes STRETCH: Design an experiment to find out which insulating material is the best. List the equipment and write a method.	
9 **WORKSHEET 1**	**Graph skills- Temperature inside a house** Name the independent and dependent variables Draw a graph Create 5+ Q for someone to answer about this graph.	
10 **WORKSHEET 2**	**Evaporation** Read the sheets. Summarise the information in a 10 sentences or less. Create 10 Q from the passage- include your answers CREATIVE? : Draw a colourful poster that would explain and give examples of evaporation.	
11 **WORKSHEET 3**	**Evaporation – handling data** Read the method, draw a graph and answer the Q	

14	**The structure of an atom** Physics CGP page 110 -113. Read, copy diagram of the atom (figure 1) and figure 2. Make notes and answer Q	**November**
15	**Ion and Isotopes** Physics CGP page 112 -113. Read, copy diagrams and makes notes. Answer Q.	
16 **WORSHEET 4**	**Marie Curie** Read worksheet 4 and create a booklet / poster about Marie Curie	
17	**What is radioactivity?** Read pages 298- 301 Nelson Thornes Orange GCSE science Copy the key points and answer the summary Q on pages 298-299 Copy the table and figure 1 page 300. Copy key points box and answer Q.	
18	**Background radiation** Read pages 306- 307 Nelson Thornes Orange GCSE science Copy figure 3 – sources of background radiation. Complete the activity and Q	**December**
19	**Uses of radiation in the workplace.** Read pages 304- 305 Nelson Thornes Orange GCSE science Make notes on uses of radioactivity and answer summary Q	
20	**Half life** Read pages 302- 303 Nelson Thornes Orange GCSE science Copy the key points Copy the graph – fig 2 Make notes and answer summary Q	
21	Recap of learning so far and revision- Use the fold in half sheets to test yourself. LOOK, COVER and CHECK!!	
22	**Introduction to waves** Read pages 187-188 9-1 CGP book. Copy the key points and draw the diagram of a transverse and a longitudinal wave Make notes and answer summary Q	**Jan**
23	**Wave period** Read pages 189-190 9-1 CGP book. Copy the key points and draw and label the diagrams of a wave and wave measurements Copy the formula for a period of a wave Answer summary Q	
24-25	**Speed of waves** **Lesson 24:** Read pages 191-192 9-1 CGP book. Copy the wave equation. Make notes and draw diagrams on measuring the speed of sound in air.	

	Lesson 25: Read pages 192-194 9-1 CGP book. Make notes on the required practical and draw diagram of the ripple tank. Make notes and answer summary Q	
26	**Sound waves** Read pages 140-141 Exploring Science 8 Make notes on how sound travels. Answer Q 1-8 on page 140-141.	
28	**Echoes** Read pages 150 Exploring Science 8 Make notes on what echoes are and how they can be used. Answer Q 1-5 page 150.	
29	**The electromagnetic spectrum** Read pages 200-202 9-1 CGP book. Copy the key points and draw the diagram of the electromagnetic spectrum Answer summary Q	
30	**Infra-red and visible light** Read pages 206-207 9-1 CGP book. Make a poster on the uses of infra-red and visible light	
31	**U.V., X-ray and gamma rays** Read pages 207-208 9-1 CGP book. Make a poster on the uses of U.V, X-rays and gamma rays Answer summary Q	
32 and 33	**Speed** **Lesson 32:** Read page 147- 149 9-1 CGP book. Revise speed, velocity and acceleration. Make notes on the areas you don't know. Learn off by heart these speed values: walking- 1.5 m/s running- 3 m/s cycling- 6 m/s. speed of sound in air is 330 m/s HT: Motion in a circle **Lesson 33: Read page 148 – 149 from the section calculating speed** **Copy the example boxes and answer all the Q**	**February**
34	**DT graphs** Read page 152 - 153 9-1 CGP book. Copy the example of a distance time graph page 153 and important points page 152 about DT graphs Answer Q page 154. HT only - drawing a tangent and measuring the gradient of a DT graph	
35	**VT graphs** Read page 155 9-1 CGP book.	

	Copy the example of a velocity time graph page 155 and important points about VT graphs Answer Q 1,2 and 3 page 158. HT = read and make notes from pages 156 – 157. Answer all Q	
36	**Stopping and braking distances** Stopping distances and factors that affect them. Read page 176 - 179 9-1 CGP book. Copy figure 1 – make notes. Answer Q	
37	**Newton's First Law** Newton's 1st Law and give everyday examples. Read page 162 - 163 9-1 CGP book. Make notes and answer Q page 163.	
38	**Newton's second Law** Read page 164 - 165 9-1 CGP book. Learn this equation off by heart. Recall and apply them $resultant\ force = mass \times acceleration$ $F = m\,a$ Answer Q page 166 HT / STRETCH - Inertia	
39	**Newton's third Law** Read page 169 - 170 9-1 CGP book. Make notes and answer Q STRETCH answer Q on page 173 - 175	
40	**Weight, mass and gravity** Read pages 129-130 9-1 CGP book. Make notes on weight, mass and gravity. Copy the formula of how to calculate weight pg 130. Answer Q page 130.	**March**
41	**Terminal velocity** Read pages 159-161 9-1 CGP book. Make notes on friction, drag, terminal velocity and factors affecting it. Answer Q page 161.	
42-45	**Space** Research into days, nights, years and seasons Solar system: Sun, stars and galaxies Red shift Space missions Make a PowerPoint on the space topics above. Use the following websites for information: **https://www.bbc.co.uk/bitesize/topics/z8c9q6f/articles/zmhw7p3** **https://www.space.com/16080-solar-system-planets.html** **https://www.bbc.co.uk/bitesize/guides/zstb8mn/revision/1** **https://www.nasa.gov/missions**	

TASK 1: TEMPERTAURE

Time of day	Temperature ^{o}C
15.00	18
17.00	21
19.00	22
21.00	23
23.00	19
1.00	18
3.00	17
5.00	15

TASK 2: EVAPORATION

Evaporation involves a liquid changing to a gas - vaporisation.
When that happens at a particular temperature called the **boiling point**, we call the process of vaporisation '**boilin**g' but when it happpens at a lower temperature we call it **evaporation**.
The particles in a liquid at a given temperature have a range of energies. The temperature of a liquid is related to the average kinetic energy of the particles within the liquid. Therefore at any temperature some of the particles will have enough energy to escape from the liquid and become a gas.
If these high energy particles are at the surface of the liquid they can escape, if they are deeper within the liquid they will interact with neighbouring particles and share out that excess energy.
Once a high energy particle has escaped the remaining particles in the liquid will then have a lower average kinetic energy than before, so the temperature of the liquid will be lower than before - the liquid cools down as evaporation happens.
The liquid will then be cooler than its surroundings and therefore will take in heat energy from the surroundings (heat energy always travels from hot to cold). This will raise the kinetic energy of the particles within the liquid and the whole process will start again.

Evaporation is why **sweating** cools you down. The liquid sweat absorbs energy from your skin so that it can evaporate. This cools your skin. Your body uses this mechanism to maintain your body at the optimum temperature.

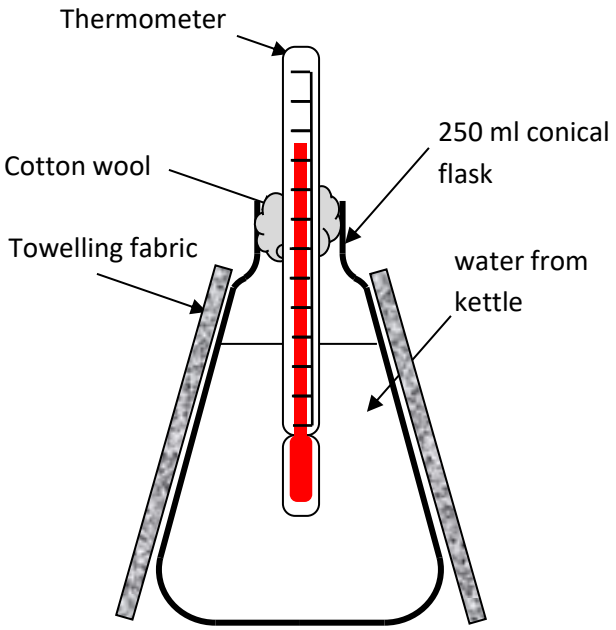
Evaporation is also the reason why damp **clothes dry on a washing line**.
On a cold day the temperature of the water in the clothes is well below the boiling point of water. However some of the water particles have enough energy to escape

into the atmosphere, the clothing is then cooler, takes in energy from the air and the whole evaporation process continues until all of the water particles have escaped.

If it is a **windy day** the water particles are rapidly moved away from the washing after they have escaped. This reduces the probability of the particles re-condensing on the washing. If it is a still day some recondensation will occur and the washing will take longer to dry.
If it is a **sunny day** the sunlight will be a source of electromagnetic energy (infra red energy) that will be absorbed by the water in the washing. This will mean that more particles have enough energy to escape and will make the washing dry quicker.
If the clothing has fine threads there will be a bigger surface area for the water to escape from and it will dry more quickly that materials with dense threads.
If the clothing is spread out to dry a bigger surface area is available from which the evaporation process can occur. If you overload your washing line and bunch all of the clothes together, they will not dry as efficiently as if you space them out.

TASK 3: Investigating the Effects of Sweating

A pupil wanted to investigate the effects of sweat on the rate at which a body loses heat. He used the model shown in the diagram opposite.



Method:

1. The equipment was set up as shown in the diagram opposite. The conical flask was filled with hot water from a kettle, and then a dry piece of towelling fabric was then wrapped around the flask.

2. The temperature of the water was recorded, and a stop clock was then started. The temperature was then recorded every minute for ten minutes.

3. The practical was then repeated using a piece of towelling fabric which had been soaked under a running cold tap and then wrung out so that it was still damp.

Results: The pupil's results are shown in the table opposite

At the end of the second experiment, the pupil noticed that the towelling around the flask was almost dry.

Time (minutes)	*Temperature of flask (°C)*	
	Dry Flask	*Wet Flask*
0	87	89
1	83	82
2	82	79
3	80	77
4	79	75
5	78	73
6	77	71
7	76	69
8	76	68
9	75	67
10	74	65

To do:

1. Plot a suitable graph of the results.

2. What conclusion can you draw from this data?

3. How do you explain why one flask cooled faster than the other?

4. Reread the method *carefully* and look at the results. Do you think that this was a fair test?

5. How could you improve the method to make the experiment more of a fair test?

TASK 4: MARIE CURIE

Humble beginnings

Born Maria Sklodowska on 7 November 1867 in Warsaw, Poland, she was the youngest of five children of poor school teachers.

After her mother died and her father could no longer support her she became a governess, reading and studying in her own time to quench her thirst for knowledge. She never lost this passion.

To become a teacher – the only alternative which would allow her to be independent – was never a possibility because a lack of money prevented her from a formal higher education. However, when her sister offered her lodgings in Paris with a view to going to university, she grasped the opportunity and moved to France in 1891.

She immediately entered Sorbonne University in Paris where she read physics and mathematics – she had naturally discovered a love of the subjects through her insatiable appetite for learning.

It was in Paris, in 1894, that she met Pierre Curie – a scientist working in the city – and who she married a year later. It was also around this time that she adopted the French spelling of her name – Marie. It is of course this version of her name that our charity (Marie Curie) uses.

Work on radioactivity and discoveries

Marie and her husband became research workers at the School of Chemistry and Physics in Paris

Marie also noticed that samples of a mineral called pitchblende, which contains uranium ore, were a great deal more radioactive than the pure element uranium. Marie was convinced she had found a new chemical element – other scientists doubted her results. Pierre and Marie Curie set about working to search for the unknown element. They ground up samples of pitchblende, dissolved them in acid, and began to separate the different elements present. Eventually, they extracted a black powder 330 times more radioactive than uranium, which they called polonium . Polonium was a new chemical element, atomic number 84.

When the Curies investigated further they realised that pitchblende contained another new element, far more radioactive than polonium, but present in even smaller quantities – RADIUM!

Marie Curie Nobel Prize

In 1903 Marie and Pierre were awarded the Nobel Prize for Physics jointly with Henri Becquerel for their combined, though separate, work on radioactivity.

In the same year, Marie passed her doctorate thesis in Physics.

In 1906 Marie's life was struck by tragedy when Pierre was killed in a street accident after being knocked down by a horse and cart. Her indomitable spirit, however, kept her working and she went on to succeed him in his Chair as Professor at Sorbonne, as well as carrying on lecturing where he had left off.

Her determination and remarkable endeavours led to a second Nobel Prize in 1911, this time in chemistry for creating a means of measuring radioactivity. Not long after, Sorbonne built the first radium institute with two laboratories; one for study of radioactivity under Marie Curie's direction, and the other for biological research into the treatment of cancer.

During the First World War, Marie Curie worked to develop small, mobile X-ray units that could be used to diagnose injuries near the battlefront. As Director of the Red Cross Radiological Service, she toured Paris, asking for money, supplies and vehicles which could be converted.

In October 1914, the first machines, known as "Petits Curies", were ready, and Marie set off to the front. She worked with her daughter Irene, then aged 17, at casualty clearing stations close to the front line, X-raying wounded men to locate fractures, bullets and shrapnel.

The technology Marie Curie developed for the "Petits Curies" is similar to that used today -A powerful X-ray machine, it allows doctors to examine moving images in the body, such as pumping action of the heart or the motion of swallowing.

After the war, Marie continued her work as a researcher, teacher and head of a laboratory and received many awards and prizes. On 4 July 1934, at the age of 66, Marie Curie died. The cause of her death was given as pernicious anaemia, a condition she developed after years of exposure to radiation through her work.

She left two daughters, Irene (born 1898) and Eve (born 1904). Marie Curie's life as a scientist was one which flourished because of her ability to observe, deduce and predict. She is also arguably the first woman to make such a significant contribution to science.