Summer Science Homework Year 9 into 10

Next year you will either be doing GCSE Combined Science which will give you two Science grades, or separate GCSE Biology, Chemistry and Physics.

You have already started the work for these subjects and should understand the importance of the required practicals.

In your final exams, you will be given exam questions on the required practicals so you need to know and understand each one.

To be well prepared you need to have a really thorough understanding of all the practicals and the earlier you start learning about them and being able to explain what you would do, the better you will do.

In the Summer term you will have done two of the required practicals and these are:

Microscopy

Use a light microscope to observe, draw and label biological specimens.

https://www.youtube.com/watch?v=jBVxo5T-ZQM

Density

Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids.

https://www.youtube.com/watch?v=ScXOp8Zph28

Your Homework

Use your checklist in your book and watch videos on free science lessons.co.uk relating to the required practicals covered this year.

Write a full method for each one, which includes describing the variables.

Learn about each required practical ready for exam questions on them.

How will you be assessed on this homework?

Pupils will sit an assessment on these in the first two weeks of September. This will be a long, 6 mark exam question.

Other useful information to start learning…….

GCSE Science / Physics

Physics Equations and Units

Symbol	Quantity	Unit	*Unit name*
F	(resultant) force	**N**	*newtons*
W	weight		
M	moment of a force	**N m**	*newton metres*
g	gravitational field strength	**N/kg**	*newtons per kilogram*
m	mass	**kg**	*kilograms*
v	velocity/speed OR wave speed	**m/s**	*metres per second*
p	momentum	**kg m/s**	*kilograms metres per second*
a	acceleration	**m/s^2**	*metres per second squared*
t	time	**s**	*seconds*
T	period		
f	frequency	**Hz**	*hertz*
k	spring constant	**N/m**	*newtons per metre*
e	extension	**m**	*metres*
s	distance		
h	height		
l	length		
λ	wavelength		
A	area	**m^2**	*metres squared*
p	pressure	**N/m^2** **Pa**	*newtons per metre squared* *OR pascals*
V	volume	**m^3**	*metres cubed*
ρ	density	**kg/m^3**	*kilograms per metre cubed*

W	work done	**J**	*joules*
E	energy transferred		
E_e	elastic potential energy		
E_k	kinetic energy		
E_p	(gravitational) potential energy		
P	power	**W**	*watts*
c	specific heat capacity	**J/kg°C**	*joules per kilogram degrees celsius*
L	specific latent heat	**J/kg**	*joules per kilogram*
	efficiency	**% or decimal**	
Q	charge	**C**	*coulombs*
I	current	**A**	*amps*
V	potential difference (voltage)	**V**	*volts*
R	resistance	**Ω**	*ohms*
B	magnetic flux density	**T**	*tesla*

Remember:

- Most units are upper case (e.g. T, J, N, A…) – you must write them like this, you won't get the mark if you use lower case for these.
- Work done is another way of saying energy transferred.

See the Physics Equations below……

Physics Equations

Equation number	Word equation	Symbol equation
1	weight = mass × gravitational field strength *g*	$W = mg$
2	work done = force × distance along the line of action of the force	$W = Fs$
3	force applied to a spring = spring constant × extension	$F = ke$
4	moment of a force = force × distance normal to direction of force	$M = Fd$
5	$pressure = \frac{force\ normal\ to\ a\ surface}{area\ of\ that\ surface}$	$p = \frac{F}{A}$
6	distance travelled = speed × time	$s = vt$
7	$acceleration = \frac{change\ in\ velocity}{time\ taken}$	$a = \frac{\Delta v}{t}$
8	resultant force = mass × acceleration	$F = ma$
9 HT	momentum = mass × velocity	$p = mv$
10	kinetic energy = 0.5 × mass × (speed)^2	$E_k = \frac{1}{2}mv^2$
11	gravitational potential energy = mass × gravitational field strength (*g*) × height	$E_p = mgh$
12	$power = \frac{energy\ transferred}{time}$	$P = \frac{E}{t}$
13	$power = \frac{work\ done}{time}$	$P = \frac{W}{t}$
14	$efficiecy = \frac{useful\ output\ energy\ transfer}{total\ input\ energy\ transfer}$	
15	$efficiecy = \frac{total\ power\ output}{total\ power\ input}$	
16	wave speed = frequency × wavelength	$v = f\lambda$
17	charge flow = current × time	$Q = It$
18	potential difference = current × resistance	$V = IR$
19	power = potential difference × current	$P = VI$
20	power = (current)^2 × resistance	$P = I^2R$

21	energy transferred = power × time	$E = P\,t$
22	energy transferred = charge flow × potential difference	$E = Q\,V$
23	$density = \frac{mass}{volume}$	$\rho = \frac{m}{V}$

Some chemistry facts to learn by heart…..

Some common formulae that you should know

H_2O	water	**CO_2**	carbon dioxide
CO	carbon monoxide	**H_2SO_4**	sulfuric acid
HNO_3	nitric acid	**NaOH**	sodium hydroxide
KOH	potassium hydroxide	**NH_3**	ammonia
SO_2	sulfur dioxide	**CH_4**	methane
NaCl	sodium chloride	**$CaCO_3$**	calcium carbonate

HCl Either a gas called hydrogen chloride, but when dissolved in water, hydrochloric acid

Some common groups you need to know about

There are some groups that you need to be able to recognise in formulae

~NO_3 a nitrate group, e.g. $NaNO_3$ is sodium nitrate

~SO_4 is a sulfate group, e.g. K_2SO_4 is called potassium sulphate

~OH is a hydroxide group e.g. NaOH is sodium hydroxide. These are alkalis if soluble in water, or bases if not.

~CO_3 is a carbonate group, e.g. $CuCO_3$ is called copper carbonate

Tests for gases

Oxygen – relights a glowing splint.

Hydrogen – makes a pop sound with a lighted splint.

Carbon dioxide – turns lime water cloudy when it is bubbled through.

Chlorine – turns damp blue litmus paper red and then bleaches it.