

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	<i>newtons</i>
W	weight		
M	moment of a force	N m	<i>newton metres</i>
g	gravitational field strength	N/kg	<i>newtons per kilogram</i>
m	mass	kg	<i>kilograms</i>
v	velocity/speed OR wave speed	m/s	<i>metres per second</i>
p	momentum	kg m/s	<i>kilograms metres per second</i>
a	acceleration	m/s²	<i>metres per second squared</i>
t	time	s	<i>seconds</i>
T	period		
f	frequency	Hz	<i>hertz</i>
k	spring constant	N/m	<i>newtons per metre</i>
e	extension	m	<i>metres</i>
s	distance		
h	height		
l	length		
λ	wavelength		
A	area	m²	<i>metres squared</i>
p	pressure	N/m² Pa	<i>newtons per metre squared</i> <i>OR pascals</i>
V	volume	m³	<i>metres cubed</i>
ρ	density	kg/m³	<i>kilograms per metre cubed</i>

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

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	$W = m g$
2	work done = force × distance along the line of action of the force	$W = F s$
3	force applied to a spring = spring constant × extension	$F = k e$
4	moment of a force = force × distance normal to direction of force	$M = F d$
5	$pressure = \frac{\text{force normal to a surface}}{\text{area of that surface}}$	$p = \frac{F}{A}$
6	distance travelled = speed × time	$s = v t$
7	$acceleration = \frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{\Delta v}{t}$
8	resultant force = mass × acceleration	$F = m a$
9 HT	momentum = mass × velocity	$p = m v$
10	kinetic energy = $0.5 \times \text{mass} \times (\text{speed})^2$	$E_k = \frac{1}{2} m v^2$
11	gravitational potential energy = mass × gravitational field strength (g) × height	$E_p = m g h$
12	$power = \frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
13	$power = \frac{\text{work done}}{\text{time}}$	$P = \frac{W}{t}$
14	$efficiency = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$	
15	$efficiency = \frac{\text{total power output}}{\text{total power input}}$	
16	wave speed = frequency × wavelength	$v = f \lambda$
17	charge flow = current × time	$Q = I t$
18	potential difference = current × resistance	$V = I R$
19	power = potential difference × current	$P = V I$
20	power = (current) ² × resistance	$P = I^2 R$

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

H₂O	water	CO₂	carbon dioxide
CO	carbon monoxide	H₂SO₄	sulfuric acid
HNO₃	nitric acid	NaOH	sodium hydroxide
KOH	potassium hydroxide	NH₃	ammonia
SO₂	sulfur dioxide	CH₄	methane
NaCl	sodium chloride	CaCO₃	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

~NO₃ a nitrate group, e.g. NaNO₃ is sodium nitrate

~SO₄ is a sulfate group, e.g. K₂SO₄ 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.

~CO₃ is a carbonate group, e.g. CuCO₃ 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.