November 2017

Dear Parents/Carers

As I am sure you are aware your son/daughter has been working on the new specification for GCSE Science, grades 9-1. To help identify areas to improve and assist in deciding the tier of entry that would be suitable for each student, there will be science mock exams on the following dates covering the topics listed below:-

Monday 4 December 2017 P1 & 2 - Biology Paper 1
Topics – cell biology, organisation, infection and response and bioenergetics

Tuesday 5 December 2017 P1 & 2 - Chemistry Paper 3
Topics – atoms and periodic table, bonding, quantitative chemistry, chemical changes, energy changes

Thursday 7 December 2017 P1 & 2 - Physics Paper 5
Topics – energy, electricity, particle model and atomic structure

For these exams students are now required to recall (memorise):

- 21 equations if they are taking trilogy combined science
- 23 equations if they are taking the physics separate science option

It is important that they can secure marks in the exam by memorising the required equations, either the word equations or the symbol (letter) equations. Revision cards and personal learning checklists will be given to every student to help them revise the key terms and focus on weaker areas. It would be great if you could help to support your child's learning by testing them on both the equations and the content from the revision cards.

With the increased mathematical content, it is also essential that all students have a scientific calculator which they can familiarise themselves with in class and whilst doing homework ready for the exam.

Revision guides provide a comprehensive summary of the content and these have been available to purchase throughout the year. If you still require one, please contact me on the email address below.

Yours sincerely

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12 Appendix B: Physics equations

In solving quantitative problems, students should be able to recall and apply the following equations, using standard SI units.

Equations required for Higher Tier papers only are indicated by HT in the left-hand column.

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	distance travelled = speed × time	$s = v\,t$
5	acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{\Delta v}{t}$
6	resultant force = mass × acceleration	$F = m\,a$
7 HT	momentum = mass × velocity	$p = m\,v$
8	kinetic energy = 0.5 × mass × (speed)^2	$E_k = \frac{1}{2}m\,v^2$
9	gravitational potential energy = mass × gravitational field strength (g) × height	$E_p = m\,g\,h$
10	power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
11	power = $\frac{\text{work done}}{\text{time}}$	$P = \frac{W}{t}$
12	efficiency = $\frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$	
13	efficiency = $\frac{\text{useful power output}}{\text{total power input}}$	
14	wave speed = frequency × wavelength	$v = f\,\lambda$
15	charge flow = current × time	$Q = I\,t$
16	potential difference = current × resistance	$V = I\,R$
17	power = potential difference × current	$P = V\,I$
18	power = (current)^2 × resistance	$P = I^2\,R$
19	energy transferred = power × time	$E = P\,t$
20	energy transferred = charge flow × potential difference	$E = Q\,V$
21	density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$

Students should be able to select and apply the following equations from the *Physics equation sheet*.

Equations required for higher tier papers only are indicated by HT in the left-hand column.

Equation number	Word equation	Symbol equation
1	(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance	$v^2 - u^2 = 2\,a\,s$
2	elastic potential energy = 0.5 × spring constant × (extension)^2	$E_e = \frac{1}{2}\,k\,e^2$
3	change in thermal energy = mass × specific heat capacity × temperature change	$\Delta E = m\,c\,\Delta\theta$
4	period = $\frac{1}{\text{frequency}}$	
5 HT	force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length	$F = B\,I\,l$
6	thermal energy for a change of state = mass × specific latent heat	$E = m\,L$
7 HT	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_s\,I_s = V_p\,I_p$