

**To: All prospective Year 12 Physics students**

**From: Mr Worthy (Head of Physics)**

I am very pleased that you have chosen to apply to the Math to study Physics at Advanced Level and I hope that you will find the course a rewarding one.

To be successful you will need a very high degree of motivation and there will almost certainly be times when you find aspects of the work extremely challenging. You should remember however that the Physics Department is here to support you through your studies. This help is most effective if it is sought at the time you discover the difficulty – rather than later when a significant obstacle to learning has developed.

To help you to prepare for the challenges that this course will pose a booklet of work has been produced to help you test your own understanding of some key concepts and to refresh your memory or extend your learning to help bridge the gap between GCSE and A Level.

You will be expected to download the electronic copy of this document during induction week, print it out and bind it / hole punch and use treasury tags.

Answers to some of the questions are provided at the back of the booklet, and the intention here is that you can gauge how well you understand the relevant topic areas. You may well need to read around the subject – indeed we encourage this.

Please note:

You will be required to **bring your booklet and all your completed work to your first Physics lesson, where it will be collected in.**

- You must **show ALL working** to demonstrate that you have completed the work yourself.
- Your work **must be marked and annotated with corrections.**
- The work is to be done **in the booklet**, NOT on separate sheets.
- You should also **annotate the contents page** to show any topic areas in which you are experiencing any difficulty and the nature of this difficulty.

**Should you have any particular difficulties in completing the work, or if you just need some advice, please contact me by email at [worthya@sjwms.org.uk](mailto:worthya@sjwms.org.uk) but please do not leave this until just before you enrol for the sixth form.**

In addition to this you will be **expected to recall** all the formulae listed on the formula sheet attached. This will enable you to identify the appropriate formula quickly during your A level studies and this in turn will increase your success in your A level exams.

**You will sit a series of tests at the start of the first term in Year 12 on your knowledge of the formulae provided, your ability to manipulate equations, understanding of mechanics and understanding of electricity. The pass mark for these tests will all be greater than 70 %, so it is essential that you seek help if necessary to avoid a retest.**

We wish you well for GCSE results day and hope to see you in September.

# List of Formulae to be Learned Prior to the Commencement of the Year 12 Course

## Mechanics

Velocity = displacement / time ( Note that the symbol for displacement is 's' )  $v = s/t$

Acceleration = change in velocity /time  $a = \Delta v / \Delta t$

Acceleration = (final velocity – initial velocity)/ time  $a = (v-u) / t$

Resultant force = mass x acceleration  $F = ma$

Weight = mass x gravitational field strength  $W = mg$

Kinetic energy =  $\frac{1}{2}$  x mass x speed<sup>2</sup>  $E_k = \frac{1}{2} m v^2$

Change in gravitational potential energy = mass x gravitational field strength x change in height  $\Delta E_{grav} = mg\Delta h$

Momentum = mass x velocity  $p = mv$

Force = rate of change of momentum = change in momentum/time  $F = \Delta(mv) / \Delta t$

Pressure = force / area  $P = F/A$

Work done = **average** force x distance moved **in the direction of the force**  $W = F \Delta s$

## Electricity

Current = charge / time  $I = \Delta Q / \Delta t$

Voltage = current x resistance  $V = I R$

Voltage = energy/charge or work/charge  $V = E/Q$  or  $W/Q$

Power = current x voltage  $P = I V$

Power = energy / time  $P = E / t$

Energy = power x time  $E = P t$

Energy = current x voltage x time  $E = VIt$

## Other Formulae

Wave speed = frequency x wavelength  $v = f \lambda$

Change in energy = speed of light<sup>2</sup> x change in mass  $\Delta E = c^2 \Delta m$