

Student Name

Department of Physics

Sir Joseph Williamson's Mathematical School

Summer Work for Prospective Year 12 Students

(Revision D)

A Worthy July 2017

The intention of this booklet is to refresh or extend your working knowledge of Physics so as to smooth the transition to AS level Physics. Some students find the change to AS level daunting, and this is mainly due to three factors:

- poor memory of key Physics principles and formulae
- difficulty in rearranging equations
- failing to set out calculations clearly with all working shown

By studying this booklet you should become more confident in your subject knowledge and more careful with your presentation of work.

It should be noted that:

- all work is to be completed prior to commencement of the AS Physics course and brought to the first lesson
- answers are provided at the back of the booklet and students are expected to check answers carefully (Answers are given in Chapter 13) and show corrections.
- students should make a list of areas with which they are having difficulty so that these can be addressed early on
- a series of tests will be undertaken early in the first term of Year 12 to check progress

Learning Objectives

(Mechanics):

1. Calculate displacements and distances (see Chapter 1)
2. Calculate velocities and speeds (see Chapter 2)
3. Interpret motion graphs (see Chapters 1-4)
4. Calculate accelerations (see Chapters 2 and 5)
5. Calculate displacement from velocity – time graphs (see Chapter 6)
6. Use Newton's 3 Laws of Motion (see Chapter 7)
7. Use free body force diagrams to calculate forces (see Chapter 7)
8. Apply $F=ma$ to calculate resultant forces, accelerations and masses, and also frictional forces (see Chapter 8)
9. Calculate work done and power (see Chapter 9)

(Electricity):

10. Apply rules for current and voltage in series and parallel circuits (see Chapter 10)
11. Explain how resistors can be used to control devices (see Chapter 11)
12. Use Ohm's Law to calculate potential differences, currents and resistances (see Chapter 11)
13. Calculate the power of electrical devices (see Chapter 12)
14. Calculate the energy used by electrical devices (see Chapter 12)

Chapter

- 1 Distance, displacement, speed and velocity**
- 2 Displacement – time graphs**
- 3 Velocity – time graphs**
- 4 More motion graphs**
- 5 Acceleration calculations**
- 6 Calculating displacement from a velocity – time graph**
- 7 Newton’s laws of motion and force diagrams**
- 8 Resultant force and $F=ma$**
- 9 Work done and power**
- 10 Current and voltage**
- 11 Ohm’s law and resistance**
- 12 Electrical energy and power**
- 13 *Answers to Questions***