Hellesdon Sixth Form
Your next step

A level Physics Expectations

A-level Physics is a demanding and challenging course that uses science and maths as tools to describe the underlying laws of nature. A-level Maths is not necessary but it does help and if you are not taking it you will need to attend extra sessions and put in extra work to be able to succeed. The course is exciting, interesting and covers up to date cutting edge Physics. There is plenty of practical work and you will be required to keep an accurate experimental log to demonstrate your competence in doing practical work ready for University.

You will need to bring the following equipment to every lesson

- Scientific calculator.
- Text book (see bottom of page for details).
- Pen.
- Pencil.
- Ruler.
- Your notes.
- Data and formula sheet.
- Summary questions book.
- Your log of extracurricular work/activity, showing evidence for approximately 5 hours per week of Physics.

You will do the following things in lessons:

- Take reasonable notes.
- Actively take part in all practical activities.
- Listen carefully and make sure you are following what is being taught, asking questions if you don't understand.
- Comply with all safety instructions, some of the practicals are dangerous.
- Attempt all questions and calculations yourself, don't rely on others.

Outside the lessons you will need to

- Come and talk to your Physics teachers with any problems or if you are unsure of anything. We are all available outside of lessons to help, please come and ask.
- Review each lesson taught and your notes, rewriting and clarifying if necessary.
- Read ahead in the textbook, and in other media so you know what is coming.
- Complete all homework by the deadline, attempting it early so there is time to talk to your teachers if you are stuck.
- Revise carefully and thoroughly for end of unit tests.
- Completing your own independent study: completing past paper questions, watching youtube tutorials, reading around the subject, etc. This is to be recorded and signed off on your log of extracurricular activity.

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The textbook we will be using is AQA Physics 2nd Edition by Jim Breithaupt, published by Oxford University Press ISBN 978-0-19-835187-0. This book contains all the content for Y12 and Y13, but it is also available as separate AS and A2 versions which are more likely to be around second hand. Either is fine, but you will need one before you start the course.

Because of changes made to GCSE Science and Physics exams these last few years, you were given a formula sheet rather than having to learn those formula. However, at A level it is important that you know these formulae and are able to apply them confidently. Therefore, we have included/attached the sheet of equations for the GCSE Physics. Please learn these thoroughly using an appropriate method. Shortly after we start in September there will be a test on the content to check your understanding.
You can also use the following website/app to help you: https://23equations.com/

Name:…… Date:……..……

Physics A level Bridging Work Task 1 - Maths skills for physics

Please complete the following in the spaces provided.

Standard form and Indices

1. Express as a power of ten:

   a. 10000 = ...

   b. 0.004 = ...

2. Convert to 'normal' form:

   a. 8.95×10^{3} = ...

   b. 3.75×10^{-2} = ...

3. Answer the following to 3 significant figures:

   a. $(2.22 \times 10^{5}) \times (3.33 \times 10^{6})$ = ...

   b. $(8.81 \times 10^{8}) \times (7.71 \times 10^{7})$ = ...

4. $x^{1/2}$ can also be written as: .....

Prefixes and multipliers

5. What is the multiplier for the following prefixes?

   milli m = ...

   Mega M = ...

6. Convert the following into metres:

   250cm = ...

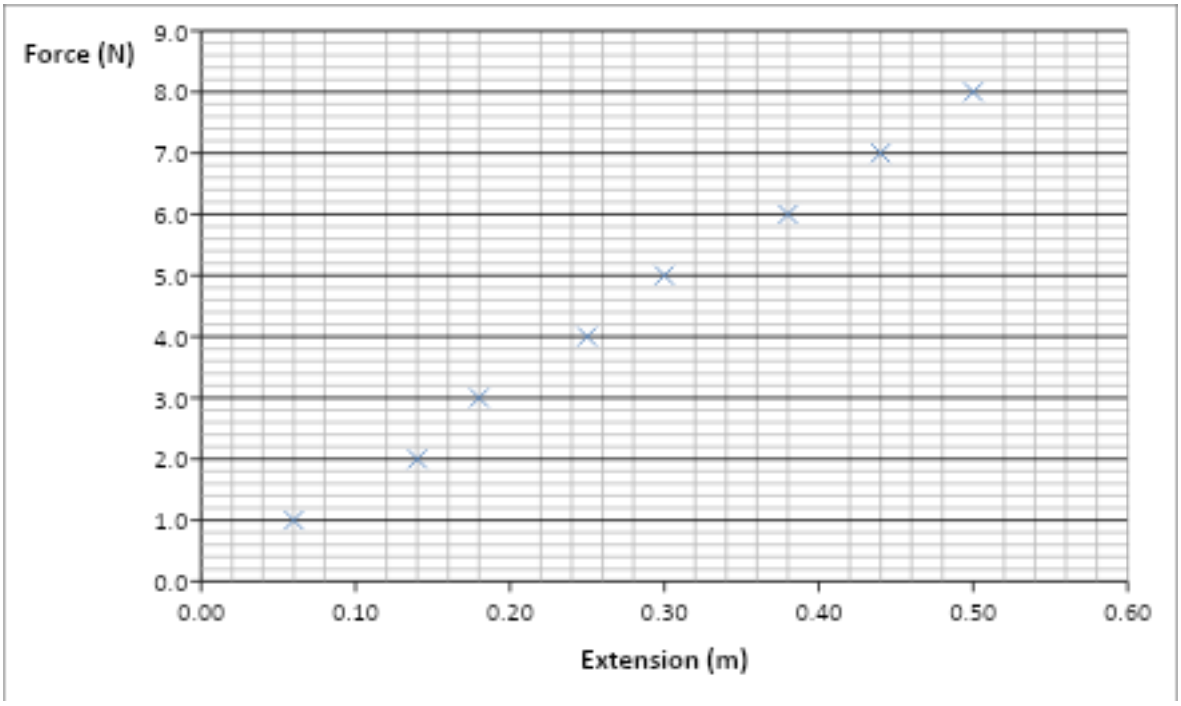
   0.25km = ...

Graphs

7. What is the equation for a straight line graph?

.....

8. Draw the line of best fit and find the gradient of this graph:



Gradient = ...

.....

9. The graph below shows the motion of a runner for the first 40 seconds of a race.

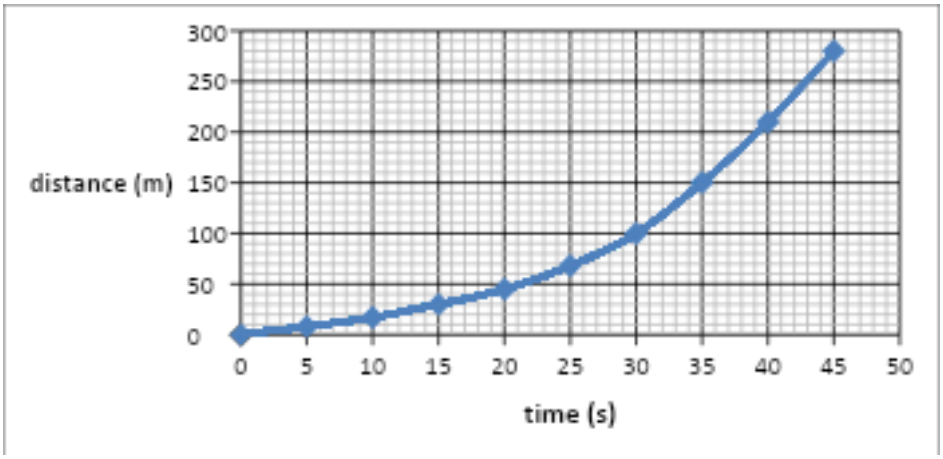
a. What can you say about his speed?

.....

.....

b. Use the graph to find his speed at time 30s .....

.....



10. What can you say about the relationship between quantity **a** and quantity **b**?

.....

.....

Using Formulae

11. Find the answers to the following. Ensure you show all workings.

a. $PV = nRT$ *Find T if:* P = 1700 Pa V = 3.0 V n = 2.5 R = 8.3

.....

.....

b. $v^2 = u^2 + 2as$ *Find v if:* u = 15 a = 1.5 s = 150

.....

.....

c. $E_k = ½ mv^2$ *Find v if:* E_k = 1000 m = 170

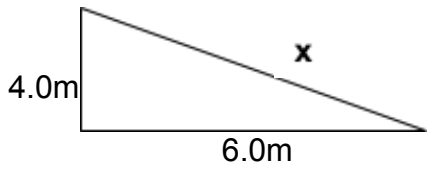
.....

.....

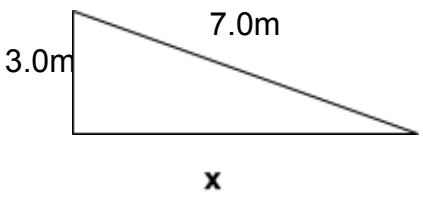
Pythagoras

12. Find the length of the side labelled **x** :

a.



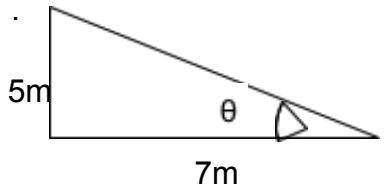
b.



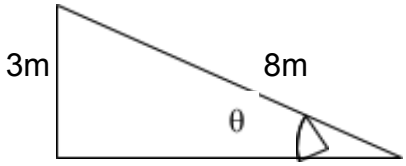
Trigonometry

13. Find angle θ. The lengths of two sides are given.

a. .

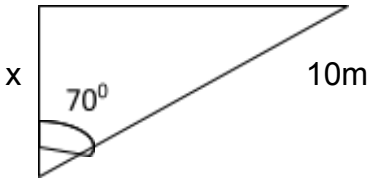


b.

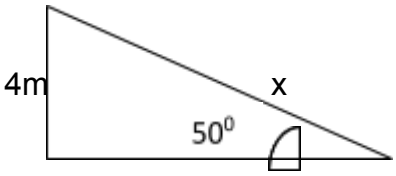


14. Find length x. The length of one side and one angle are given.

a.



b.



Physics A level Bridging Work Task 2 - Practical application of physics

Why is the Diffraction seen with a diffraction grating?

You need to research and produce a report on how a diffraction works. The report must be about 750 words.

In your report you should include the keywords:

Diffraction, Phase, Antiphase, Constructive Interference, Destructive Interference, Superposition and Path difference.

1. Introduction (which includes the aim of the report)
2. Define each of the relevant specialist terminology (keywords) seen above.
3. A suitable labelled diagram for constructive and destructive interference (which must be referenced in your report)
4. An explanation of the physics principles involved in the experiment (Including an equation and what phase difference is required for constructive and destructive interference.)
5. References / bibliography

The report can be hand written or word processed.

Videos that may help you

Path Difference, Constructive & Destructive Interference - A Level Physics

https://www.youtube.com/watch?v=WRgf2r0WEHQ

Measuring Wavelength of Light with a Diffraction Grating - PRACTICAL - A Level Physics

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