THE PRIORY ACADEMY LSST

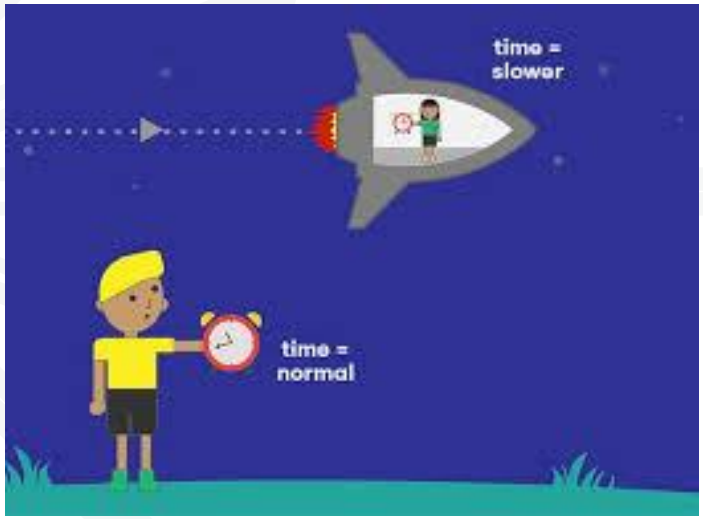
Sixth Form Induction Day

Physics Taster Session

THE PRIORY FEDERATION OF ACADEMIES TRUST

Quick Challenge!

I am on a spaceship travelling at the speed of light. I shine a torch out of the front of the spaceship. How fast do I measure the light waves to be going? How fast does someone stood on Earth watching all of this measure the light waves to be going?



More on this at the end of year 13!!!!!!

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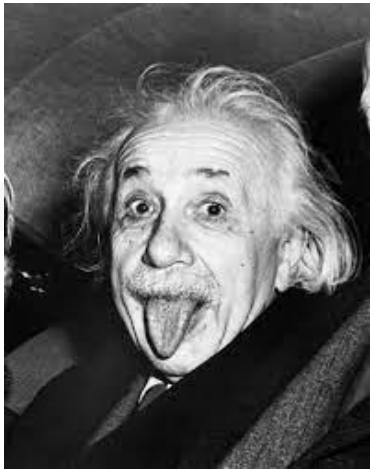
Today's Session

- Why Physics?
- Options beyond LSST and A level
- Course Structure
- Transition for GCSE to A level
- Summer Preparations
- Resources



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Why Physics?

What A-levels have you chosen?

What do you want to do?

Why have you chosen Physics?

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Physics and Beyond at LSST

What courses are you interested in?

Courses our students have gone on to do:

- Physics
- Mathematics
- Economics
- Engineering
- Philosophy
- Chemistry
- And loads more….!
- Medicine
- Computing

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Physics and Beyond at LSST

- Possible careers with a Physics degree:

Research

Education

Nuclear energy

Any thoughts on what you want to do?

Engineer

Medical research

Economist

Meteorologist

Doctor

Civil service

Accountant

And loads more….!

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Course Outline

- **Particles and radiation:** This section introduces students both to the fundamental properties of matter, and to electromagnetic radiation and quantum phenomena.
- **Waves:** Development of knowledge of the characteristics, properties, and applications of travelling waves and stationary waves. Topics treated include refraction, diffraction, superposition and interference.
- **Mechanics and materials:** Vectors and their treatment are introduced followed by development of the student's knowledge and understanding of forces, energy and momentum.
- **Electricity:** This section builds on and develops earlier study of these phenomena from GCSE.

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Course Outline

- Further mechanics: The earlier study of mechanics is further advanced through a consideration of circular motion and simple harmonic motion (the harmonic oscillator).
- Thermal Physics: A further section allows the thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth.
- Gravitational fields: The ideas of gravitation, practical applications considered include: planetary and satellite orbits.
- Electric fields: Electric fields and potentials.
- Capacitors: Capacitance, charging and discharging and uses.
- Magnetic fields: Magnetic fields and electromagnetic induction.
- Nuclear Physics: The properties of the nucleus to the production of nuclear power through the characteristics of the nucleus, the properties of unstable nuclei.
- Options (turning points): This option is intended to enable key concepts and developments in physics to be studied in greater depth than in the core content.

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Exam Outline

Paper 1

What's assessed

Sections 1 - 5 and 6.1 (Periodic motion)

Assessed

- written exam: 2 hours
- 85 marks
- 34% of A-level

Questions

60 marks of short and long answer questions and 25 multiple choice questions on content.

Paper 2

What's assessed

Sections 6.2 (Thermal Physics), 7 and 8

Assumed knowledge from sections 1 to 6.1

Assessed

- written exam: 2 hours
- 85 marks
- 34% of A-level

Questions

60 marks of short and long answer questions and 25 multiple choice questions on content.

Paper 3

What's assessed

Section A: Compulsory section: Practical skills and data analysis

Section B: Students enter for **one** of sections 9, 10, 11, 12 or 13

Assessed

- written exam: 2 hours
- 80 marks
- 32% of A-level

Questions

45 marks of short and long answer questions on practical experiments and data analysis.

35 marks of short and long answer questions on optional topic.

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As well as scientific content…

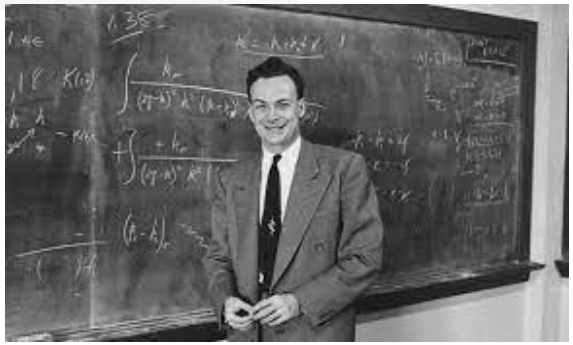
To cover a range of topics and skills

e.g.

Standing Waves
Capacitor Behaviour
Stretching a Wire
Free Fall
Resistivity
Thermodynamics
Magnetic fields

As well as the main content of the course there are also 12 core practical activities to be carried out and written up.

Hopefully it won't be a shock to you that the A-Level Physics course is very heavily mathematical. At least 40% of the exams will be mathematical but you can expect this to be regularly more. The standard is "at least" GCSE higher maths but in places goes a little further.



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Transition from GCSE

- Grade 6 in Science/Physics at GCSE
- Demands at A-level are high and very skills based – like your GCSE (required practical work and data!)
- Maths demand – 40% (algebra, graphs, geometry, logs and exponentials etc.)
- Independent learning, extra reading
- 4 periods + study time – where you are expected to complete set work!

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Preparing Over Summer!

- Get equipped (we'll do checks so no excuses)!

☐ Pens (different colours)	☐ Calculator
☐ Pencils	☐ Paper/Notepad
☐ Sharpener	☐ Folder
☐ Ruler	☐ Folder Dividers
☐ Rubber	

no exercise books anymore!

- You won't get a textbook but you can borrow one in your free periods if needed. You will be getting an exercise book.
- Revision guides bought need to be **'AQA'**
- **Transition work:**
  - Induction booklet and tasks
  - Reading list

Very Important!

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Taster task!

- To give you an idea of the demand required we are going to do an example task. Here is a car pulling a trailer. Draw one diagram showing the forces acting on the car and a separate one doing the same for the trailer.

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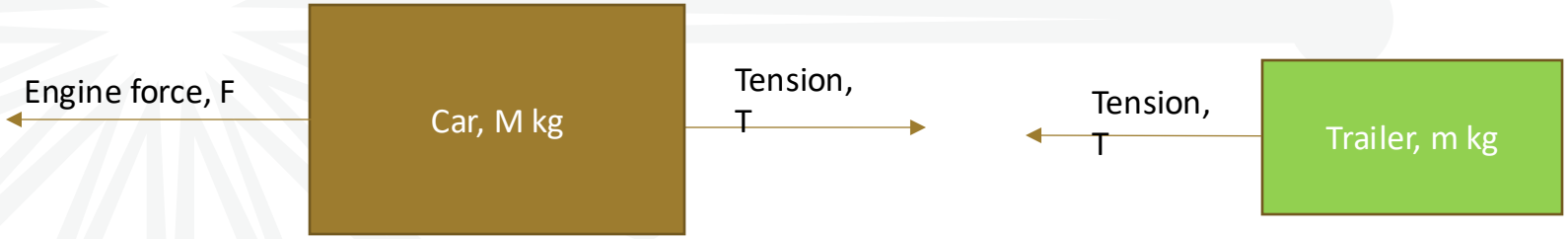
Taster task!

- Hopefully you got something like the diagrams below. Note that the tension in the tow bar works in opposite directions for the car and trailer. Well done if you included friction but we are going to ignore that in this problem. Newton's second law says that Resultant force = mass x acceleration, F = ma. Can you write a separate equation for each object?



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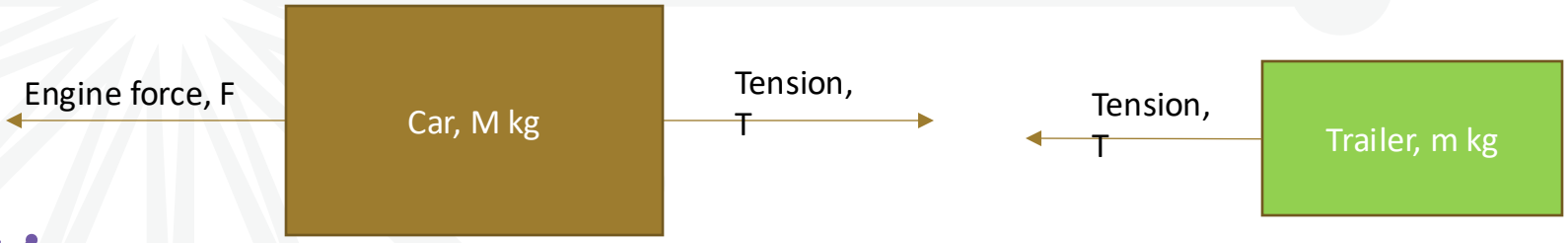
Taster task

- $F - T = Ma$
- $T = ma$

The acceleration of both, if any, is the same. They have to be as they are connected. Finally can you add the equations together to get an expressions for the acceleration? If M = 500 kg, m = 100 kg and F = 1000 N, can you calculate acceleration?



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Taster task

- $a = \frac{F}{M+m}$
- a = 1000/600 = 16.7 ms^{-2}

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Transition work…

- You have received an induction booklet wit ic information covering some of the skills you will need to master over the two year course. Please take a look at this over the summer.

- In addition to this your actual transition work is a maths skills booklet. Having sharp maths skills is vital to success at A-Level physics and so by working through this booklet as best you can over the summer you will be giving yourself a head start, and making the transition to a difficult course a little less of a shock.

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It is important that you take these transition booklets seriously!

If you are taking A-Level Maths this will obviously help out your physics as well. Don't worry if you're not though as support will be given to you to get you confident!

As well as the transition packs…

Wider reading around the subject helps you succeed at A level!

Over the summer why not put your phone down for a while and read a book (remember them)!

- Six Easy Pieces (Richard Feynman)
- Why does E-mc^2 ? (Brian cox and Jeff Forshaw)
- Quantum Theory Cannot Hurt You (Marcus Chown)
- Surely You're Joking Mr Feynman (Richard Feynman)
- In Search of Schrödinger's Cat (John Gribbin)

If you insist on watching something then the BBC is always a good source of relevant and interesting Physics. Try the i-player for Brian cox and Jim al-Khalili documentaries that will ignite your passion for Physics!

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Any Questions?

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Quick Physics Quiz

Name a vector quantity?

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Quick Physics Quiz

How many neutrons are in a Carbon-12 nucleus?

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Quick Physics Quiz

In a sealed container of air, if I increase the temperature what else increases?

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Quick Physics Quiz

True or False, there is no gravity in space, that's why things float?

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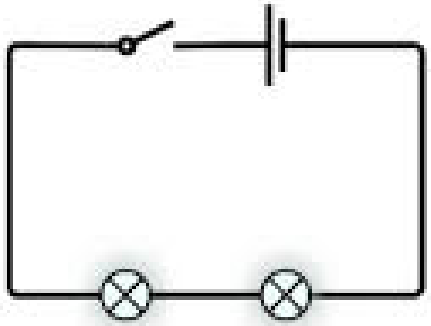
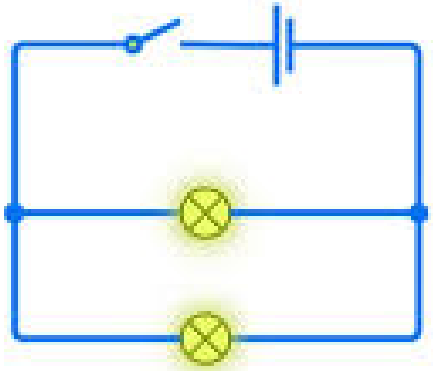
Quick Physics Quiz

All of the bulbs below are identical. The cells have p.d of 6 V. What are the p.ds across each of the bulbs?





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Quick Physics Quiz

Sketch the magnetic field around a bar magnet.

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Quick Physics Quiz

What turns in to a what in beta minus decay?

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Quick Physics Quiz

A wave has frequency of 50 Hz and a wavelength of 2 m. Calculate its speed.

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Quick Physics Quiz

What is the unit of electrical charge?

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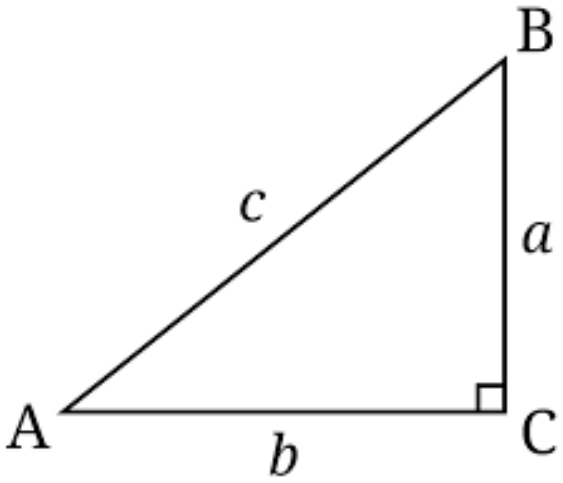
Quick WB Biology Quiz

a = 4cm, b = 3cm, c = ?



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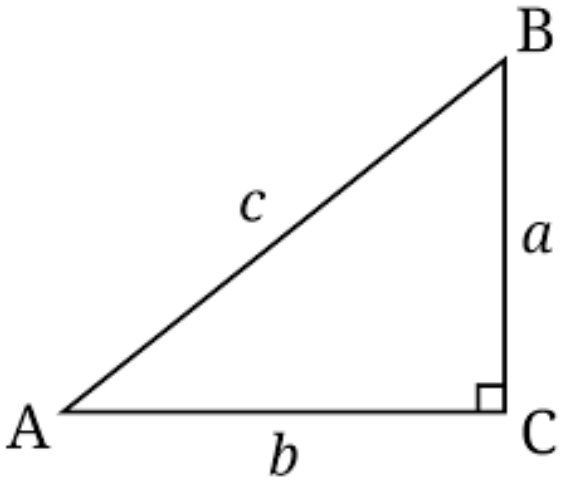
Quick WB Biology Quiz

Angle A = 30^{o}, c = 10cm, a = ?, b = ?



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The bigger picture!

- This is to give them a flavour, insight into the types of topic and types of question they might be tackling.
- It might follow on from the starter activity but ideally would give them an idea of the bigger picture for your subject.
- Structure 5 minutes discussion work/group work around these in the manner that is most appropriate to your subject area.

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Top tips for studying German at A Level.

- Please insert your top tips for studying the subject at A Level. This could be able about managing time, additional things to be involved in. Any might mention equipment/materials needed for your subject.

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What do I need to do to prepare before September?

Please list things that need to be done before September. These listed below need to be included if possible.

- Over the summer make sure you complete the transition work which can be found on the website.
- State when and how this needs to be submitted
- Look at the specification from the examination board. (Insert links to specification)
- Further reading – add a link?

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