

Karen Hill - My experience



Imperial College
London



The Open
University



Making physics matter



Physics. *You work it out.*

My experience



Imperial College
London

A long long time ago.....

Physics A levels at a Girls Grammar School

BSc Physics, PhD Theoretical Physics and 2 years post-doc at Imperial College

My experience



Imperial College
London



The life of an Academic- Theoretical and
Quantum optics

Discovered teaching!



My experience

More than 25
years teaching
Physics (11-18) at
4 different
schools

3 out of 4 schools
for Girls



My experience

Since 2010: Head of Physics
at West Kirby Grammar
School



Ogden Teacher Fellow

Isaac Physics Ambassador



Making physics matter



Physics. You work it out.

Overcoming Hurdles

Students

- Too hard!
- IP doesn't work on my computer
- I did the assignment but it didn't save it!



Overcoming Hurdles



Students

- Too hard!
- IP doesn't work on my computer
- I did the assignment but it didn't save it!
- Book a computer room for first session
- Make sure students know how to log in
- Make sure students agree to their teacher connections
- Start small – edit existing boards to make them easier or to reduce the number of questions

Overcoming Hurdles



Teachers

- Too hard!
- I prefer to use Exampro.

Overcoming Hurdles



Point out

- where the guides are on the website
 - How to contact the helpdesk for hints
 - The value of teachers getting it wrong
 - Email you with a screenshot to trouble shoot
-
- Put it into your SoW as a key assessed piece of work

Teachers

- Too hard!
- I prefer to use Exampro.

Includes worked examples and guidance.

GCSE grades 9-4/5.

Includes extension materials (beyond GCSE, indicated by ♡)

Lessons for remote COVID-19 learning

Virtual lessons following the Mastering Essential GCSE Physics book.

Virtual lessons by topic

Buy the book

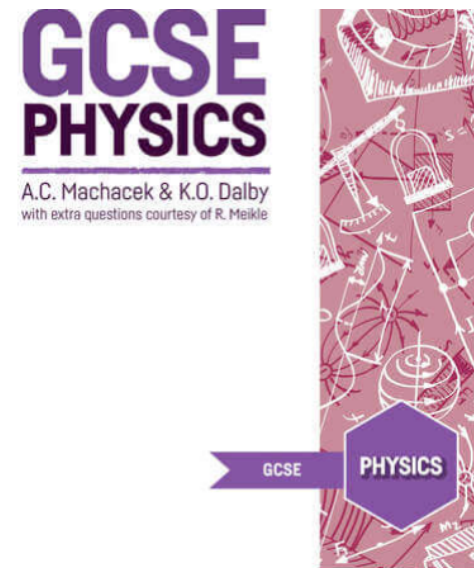
Printed copies, cost price £1 (plus p+p)

Buy Isaac Books

For Teachers

Specification Table - maps the book to your exam board.

Teacher Guidance Notes - by A. Machacek, K. Dalby, A Davies.





Isaac Physics. [Learn](#) & [Teach](#).

MY ACCOUNT

[My Isaac](#) 2

[Teach](#)

[Learn](#)

[Events](#)

[Help](#)

Master Physics by Solving Problems: from School to University!

Welcome to Isaac Physics, the free platform for teachers and students.

- Use it in the **classroom**
- Use it for **homework**
- Use it for **revision**



[How-to Videos](#)

[Problem Solving Guide](#)

[Student FAQ](#)

[Teacher FAQ](#)

[Contact Us](#)

Embedding Isaac Physics into SoW



Curriculum maps & unit contexts



11/09/2023 08:19

- Our SoW takes the form of a **curriculum Map**.
- Each topic or unit of work has a **Context Sheet**.
- The Context sheet is for the students (and parents) and outlines the knowledge and skill areas taught. It also states key pieces of assessed work that must be done for every group – i.e. **common assessments**.
- I have put IP boards onto each Context Sheet to ensure every teacher and every student engages fully with it.
- I make sure I am a **co-teacher with each class on IP** so I can access/monitor all data.

Adding teachers to classes

[My Isaac](#) 2

[Teach](#)

[Learn](#)

[Events](#)

**Master
Problems
from Scratch**

Welcome to Isaac

Use it in the

by Solving

University!

for teachers and students.

[Teacher Features](#)

[Manage Groups](#)

[Set Assignments](#)

[Assignment Schedule](#)

Adding teachers to classes

[My Isaac](#) 2

[Teach](#)

[Learn](#)

[Events](#)

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Adding teachers to classes

My Isaac 2

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Manage Groups

Master Problems

by Solving

Manage group

Y12 Physics 2023-2024

Update

Archive

*Group name is shared with students

Group managers

Add / remove

The 2 user(s) below have permission to manage this group.

Karen Hill (group owner) (you)

Anthony Heath

Adding teachers to classes

My Isaac 2

Teach

Learn

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Y12 Physics 2023-2024

Update

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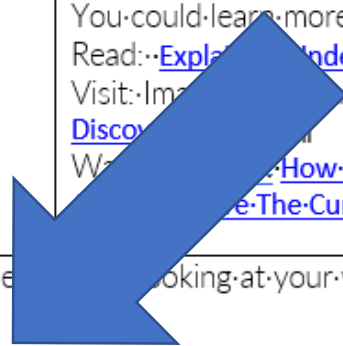
Add / remove



GCSE Physics Topic 1 Waves



<p>Learning about waves is important because: We rely on light and sound to communicate with other people not just near to us, but all around the world, so it is important for us to understand how this works and what other uses light and sound have that we may not have thought about. But these are not the only waves that are important to us. Visible light is just a tiny part of a much wider spectrum of waves called the electromagnetic spectrum. From radio waves and microwaves to gamma and x-rays, waves play a key part in how we live our lives.</p>	
<p>This builds on: In Y5 or 6 you learned how the fact that light travels in straight lines is used to explain why we see shadows. In Y7 or 8 you will have learnt about Light and Sound, discovering how they are made, how they travel and how they are detected. You learned how waves are reflected and refracted and used this to understand how lenses work. You learned that white light is a mixture of colours and found out why objects look different colours in coloured lights.</p>	
<p>This leads to: In Y11, you will learn more about how light can be bent through lenses to help us see better, for example, in glasses to correct vision and in microscopes. You will also learn how our knowledge of the electromagnetic spectrum has helped us to understand the properties of stars and galaxies and what this tells us about the very beginnings of our Universe.</p>	
<p>We will learn:</p> <ol style="list-style-type: none"> 1. → Describing Waves with numbers 2. → Waves and time 3. → Interfering waves — superposition 4. → The wave equation 5. → Investigating ripples 6. → Sound and ultrasound 7. → Seismic waves 8. → Beyond the visible 9. → The electromagnetic spectrum 	<p>We will develop/practise skills including:</p> <p>Practical skills and teamwork by investigating factors that affect the speed of a wave and learning how to measure frequency and wavelength accurately.</p> <p>Maths skills by:</p> <ul style="list-style-type: none"> • → practising and rearranging the equations for frequency and wave speed • → learning how to deal with numbers that are very large or very small by introducing you to standard form and converting units.
<p>Some of the vocabulary that we will use includes:</p> <p>Frequency, wavelength, amplitude, time period, wave, transverse, longitudinal, compression, rarefaction, electromagnetic wave, superposition, vacuum, ionising, absorption, transmission, reflection, refraction, ultraviolet, infrared, ionising, seismic waves, ultrasound, infrasound</p>	<p>You could learn more about this topic by:</p> <p>Read: Explaining Understanding waves and wavelengths Science News for Students</p> <p>Visit: Imagine That! Liverpool! Family day out Liverpool Imagine That! Science and Discovery</p> <p>Watch: How to measure the speed of light -- with CHOCOLATE! Do Try This - The Curious -- YouTube</p>
<p>Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:</p> <p>Lesson 4: P6: Frequency and Time Period Calculations — Isaac Physics</p> <p>Lesson 5: Investigating ripples (GCSE required practical)</p> <p>Physics Waves Assessment</p>	



Useful Features

News and features



Senior Physics Challenge

Complete questions to earn a place on a Summer School at Cambridge University.



New Books!

Order and explore our new books for GCSE Maths, pre-GCSE Physics, and linking concepts at A Level Physics.



We've updated our Privacy Policy

We are committed to protecting the privacy and security of your personal information.



Consolidation Programmes

Isaac provides a free topic-based learning plan for Yr 10-13 students working independently from home and for schools offering support.

[Read more](#)



GCSE Boards for Lessons

Use these boards as they are, customise them, or create your own boards to meet your own needs.

[Read more](#)



GCSE & Yr 10 Quizzes

These quizzes will help you to revise, rearrange equations, change units and practise extracting the correct information from a question.

[Read more](#)



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GCSE Example Materials



Customise these materials, or create your own

Here, one teacher shares custom boards they have created for GCSE, and they describe their rationale. Use these boards as they are, customise them, or create your own boards to meet your own needs.

The boards are linked from the table below, or you can download the complete spreadsheet that includes descriptions of prerequisite skills and what the student will achieve from each board:

Download xlsx

Download CSV


Download pdf

Download Guidance notes (pdf)



AQA Spec ref.	Unit	Topic	Number of Questions	GCSE Book Page num	Number of Hexagons	Link	What type of question will the student face	What will the student achieve
P1	Energy	GPE and Kinetic Energy	10	105	5	https://isaacphysics.org/board/3097c6b7-2e87-4f7e-a72f-695f243c7ed6	Simple worded problems	Students will link GPE and KE and how changing a variable will affect the other
P1	Energy	Kinetic Energy (Challenging)	3	106	3	https://isaacphysics.org/board/21e16279-59bc-4baa-8ba5-b1affbfbf4c1	More lengthy worded problems, as well as using more than one step to solve problems.	Although stated in the question, students will need to use the approach with using more than one step to solve the problem – which is often the case in real life
P1	Energy	Efficiency Calculations	11	108	4	https://isaacphysics.org/board/1dd7b391-6009-4f3a-8d7c-b5c87088a515	2 worded problems (Hexagon 35.1 and 35.2) and 8 drill practice	Improve their ability at real life calculations. Also, using more than one step to solve the problem

Consolidation Programme



The screenshot shows the Isaac Physics website interface. On the left, the 'Electricity' section is highlighted, listing various topics and resources. On the right, a 'Video presentation' window is open, showing a circuit diagram and a play button. Below the video, there is a 'Year 10 Electricity Test' section with a 'Start' button and a 'Help' link.

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[Read more](#)

Click the button below to see resources for your Physics course:



Year 10 Trilogy

Year 10 Separate Physics

Year 11 Trilogy

Year 11 Separate Physics

Year 12 Physics

Year 13 Physics

If you are a registered Isaac Physics teacher, and wish to set the assignments to your class, then click t

Teacher Features

The resources are in three parts for each topic

1 Baseline: a set of questions from our book so you can identify whether you are ready for the test or whether a brush up is needed, and if so, which concepts need review. You can see your progress with these questions in [My Assignments](#).

2 Revise: links to our concept learning and topic revision pages to help you review your learning, and

3 Test: a test for you to do at the end to demonstrate your progress.

Test results and feedback are found under 'Completed Tests' in your [Tests page](#).

Please note that if you do a test set to you by a teacher, then you will not receive marks and feedback until the teacher wishes you to see this information.

Energy



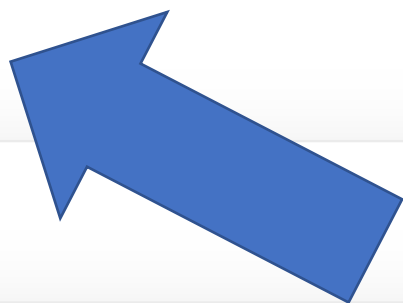
Electricity



Internal energy, gases and density



Motion



Energy



1 Ten Baseline questions on Energy to assess your understanding of the topic.

Have a go at these questions first, so that you can focus your revision on the areas which most need it.

2 Energy revision video with practice questions and worked solutions

Revision resources on individual concepts (concept video, practice assignment & tutorial video showing how to answer the questions) are listed below. Numbers refer to sections of the GCSE Workbook.

- 30 Thermal energy and heat capacity ($E = mc \Delta T$)
- 32 Payback times
- 33 Work, gravitational potential energy and power ($E = Fs$, $E = Pt$, $E = mgh$)
- 34 Kinetic energy ($E = \frac{1}{2}mv^2$)
- 35 Efficiency
- 37 Springs and elastic deformation ($F = kx$, $E = \frac{1}{2}kx^2$)

3 Topic Test to demonstrate your progress once you have revised this section.

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programme for Year 10

[My Account](#)

[My Gameboards](#)

[My Assignments](#) 3

[My Progress](#)

[My Tests](#) 1

Year 10 Programme for Year 10

consolidate your Year 10 learning in **Separate Science Physics**
click here.

cores in any assignments are stored, make sure that you log on to the Isaac

[Home](#) > My Tests

My Tests

[Help](#)

In Progress Tests

Completed Tests

Practice Tests



You freely attempted this test.

Instructions

This test is to measure your progress having completed the baseline assessment the Consolidation Programme.

Overall mark 7 / 9

Section mark breakdown

Work, potential and kinetic energy 3 / 4

Payback times and efficiency 2 / 3

Heating and springs 2 / 2

Click on a section title or click 'Next' to look at your detailed feedback.

A weight-lifter raises a barbell of mass 15 kg, doing 350 J of work on it. Through what height does he lift the barbell? $g = 10 \text{ N/kg}$

Value

23



Units

m

Incorrect

Don't forget g .