Edexcel International AS/A Level Physics

Welcome to Pearson

Event code: YPH11-20IO2
Prepare for delivery

First teaching in 2018, first assessment 2019

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Aims and objectives

In this training, you will:

- identify how the qualification is devised
- review the content of the qualification
- explore how to plan the course and/or lessons
- understand the assessment of the qualification and how to prepare students
- identify the support available from Pearson.

Introductions

- Find out about the delegate sitting next to you.
- Introduce them to the other delegate on your table.

Welcome to Pearson Edexcel

Welcome to Pearson Edexcel,
the world's leading learning company
and the UK's largest awarding body.

We set the standard for worldwide recognised qualifications, built on the UK educational system and accepted by universities worldwide.

We have a simple mission:
to help make a measurable impact on improving people's lives through learning.

'We judge ourselves – and invite others to judge us – not by the products that we make but by the impact on learners.'

John Fallon,
Chief Executive Officer,
Pearson

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About Pearson Edexcel

- As the UK's largest awarding organisation, we are best placed to provide qualifications that are most closely aligned to the British educational system.
- We are the most reliable awarding organisation in the UK, recognised and trusted by educators, learners and employers to provide high quality qualifications.
- By helping you to realise student potential, you can prepare and empower all your students to progress to further education, university and employment.
- Our technology capability allows us to provide you with more advanced support services, tools and resources to make life easier for school leaders, teachers and students.
- Pearson Edexcel are leading the way, challenging thinking and creating new ideas so you can be confident our qualifications will always be world-class.

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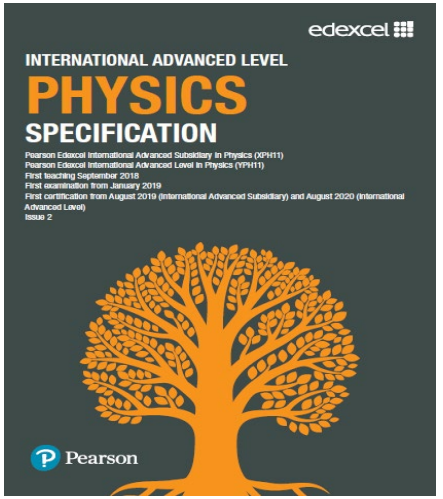
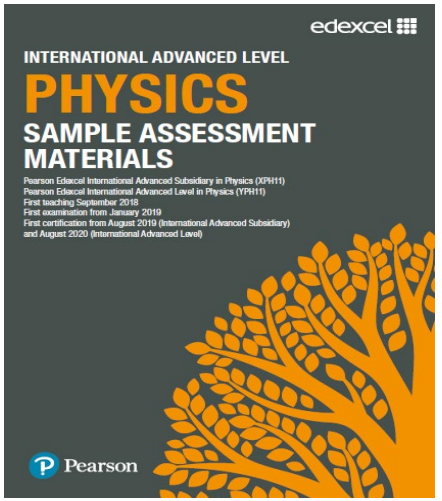
What is the specification?



- The specification is the main document you need to teach the course.
- It outlines the aims of the course, the content you MUST cover and all the information you need about assessing your students.
- A copy of this document is in your download pack and on our website.



- There are also Sample Assessment Materials. This document provides examples of the question papers and was especially useful when this specification was launched. Since there are now at least two series of live exam papers, it is arguable that the real papers have become a more important resource than the SAMs.

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Key features

Structure: the International Advanced Subsidiary and Advanced Level in Physics are modular qualifications.
Content: the content is relevant for learners who have achieved a GCSE or IGCSE in Physics and who want to study this subject at a higher level.
Assessment: assessment consists of three written papers at IAS level that are externally assessed. The International A Level consists of three further written papers that are externally assessed.
Approach: learners will develop their knowledge and understanding of Physics by applying the concepts in this specification to a range of different problems that include a variety of contexts. Problems will require the application of mathematical skills. Learners will also develop their practical skills.

Using this specification

Compulsory content: as a minimum, all the items in the content must be taught. The word 'including' in content specifies the detail of what must be covered.

Assessments: use a range of material and are not limited to the examples given. Teachers should deliver these qualifications using a good range of examples to support the assessment of the content.

Depth and breadth of content: teachers should use the full range of content and all the assessment objectives given in the subject content section.

Practical investigation

Practical investigation

Students will be assessed on their ability to:

23	be able to use the equation density $\rho = \frac{m}{V}$
24	understand how to use the relationship upthrust = weight of fluid displaced
25	a be able to use the equation for viscous drag (Stokes' Law), $F = 6\pi\eta rv$. b understand that this equation applies only to small spherical objects moving at low speeds with *laminar flow* (or in the absence of *turbulent flow*) and that viscosity is temperature dependent
26	**CORE PRACTICAL 2: Use a falling-ball method to determine the viscosity of a liquid**
27	be able to use the Hooke's law equation, $\Delta F = k\Delta x$, where k is the stiffness of the object
28	understand how to use the relationships • *(tensile or compressive) stress = force/cross-sectional area* • *(tensile or compressive) strain= change in length/original length* *Young modulus = stress/strain.*
29	a be able to draw and interpret force-extension and force-compression graphs b understand the terms limit of proportionality, elastic limit, yield point, elastic deformation and plastic deformation and be able to apply them to these graphs
30	be able to draw and interpret tensile or compressive stress-strain graphs, and understand the term *breaking stress*
31	**CORE PRACTICAL 3: Determine the Young modulus of a material**
32	be able to calculate the elastic strain energy E_{el} in a deformed material sample, using the equation $\Delta E_{el} = \frac{1}{2}F\Delta x$, and from the area under the force-extension graph *The estimation of area and hence energy change for both linear and non-linear force-extension graphs is expected.*

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Overview of the Physics specification

International Advanced Subsidiary	International Advanced Level
This qualification consists of **three** externally examined units. The IAS is the first half of the IAL qualification and consists of three IAS units, Units 1, 2 and 3. This qualification can be awarded as a discrete qualification or can contribute 50 per cent towards the International A Level. The qualification will include questions that target mathematics at Level 2 or above. Overall, a minimum of 40% of the marks across the papers will be awarded for mathematics at Level 2 or above.	This qualification consists of **six** externally examined units. The International A Level consists of the three IAS units (Units 1, 2 and 3) plus three IA2 units (Units 4, 5 and 6). Students wishing to take the International A Level must, therefore, complete all six units. The qualification will include questions that target mathematics at Level 2 or above. Overall, a minimum of 40% of the marks across the papers will be awarded for mathematics at Level 2 or above.

Unit 1: Mechanics and Materials	Unit 2: Waves and Electricity	Unit 3: Practical Skills in Physics I
Externally assessed Written exam: 1 h 30 min 80 marks 40% of IAS 20% of IAL The paper may include multiple-choice, short open, open-response, calculations and extended-writing questions.	Externally assessed Written exam: 1 h 30 min 80 marks 40% of IAS 20% of IAL The paper may include multiple-choice, short open, open-response, calculations and extended-writing questions.	Externally assessed Written exam: 1 h 20 min 50 marks 20% of IAS 10% of IAL This unit will assess students' knowledge and understanding of experimental procedures and techniques developed in Units 1 and 2. The paper may include short-open, open-response, calculations and extended-writing questions.

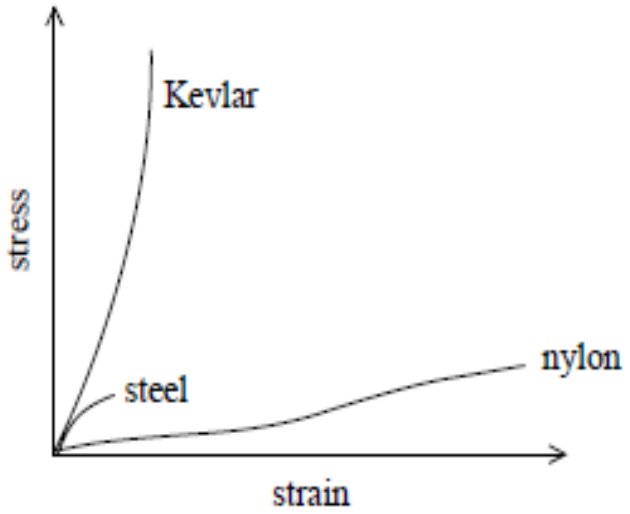
Unit 4: Further Mechanics, Fields and Particles	Unit 5: Thermodynamics, Radiation, Oscillations and Cosmology	Unit 6: Practical Skills in Physics II
Externally assessed Written exam: 1 h 45 min 90 marks 40% of IA2 20% of IAL The paper may include multiple-choice, short open, open-response, calculations and extended-writing questions.	Externally assessed Written exam: 1 h 45 min 90 marks 40% of IA2 20% of IAL The paper may include multiple-choice, short open, open-response, calculations and extended-writing questions.	Externally assessed Written exam: 1 h 20 min 50 marks 20% of IA2 10% of IAL This unit will assess students' knowledge and understanding of experimental procedures and techniques developed in Units 4 and 5. The paper may include short-open, open-response, calculations and extended-writing questions.

Activity

This is part of a question – what part of the content (which specification point) is being assessed?

Kevlar is a modern lightweight material. Due to its physical properties, Kevlar is being used to replace nylon and steel in many applications.

The stress-strain graphs for Kevlar, nylon and steel are shown.



(a) When pulling a heavy load, Kevlar cables are now often used instead of nylon cables.

Explain two advantages of using Kevlar in cables compared to using nylon.

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Unit 1: Mechanics and Materials	Unit 2: Waves and Electricity	Unit 3: Practical Skills in Physics I
• Mechanics • Materials	• Waves and Particle Nature of Light • Electric Circuits	Students are expected to develop experimental skills, and techniques by carrying out a range of practical experiments in Units 1 and 2.
Unit 4: Further Mechanics, Fields and Particles	**Unit 5: Thermodynamics, Radiation, Oscillations and Cosmology**	**Unit 6: Practical Skills in Physics II**
• Further Mechanics • Electric and Magnetic Fields • Nuclear and Particle Physics	• Thermodynamics • Nuclear Decay • Oscillations • Astrophysics and Cosmology	Students are expected to further develop the skills and techniques acquired in Units 1 and 2 by carrying out a range of practical experiments in Units 4 and 5.

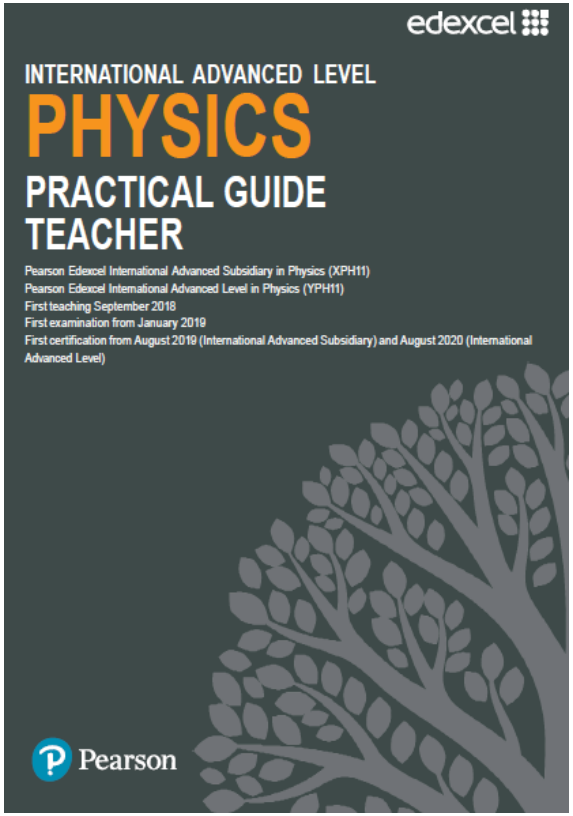
Activity

Choose one topic (or part of a topic) from the Physics specification. Plan the order in which you would teach that topic.
In the chatbox, share your preferred teaching order, with your reasoning.

Experimental skills

In order to prepare students for the assessment of experimental skills (Units 3 and 6), centres should give students opportunities to plan experiments, implement their plans, collect data, analyse their data and draw conclusions.

Experiments should cover a range of different topic areas and require the use of a variety of practical techniques.



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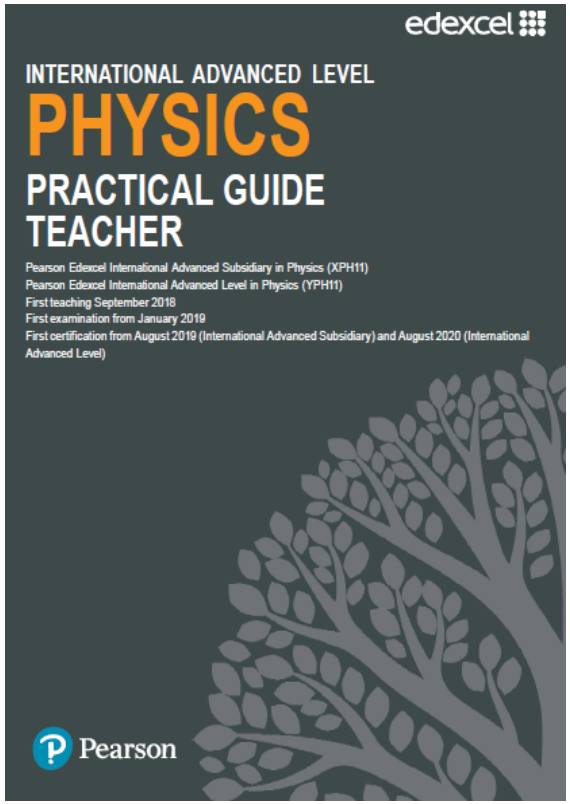
How do the core practicals cover practical skills?

- As long as you follow the programme of core practicals, you will automatically cover all of the standard techniques and apparatus the students are expected to know and reproduce in their examinations.

- However, students who do well in Units 3 and 6 are often those that have carried out a range of practicals so you should aim to complete *more* than just the core practicals.



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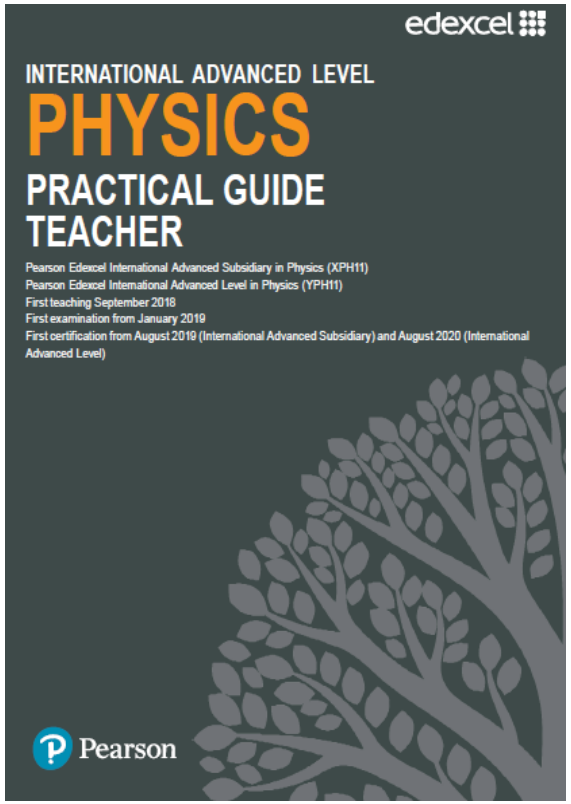
How do the core practicals cover practical skills?

- The core practicals are part of the specification and the students are expected to know them for the examinations.
- Students can use different methods and techniques to those stated – but they will still need to know and understand the methods stated in the core practicals.
- We'd recommend that you did other practical work as well as the practicals specified.
- These need not include expensive pieces of apparatus. Any practical work that your students attempt – not just the core practicals – will develop their practical competency.



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Teaching practical skills

What our examiners have noticed: Units 1 and 2

- Many candidates showed a good progression from GCSE to A Level, with prior knowledge extended and new concepts taught and understood well.
- Candidates found the length of some of the calculations to be challenging, often missing out key steps, therefore only scoring 1 or 2 marks for interim steps.
- The new regions of the specification were answered as expected, if not better.

What our examiners have noticed: Units 1 and 2

- It was the problem-solving nature of some of the questions as well as the requirement for explanations in an unstructured setting that many found to be challenging.
- The main challenges were on questions requiring more application.
- Candidates who had a sound understanding of the physics involved did not always demonstrate this in their responses due to a lack of precision of the language and terminology used. Some missed exactly what the question was actually asking.
- While the mathematical ability seen was strong, application to the context was not as expected.

What our examiners have noticed: Unit 3

- For this paper, the topics included **materials**, **waves and particle nature of light**. As *understanding* of the core practicals is assessed by the Unit 1 and 2 papers, the practical context met in the Unit 3 paper may be less familiar. However, *it is the skills rather than the details of the practical that we are assessing*.
- There were many questions that would be familiar for candidates but there are some questions where performances would suggest they were unfamiliar with the practical skills.
- Understanding of keywords (such as **resolution**) and command words (such as **describe how**) proved a challenge to candidates at the lower end of the ability range.
- At all ability levels, there were some questions where candidates answered in generic terms, rather than being specific to the particular practical described in the question.

Activity

What are the implications for teaching and learning arising from the feedback from the examiners' reports?

Guidance and support

A range of support resources and materials are available on the Pearson website (a screenshot of this is on the next slide and we will be exploring the various elements of support available there in more detail later on).

The support includes exam materials and teaching and learning support as well as a range of analysis and planning tools.

https://qualifications.pearson.com/en/qualifications/edexcel-international-advanced-levels/physics-2018.html

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International Advanced Levels
Physics (2018)

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Specification

First teaching: **September 2018**
First external assessment: **2019**

Our International Advanced Subsidiary and Advanced Level Physics has been developed to be engaging for international learners and to give them the necessary skills to support progression to higher education or further study in physics, as well as to a wide range of other subjects.

DOWNLOAD

Register your interest

Find out more about Pearson Edexcel International qualifications and sign up to receive the latest news.

Let us know

Course materials

- **Specification and sample assessments (2)**
- **Exam materials (19)**
- **Teaching and learning materials (16)**

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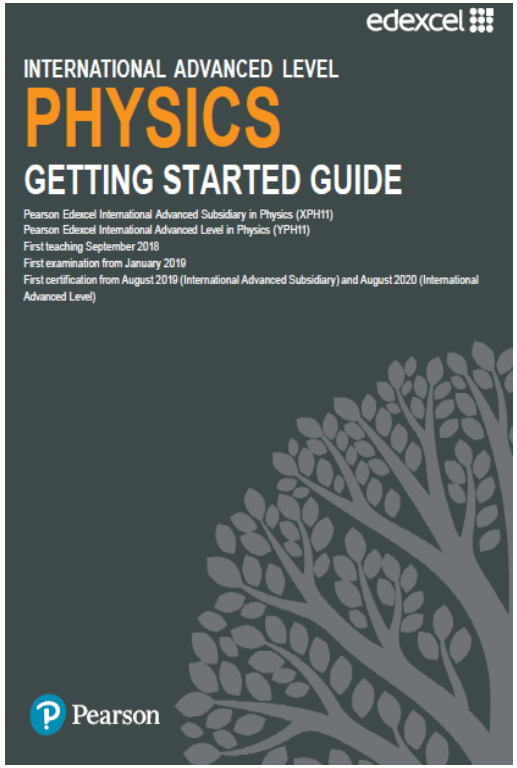
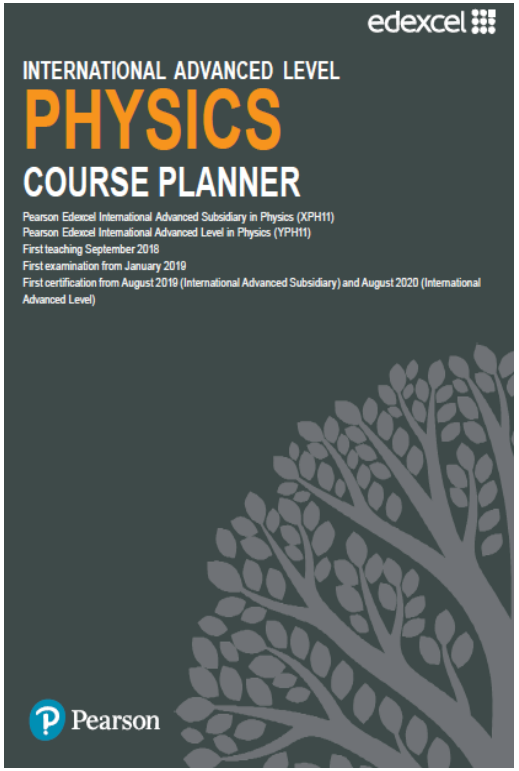
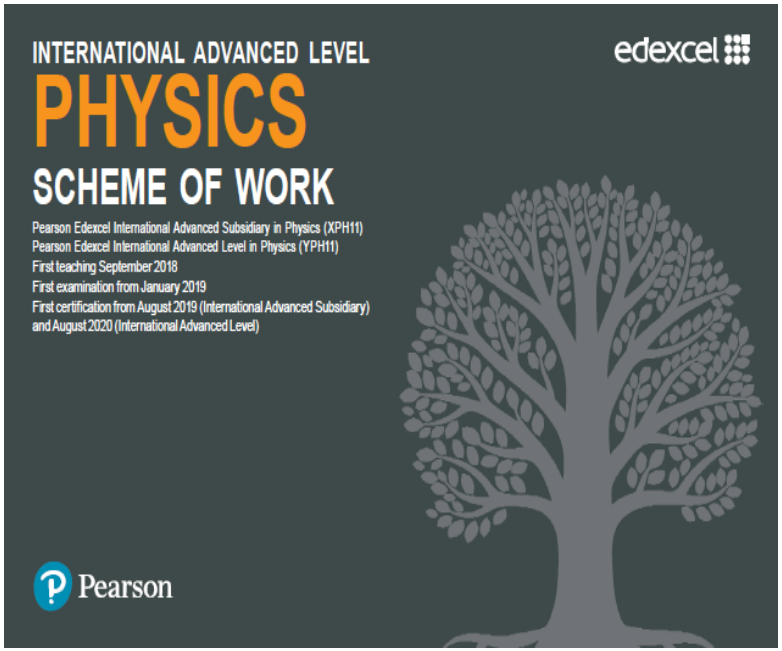
How do I make sure I cover all the content?

- Specification
- Lesson plans
- Schemes of work
- Year planners

How do I make sure I cover all the content?







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Week	Prior Learning	Content of Lessons	Teaching Suggestions	Spec Reference
1	International GCSE/GCSE mechanics – describing motion	SI base and derived units. Measurement & techniques. Sig. figs., scientific notation, standard form and prefixes. Distance, displacement, speed, velocity and acceleration.	The work on SI base and derived units, Sig. figs., standard form and prefixes is required for all topics and needs to be revisited regularly.	
2	describing motion graphically	Displacement/time and velocity/time graphs and their interpretation, for motion with uniform and non-uniform acceleration.	Displacement/time graph for a trolley on a runway with a motion sensor. Mathematical requirement: graph plotting and measuring gradients	2, 3
3	International GCSE/GCSE mechanics – equations for speed and acceleration	Derive equations of motion: $s = \frac{(u+v)t}{2}$ $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ Practise problems in one dimension. Measurement of the acceleration of free fall. *CORE PRACTICAL 1:* Determine the acceleration of a freely falling object.	Examples to include positive and negative values of the variables. Mathematical requirement: manipulate of equations. Investigate the motion of a bouncing ball. All students should carry out this experiment.	1, 11

Activity

How do you plan your lessons in physics? Do you, for example, have a common lesson structure as a starting point? Are there any ways you might need to adapt your method(s) of lesson planning to deliver this specification?

Evaluation and next steps

Next steps

Think of **three** things you might try or do differently as a result of ideas you've discussed today.

(You won't be asked to share these.)

Share in the chat box **one** thing you would like to do as soon as you return to your classroom or department.

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Evaluation

Please fill in an evaluation form.

Thank you for participating.

Find out more about us at:
http://qualifications.pearson.com

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ALWAYS LEARNING