

Welcome to this walk-through of our recent "Getting Ready to Teach" events for the new A level Physics course.

As you work your way through the slides, you'll see links to follow – either to documents on the website, or to activities that formed part of the 'live' training events.

We hope that you'll be able to use this presentation, with its guidance notes, and the materials that can be found in the links, to help prepare you to teach the new A level.

If you still have questions, you'll find some contact details at the end of the presentation.



For completeness, here are the Aims and Objectives for the event.

There is no formal agenda, but our Getting Ready to Teach events fall into three sections:

- Section 1 deals with delivery of the new specification, planning and so on
- Section 2 looks at the mathematical and practical skills aspects of the course
- Section 3 considers the specimen assessment material



In this session	edexcel III			
 Introduction to the new specification 				
 > What it looks like > How it has changed > New topics 				
Approaches to planning the delivery				
 Planning for progression over two Different approaches for AS and A Look at one topic 	years level courses			
* Progression				
 From GCSE On to university and the workplace 	i.			
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As you can see from this plan, this first session looks at three different areas:

- A general introduction to the new specification, highlighted areas of change from the current specification
- Consideration of planning to help delivery of the new specification
- Progression, particularly from GCSE on to the A level



You are probably familiar with the general changes that are happening to A level but, just in case, this slide summarises the main changes.

There are some changes to the subject criteria i.e. the mandatory content of the specification. This mandatory content comprises 60% of an A level, so there is flexibility for us to make our A level slightly different to those from other Awarding Bodies.

In terms of assessment, the new A levels are linear, with all examination components taken in the May / June series at the end of the course. These papers will incorporate the assessment of mathematical skills (min 40% of the marks on question papers) and practical skills (min 15% of the marks on question papers). Questions also need to assess students' skills and abilities in line with new, revised, assessment objectives.

All these changes to A level specifications and assessments are common to all four Awarding Bodies.

edexcel				
	AS	A Level		
1	Working as a Physicist	1 Working as a Physicist		
2	Mechanics	6 Further Mechanics		
3	Electric Circuits	7 Electric and Magnetic Fields		
		8 Nuclear and Particle Physics		
4	Materials	9 Thermodynamics		
5	Waves and the particle nature of light	10 Space		
		11 Nuclear Radiation		
		12 Gravitational Fields		
		13 Oscillations		
For more detail look at the mapping document				
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This slide gives an overview of the revised specification. The first column shows the Topics that form the AS specification; and the second column shows the additional Topics that are added in order to complete the full A level.

The new Topic here is "Working as a Physicist". This Topic, which can be tested throughout the question papers at both AS and A level, is about underlying content and concepts.

As you will see later on, the blank line indicates the Topics that appear on each question paper, so that:

- A level paper 1 is on topics 1 3 and 6 8
- A level paper 2 is on topics 1, 4 5 and 9 13

To help you work out which content has changed between the existing A level and the new A level, we have produced mapping documents. These mapping documents are available from the existing Edexcel A level, as well as from the existing AQA A, OCR A and OCR B (Advancing Physics) specifications. You can find these mapping documents on our website here.



This slide provides a brief summary of the changes from the existing Edexcel specification.

Some of these changes have been necessary because of changes to the mandatory subject content. One example of this is the movement of momentum from A level to AS.

Some changes reflect our research with teachers and Higher Education, asking about aspects of fundamental physics which seemed to be under-represented in the A level. This was the reason for including a little more work on optics within the specification.

Other changes have been made to meet new aspects of the criteria such as the reduction of simple recall definitions, or the need to include more consistent assessment of mathematical skills within physics.



The Edexcel A level Physics course has one distinctive feature, which is that the same content, arranged in a different order, can be delivered in two different ways. These different methods of delivery are, to an extent, inter-changeable.

The first method, as you have seen from the earlier slides presenting Topics in the specification, is a Topic-based approach, arranging the content in distinct blocks within areas e.g. Forces, Waves, Radioactivity.

The second method takes a more holistic approach to the Physics, introducing the material through a series of context and real-life case studies. This approach, developed in partnership with the University of York, is known as Salters-Horners Advanced Physics, or SHAP.

Both approaches cover exactly the same physics, and the final question papers are also identical. Teachers who follow the SHAP pathway often do so because they feel that the contexts are engaging for students; or because they feel that teaching in context prepares students very well for those examination questions which are in unfamiliar contexts.

The SHAP route through the specification has its own set of resources, produced by Pearson and the University of York – and you can see examples of this material here.

The two routes through the specification are not necessarily mutually exclusive: a number of schools "mix and match" the approach used across different topic areas in the specification.



This section on planning goes from looking at the whole course and the issues affecting centres, through the content and the Edexcel Scheme of Work down to an individual topic, new to this specification – optics.

	AS topics		A level topics	
PAPER 1	2 Mechanics	21+1	6 Further mechanics	9+2
	3 Electric circuits	16+2	7 Electric & magnetic fields	21+1
			8 Nuclear & Particle Physics	14
TOTAL		37+3		44+3
PAPER 2	4 Materials	8+2	9 Thermodynamics	9+3
	5 Waves & Particle Nature of Light	35+3	10 Space	8
			11 Nuclear Radiation	9+1
			12 Gravitational Fields	7
			13 Oscillations	10+1
TOTAL		43+5		41+5
TOTAL		80+8		89+8

This slide shows the number of specification statements for each topic and the totals for AS and A level papers. In each case, the two numbers represent the number of theory statements, plus the number of Core Practical statements in each Topic.

Note that the AS Paper 1 subset is slightly smaller than that for Paper 2, but there is a great deal of physics in these two topics that are right at the heart of the subject. Also, Topic 1 "Working as a Physicist" is most likely to be introduced at this early stage.

There is slightly more content in the second year of the A level and the Core Practicals will be more significant (see session 2), but students will tend to move more quickly in Year 13.

Looking at the balance of statements across the A level, you'll note that Paper 1 has 37 + 44 = 81 statements and Paper 2 has 43 + 41 = 84 statements, indicating that the four quarters of the specification are about balanced in size as are the two terminal topic papers.



You can find some more information to accompany this slide in the documents that accompany this walkthrough.

The document you need is called: "Distribution of Specification Points"



At this stage, it is likely that you will have made a decision about the route you will take but it might be worth taking some time to reflect on that decision and its implications here.



Some thoughts about AS how it can be taught and its role in the new schemes:

- AS and A level students may be taught in the same class in Year 12. You will need to think about how this Is best achieved.
- Some students may wish to supplement a three A level programme of study with an additional AS in Biology. This may be important to your students as it will continue to provide them with breadth of study.
- Alternatively, some students might start four A levels, knowing they will 'drop down' to three A levels in year 2. In this scenario, they may wish to postpone their decision until they have taken one or more AS qualifications and seen the results. Students who unexpectedly leave the course after the first year will have an AS qualification.
- Starting with the AS content gives a focus for Year 12 study and taking an AS qualification at the end of Year 12 could provide a useful way of tracking student progress at the end of the first year.



The Getting Started Guide – which you can find on the "Teaching support" tab of the GCE Physics home page (http://qualifications.pearson.com/en/qualifications/edexcel-alevels/physics-2015/teaching-support.html) under the "Planning and Delivery" section - gives very good coverage of planning.



The Scheme of Work is found in the same part of the website as the Getting Started Guide –on the "Teaching support" tab of the GCE Physics home page

(http://qualifications.pearson.com/en/qualifications/edexcel-alevels/physics-2015/teaching-support.html) under the "Planning and Delivery" section.



This may form a good planning exercise for you to try.

A final delivery plan for this activity is included in the walkthrough.



To support you and your students in this, **transition guides are provided**.

These will support you to develop students' skills in their first lessons, including two to three weeks OR 5 lesson scheme of work mapped to specification content including:

- classroom materials
- baseline assessments
- practice questions

This will support you as teachers to understand the level of your new students but also to allow students to better understand the jump required of them.

The guide is here:

http://qualifications.pearson.com/content/dam/pdf/A%20Level/Ph ysics/2015/teaching-and-learning-materials/transition-guidephysics.pdf

Note that there is also a password-protected version, which has answers to the exercises.

There is also a Topic Guide to Optics, as this contains some new material. You can find this Guide here:

http://qualifications.pearson.com/content/dam/pdf/A%20Level/Physics/20 15/teaching-and-learning-materials/A-level-Physics-Waves-Topic-Guide.doc



Of course, the choice of resources to support your teaching is a matter for your personal preference.



You can find information about both the resources through this link:

https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/physics-2015.resources.html





An overview of Session 2, which will look at Maths and Practical Skills.

The information presented in this pack was up-to-date at the time of delivery, but there will be more recent material on the website concerning CPAC (Common Practical Assessment Criteria).



There is, arguably, no new Maths in the GCE Physics course, but there is more expectation that it will be consistently tested yearon-year and across awarding bodies.

Appendix 6 of the specification gives more detail on the Maths skills that need to be covered.



This summarises the proportion of Maths, and the level of difficulty (Level 2).

The Maths Guides are available on the website:

http://qualifications.pearson.com/content/dam/secure/silver/alluk-and-international/a-level/physics/2015/teaching-and-learningmaterials/AS_and_A_level_Physics_Maths_teacher_Guide.pdf?379 206675337621 for the Teacher Guide

and

http://qualifications.pearson.com/content/dam/pdf/A%20Level/Ph ysics/2015/teaching-and-learning-

materials/AS_and_A_level_Physics_Maths_Student_Guide.pdf for the Student Guide



A summary of the new position on practical skills, with which you are likely to be familiar.



A little more detail on the two aspects of practical work.

Appendix 5 shows the "indirect" i.e. exam paper skills; and the "direct" i.e. hands-on skills which will be assessed through the CPAC skills.

For those of you used to the current specification, Appendix 5a covers planning, drawing graphs and drawing conclusion. ie everything currently done in the unit 6 (coursework) Planning and Analysis sections and representing 34 of the 40 marks. So in the new specification we are doing all this in an exam paper and not as 'coursework'.



This should clear up the mystery of the function of the Core Practicals.

The Core Practicals are the basis for practical work, and schools are encouraged to add more practical activities where possible.

The Practical Guides are available through the website:

http://qualifications.pearson.com/content/dam/pdf/A%20Level/Ph ysics/2015/teaching-and-learningmaterials/Physics_Practical_Guide.pdf for the Teacher Guide

http://qualifications.pearson.com/content/dam/pdf/A%20Level/Ph ysics/2015/teaching-and-learningmaterials/Physics_Student_Guide.pdf for the Student Guide



Appendix 5: Working Scientifically gives a detailed table of all the Core Practicals and where the required techniques are covered in each one.

We have chosen tried, tested and familiar practicals that fit naturally into the teaching and learning of topics within the specification.

Students may be asked questions in the practical papers on any of the skills in the core practicals or the questions could be asked within a different setting.

Our core practicals are seen as a minimum expectation so that students gain confidence in the investigative skills they need to be successful at A level and beyond.



It will be worth spending some time looking at the sample practical guide, which was linked to on an earlier slide.

The choice of Core Practicals was driven by the need to satisfy Appendix 5c. Handout 2 shows the core practicals at AS and A level.



A series of documents, that form part of this pack, would be useful at this point:

- Activity 2 AS Practical Activities
- List of Core Practicals
- Activity 2 Coverage of 5c and CPAC

The guide – or list of topics – can be used to show how training is given in techniques and uncertainties and how the specification is covered in the course.



For more information read the letter sent to centres. This is available at:

http://qualifications.pearson.com/content/dam/pdf/News/A%20lev el%20news/Practical_Endorsement_Letter_June_2015.pdf



The final version of the CPAC statements should be up on the website, and will be placed into update versions of the specification this autumn.



Students can work in pairs but there must be evidence that each student is competent in that activity.

It will be a challenge to find many necessary safety precautions so students should emphasise why the work is safe.

The worksheets provided with the course provide one framework for CPAC assessment, but you are free to adapt this as needed.



It is very unlikely students will be using radioactive sources individually or in pairs since centres will not have sufficient apparatus.

NB Simulations are only a supplement – the criteria do require students to do some practical work that involves a radioactive source / detector.



Again, do check the website for the most up-to-date information on the evidence that will be expected to back up your decisions on CPAC application.



One advantage of the new system is that it puts students in the driving seat when it comes to practical work. It can be used effectively as a student-centred, or peer-assessed system.



For more information read the letter sent to centres. This is available at:

http://qualifications.pearson.com/content/dam/pdf/News/A%20lev el%20news/Practical_Endorsement_Letter_June_2015.pdf

JCQ will run the monitoring process and will contact schools with more information in September.



Activity 3 – there are two documents in your pack that will help here:

- Practical Guide Sample
- Core Practicals & Maths skills
- You'll find some instructions on this task within the booklet called "GRTT Delegate Booklet Physics"





There is some summary information on the exam papers at the front of the specification, or in the "At a glance" and "Subject" guidance booklets here:

http://qualifications.pearson.com/content/demo/en/qualifications/ edexcel-a-levels/physics-2015.coursematerials.html#filterQuery=category:Pearson-UK:Category%2FTeaching-and-learningmaterials&filterQuery=category:Pearson-UK:Document-Type%2FGuide



This summary is fairly self-explanatory.

edexcel III Assessment model – AS Physics					
	Paper 1	Paper 2			
	1h 30 mins, 80 marks	1h 30 mins, 80 marks			
	50% of AS	50% of AS			
	Section A: Topics 1, 2 & 3	Section A: Topics 1, 4 & 5			
	Section B: draws across AS	Section B: draws across AS			
	Includes questions on practicals	Includes questions on practicals			
NB 40% of marks cover mathematical skills					
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AS must have at least 3 hrs assessment.

Paper 1 and Paper 2 have different Topics, but each paper has a synoptic section ${\sf B}$

Both papers assess core practicals and other practical work.

Mixture of question styles – up to 10 MCQ, then short and longer responses.

edexcel III Assessment model – A level					
Paper 1	Paper 2	Paper 3			
1h 45mins	1h 45mins	2h 30mins			
90 marks	90 marks	120 marks			
Topics 6, 7 & 8 (drawing on AS Topics 1 - 3)	Topics 9 - 13 (drawing on AS Topics 1, 4 & 5)	All topics – half the paper is practical			
30% of A level	30% of A level	40% of A level			
NB 40% of marks cover mathematical skills					
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A level must have at least 6 hrs assessment.

Paper 1 and Paper 2 have different Topics, they can ask questions about practical work including the core practicals

Both Paper 1 and 2 will draw on AS material

Mixture of question styles – 8 MCQ, then short and longer responses.

Paper 3 – can assess over the whole specification.

Half the questions based on practical skills; the other half draw across the whole specification.

Mixture of question styles – likely to have some longer responses.



It is the line of reasoning that is important in the longer answers – these are worth 6 marks.

Some examples can be found within the SAMs.



Ramping of the papers may not be evident in the SAMs, as they were changed several times during the accreditation process. The second set of specimen papers may make this clearer.

The other rules on % Maths and practical are part of the mandatory conditions for Physics.



It is a good idea to look at Appendix 5a – page 77 of spec – with reference to the bullet points on this slide. You will also find some support within the Practical guide, which gives some indication of how questions can be based on these.

NB this is all the skills that are covered in the current coursework but set in an exam context. The advantage with that is that the context can be a number of different experiments.

You should also be aware that written questions on experimental work form part of our International A Level (IAL) course. You can find IAL papers here:

http://qualifications.pearson.com/en/qualifications/edexcelinternational-advanced-

levels/physics.coursematerials.html#filterQuery=category:Pearson -UK:Category%2FExam-materials



Spend a few minutes reviewing these Appendices for yourself.

Note that certain command terms dictate the number of marks to be awarded eg explain is worth at least 2 marks; others are for specific activities eg describe – does not require explanation but does require the linkage to be developed. Generally the rule is one mark for every correct bit of physics.



Activity 4 is covered in some detail in the GRTT Delegate Booklet, supplied with pack.

You may like to look at:

- multiple choice design
- Ramping
- unscaffolded questions
- extended response and mark schemes on line of reasoning
- synoptic questions at AS section B



If the link doesn't work try this URL:

http://qualifications.pearson.com/en/qualifications/edexcel-alevels/physics-2015/teaching-support/tracking-progress.html

Go to Exam Wizard and click on Show More, when they have read this click on 'find out more...'

Do the same for Results Plus

For both of these you will need an Edexcel Online login, which your Exams Officer should be able to supply.



ResultsPlus is Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance. Here you can see your students' scores for every exam question and understand how your students' performance compares with Edexcel national averages.



Ask the Expert is at URL

http://qualifications.pearson.com/en/support/support-foryou/teachers/contact-us.html

Edexcel now has two full-time science subject advisors: Stephen Nugus and Julius Edwards.

Or click the link on the page

