Pearson Edexcel

International GCSE

Physics (9–1)

Getting Started Guide

Pearson Edexcel International GCSE in Physics (4PH1)

First teaching September 2017

First examination June 2019

Issue 2

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Through initiatives such as onscreen marking and administration, Pearson is leading the way in using technology to modernise educational assessment, and to support teachers and learners.
This guide is Issue 2. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson Edexcel website:
https://qualifications.pearson.com/

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Physics (2017) (4PH1)
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Introduction

This Getting Started Guide provides an overview of our International GCSE Physics (2017) qualification, to help you get to grips with the changes to content and assessment, and to help you understand what these mean for you and your learners.

Our package of support to help you plan and implement the specification includes:

Planning

We will provide a course planner and an editable scheme of work that you can adapt to suit your department. We also provide training for international and UK-based schools.

Teaching and learning

To support you in delivering this new specification, we will provide suggested resource lists and suggested activities.

Understanding the standard

Sample Assessment Materials and Extra Assessment Materials will be provided.

Tracking learner progress

ResultsPlus provides the most detailed analysis available of your students' examination performance. It can help you identify topics and skills where students could benefit from further learning. We will also offer examWizard, which is a free exam preparation tool containing a bank of past Edexcel exam questions, mark schemes and examiners' reports for a range of GCSE and GCE subjects.

Support

Our subject advisor ensures that you receive help and guidance from us. You can sign up to receive updates at https://qualifications.pearson.com/en/forms/subject-advisor-updates-for-teachers-andtutors.html or contact us using the support portal https://support.pearson.com/uk/s/qualificationcontactus.

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Key features of the qualification

Why choose Pearson Edexcel International GCSE in Physics (2017)?

We have listened to feedback from all parts of the international school, UK independent school and language teaching community including a large number of teachers. We have made changes that will engage students and give them skills that will support progression to further study in physics, physical science and other related subjects. Our content and assessment approach has been designed to meet students' needs and be consistent with our approach across the sciences.

Key qualification features

At Pearson, we offer separate science linear (2017) and modular qualifications in Biology, Chemistry and Physics, as well as Double Award Science qualification – these have been designed to meet different learners' needs. The content and assessment approach for this qualification has been designed to maintain the rigorous standards of all Pearson Edexcel qualifications and meet learner needs in the following ways:

- Content that is interesting and engaging for learners but is also designed to ensure good preparation, both for those continuing to further study and for those wishing to work in a physics-related field.
- There are opportunities to 'localise' the content to make it more relevant for learners in their own country.

Assessment structure

- The Pearson Edexcel International GCSE in Physics (2017) is a linear qualification. Two untiered written examinations must be taken in the same series at the end of the course of study. The assessment model has two papers. Paper 1 is 2 hours long and assesses core (non-bold) content from across the specification. Paper 2 is 1 hour and 15 minutes long and assesses a range of sub-topics (bold content) in greater detail in addition to the core content. Both papers will have a range of question styles and calculators can be used in both papers. Practical skills will be assessed through the written papers; there is no coursework or practical exam.

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Clear and straightforward question papers

- Our question papers are clear and accessible for learners of all abilities. Our mark schemes are straightforward, so that the assessment requirements are clear.

Broad and deep development of learners' skills

- The design of the international GCSEs aims to extend learners' knowledge and understanding by broadening and deepening skills, for example learners develop the ability to:
  - focus on practical skills through a number of practicals listed in the specification content. These can be supplemented with other suggested practicals. The skills developed will be assessed through questions in written examinations.
  - improve learners' analytical and logic skills by applying understanding of scientific concepts and principles to a range of situations. This will include some examination questions that are more problem-solving in style.
  - address the need for mathematical skills to complement learners' physics skills by covering a range of mathematical areas.

Progression

International GCSE qualifications enable successful progression to A Level and beyond. Through our development process, we have consulted with International Advanced Level and GCE A-Level teachers as well as higher education professionals to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

Courses to suit your students' needs and interests

Teachers of physics have a choice of International GCSE courses to deliver, each giving different levels of depth to meet learners' needs. As well as the Pearson Edexcel International GCSE in Physics (2017), learners can also be taught our International GCSE in Physics (Modular), International GCSE in Science (Double Award) (2017) and International GCSE in Science (Double Award) (Modular). The Science (Double Award) course offers a reduced amount of content but is assessed to the same standard. Progression routes for this course may vary slightly from those for the Pearson Edexcel International GCSE in Physics.

More information about all our qualifications can be found on our Pearson Edexcel International GCSE pages at qualifications.pearson.com

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Qualification overview

Physics Paper 1	Paper codes 4PH1/1P and 4SD0/1P*
Externally assessed Written examination: 2 hours Availability: November and June First assessment: June 2019 110 marks	61.1% of the total International GCSE
Content summary Assesses core content that is **not** in bold and does not have a 'P' reference. Questions may come from any topic area across the specification. 1 Forces and motion 2 Electricity 3 Waves 4 Energy resources and energy transfers 5 Solids, liquids and gases 6 Magnetism and electromagnetism 7 Radioactivity and particles 8 Astrophysics	
Assessment A combination of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions. A calculator may be used in the examinations.	

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Physics Paper 2	Paper code 4PH1/2P*
Externally assessed Written examination: 1 hour and 15 minutes Availability: November and June First assessment: June 2019 70 marks	38.9% of the total International GCSE

Content summary

Assesses **all the content**, including content that is in bold and has a 'P' reference.
Questions may come from any topic area across the specification.
Statements in bold cover some sub-topics in greater depth.

1 Forces and motion
2 Electricity
3 Waves
4 Energy resources and energy transfers
5 Solids, liquids and gases
6 Magnetism and electromagnetism
7 Radioactivity and particles
8 Astrophysics

Assessment

A combination of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.

A calculator may be used in the examinations.

Content overview

The specification content is divided into the topics, to provide centres with a clear view of what is required. Each topic is then divided into a number of key ideas (sub-topics) that give a focus to the content. Each key idea is broken down into detailed content that specifies what must be studied. The word 'including' in the content specifies the detail of what must be covered. Examination questions will be based on this content.

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Qualification aims:

The aims of this qualification are to enable learners to:

- learn about unifying patterns and themes in physics and use them in new and changing situations
- acquire knowledge and understanding of physical facts, terminology, concepts, principles and practical techniques
- apply the principles and concepts of physics, including those related to the applications of physics, to different contexts
- evaluate physical information, making judgements on the basis of this information
- appreciate the practical nature of physics, developing experimental and investigative skills based on correct and safe laboratory techniques
- analyse, interpret and evaluate data and experimental methods, drawing conclusions that are consistent with evidence from experimental activities and suggesting possible improvements and further investigations
- recognise the importance of accurate experimental work and reporting scientific methods in physics
- select, organise and present relevant information clearly and logically using appropriate vocabulary, definitions and conventions
- develop a logical approach to problem solving in a wider context
- select and apply appropriate areas of mathematics relevant to physics as set out under each topic
- prepare for more advanced courses in physics and for other courses that require knowledge of physics.

Experimental skills

The best way to develop experimental skills is to embed practical investigations in teaching or theory. The development of knowledge and experimental skills can then happen together, leading to secure acquisition of both knowledge and skills.

The skills developed through these and other practicals will be assessed through written examinations. In the assessment of experimental skills, students may be tested on their ability to:

- solve problems set in a practical context
- apply scientific knowledge and understanding in questions with a practical context
- devise and plan investigations, using scientific knowledge and understanding when selecting appropriate techniques
- demonstrate or describe appropriate experimental and investigative methods, including safe and skilful practical techniques
- make observations and measurements with appropriate precision, record these methodically and present them in appropriate ways

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- identify independent, dependent and control variables
- use scientific knowledge and understanding to analyse and interpret data to draw conclusions from experimental activities that are consistent with the evidence
- communicate the findings from experimental activities, using appropriate technical language, relevant calculations and graphs
- assess the reliability of an experimental activity
- evaluate data and methods, taking into account factors that affect accuracy and validity.

Our practical investigations are embedded within the Physics content as specification points in italics, and are summarized below:

Core	Separate
1.5 practical: investigate the motion of everyday objects such as toy cars or tennis balls *1.22 practical: investigate how extension varies with applied force for helical springs, metal wires and rubber bands* *3.17 practical: investigate the refraction of light, using rectangular blocks, semi-circular blocks and triangular prisms* *3.19 practical: investigate the refractive index of glass, using a glass block* *4.9 practical: investigate thermal energy transfer by conduction, convection and radiation* *5.4 practical: investigate density using direct measurements of mass and volume* *6.6 practical: investigate the magnetic field pattern for a permanent bar magnet and between two bar magnets* *7.6 practical: investigate the penetration powers of different types of radiation using either radioactive sources or simulations*	*2.23P practical: investigate how insulating materials can be charged by friction* *3.25P practical: investigate the speed of sound in air* *3.27P practical: investigate the frequency of a sound wave using an oscilloscope* *5.11P practical: obtain a temperature–time graph to show the constant temperature during a change of state* *5.14P practical: investigate the specific heat capacity of materials including water and some Solids*

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Suggested practical investigations

The following suggestions are *additional* practical investigations that exemplify the scientific process. They can be used to supplement students' understanding of physics in addition to the practical investigations found in the main body of the content above:

- Investigate the power consumption of low-voltage electrical items.
- Investigate factors affecting the generation of electric current by induction.
- Investigate how the nature of a surface affects the amount of energy radiated or absorbed.
- Investigate models to show refraction, such as toy cars travelling into a region of sand.
- Investigate the areas beyond the visible spectrum, such as those found by Herschel and Ritter, who discovered infrared and ultraviolet (UV) respectively.
- Investigate the relationship between potential difference (voltage), current and resistance.
- Investigate the relationship between force, mass and acceleration.
- Investigate the forces required to slide blocks along different surfaces, with differing amounts of friction.
- Investigate how crumple zones can be used to reduce the forces in collisions.
- Investigate forces between charges.
- Conduct experiments to show the relationship between potential difference (voltage), current and resistance, for a component whose resistance varies with a given factor, such as temperature, light intensity and pressure.
- Investigate the motion of falling.
- Investigate momentum during collisions.
- Investigate power by running up the stairs or lifting objects of different weights.
- Investigate the critical angle for Perspex®/air, glass/air or water/air boundaries.
- Investigate factors affecting the height of rebound of bouncing balls.
- Investigate the temperature and volume relationship for a gas.
- Investigate the volume and pressure relationship for a gas.
- Investigate the absorption of light by translucent materials in order to simulate the absorption of rays.

Safety is an overriding requirement for all practical work. Centres are responsible for ensuring that whenever their students complete practical work, appropriate safety procedures are followed.

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Mathematical skills

The table below identifies the mathematical skills that will be developed and assessed throughout this qualification. These are not explicitly referenced in the content. Details of the mathematical skills in other science subjects are given for reference:

		B	C	P
1	**Arithmetic and numerical computation**			
A	Recognise and use numbers in decimal form	✓	✓	✓
B	Recognise and use numbers in standard form	✓	✓	✓
C	Use ratios, fractions, percentages, powers and roots	✓	✓	✓
D	Make estimates of the results of simple calculations, without using a calculator	✓		✓
E	Use calculators to handle sin x and sin-1 x, where x is expressed in degrees			✓
2	**Handling data**			
A	Use an appropriate number of significant figures	✓	✓	✓
B	Understand and find the arithmetic mean (average)	✓	✓	✓
C	Construct and interpret bar charts	✓	✓	✓
D	Construct and interpret frequency tables, diagrams and histograms	✓		✓
E	Understand the principles of sampling as applied to scientific data	✓		
F	Understand simple probability	✓	✓	✓
G	Understand the terms mode and median	✓		
H	Use a scatter diagram to identify a pattern or trend between two variables	✓	✓	✓
I	Make order of magnitude calculations	✓	✓	✓
3	**Algebra**			
A	Understand and use the symbols <, >, ∝, ~		✓	✓
B	Change the subject of an equation	✓	✓	✓
C	Substitute numerical values into algebraic equations using appropriate units for physical quantities	✓	✓	✓
D	Solve simple algebraic equations	✓	✓	✓
4	**Graphs**			
A	Translate information between graphical and numerical form	✓	✓	✓
B	Understand that $y = mx + c$ represents a linear relationship		✓	✓
C	Plot two variables (discrete and continuous) from experimental or other data	✓	✓	✓
D	Determine the slope and intercept of a linear graph	✓	✓	✓
E	Understand, draw and use the slope of a tangent to a curve as a measure of rate of change		✓	✓
F	Understand the physical significance of area between a curve and the x-axis, and measure it by counting squares as appropriate			✓

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		B	C	P
5	**Geometry and trigonometry**			
A	Use angular measures in degrees			✓
B	Visualise and represent 2D and 3D objects, including two dimensional representations of 3D objects			✓
C	Calculate areas of triangles and rectangles, surface areas and volumes of cubes	✓		✓

Physics formulae for relationships

The relationships listed below will **not** be provided for students either in the form given or in rearranged form.

(1) the relationship between average speed, distance moved and time taken:

$$\text{average speed} = \frac{\text{distance moved}}{\text{time taken}}$$

(2) the relationship between force, mass and acceleration:

force = mass × acceleration

(3) the relationship between acceleration, change in velocity and time taken:

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$$

(4) the relationship between momentum, mass and velocity:

momentum = mass × velocity

momentum = $m \times v$

(5) the relationship between density, mass and volume:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

(6) the relationship between work done, force and distance moved:

work done = force × distance moved

(7) the energy relationships:

energy transferred = work done

kinetic energy = $\frac{1}{2} \times \text{mass} \times \text{speed}^2$

gravitational potential energy = mass × g × height

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(8) the relationship between mass, weight and gravitational field strength:

weight = mass × gravitational field strength

(9) the relationship between an applied force, the area over which it acts and the resulting pressure:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

(10) The relationship between the moment of a force and its perpendicular distance from the pivot:

moment = force × perpendicular distance from the pivot

(11) the relationship between charge, current, voltage, resistance, energy and power:

charge = current × time

voltage = current × resistance

electrical power = voltage × current

energy transferred = charge x voltage

(12) the relationship between speed, frequency and wavelength of wave:

wave speed = frequency × wavelength

(13) the relationship between turns and voltage for a transformer:

$$\frac{\text{input (primary) voltage}}{\text{output (secondary) voltage}} = \frac{\text{primary turns}}{\text{secondary turns}}$$

(14) the relationship between refractive index, angle of incidence and angle of refraction:

$$n = \frac{\sin i}{\sin r}$$

(15) the relationship between refractive index and critical angle:

$$\sin c = \frac{1}{n}$$

(16) the relationship for efficiency:

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy output}} \times 100\%$$

(17) the relationship for pressure difference:

pressure difference = height × density × gravitational field strength

$p = h \times \rho \times g$

(18) input power = output power

$V_p I_p = V_s I_s$

for 100% efficiency

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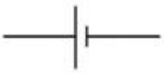
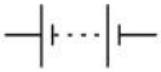
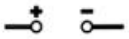
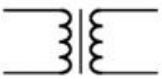
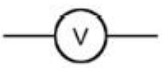
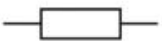
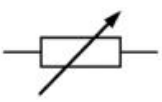
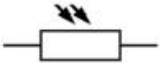
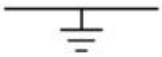
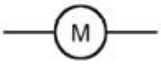
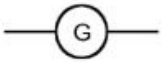
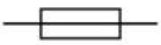
Electrical circuit symbols

Description	Symbol
Conductors crossing with no connection	
Junction of conductors	
Open switch	
Cell	
Battery of cells	
Power supply (DC)	
Power supply (AC)	
Transformer	
Ammeter	
Voltmeter	
Fixed resistor	
Variable resistor	

Description	Symbol
Heater	
Thermistor	
Light-dependent resistor (LDR)	
Diode	
Light-emitting diode (LED)	
Lamp	
Loudspeaker	
Microphone	
Electric bell	
Earth or ground	
Motor	
Generator	
Fuse/circuit breaker	

Although these are the forms of circuit symbols that will be used in examination papers, there may be other internationally agreed symbols acceptable in learner answers.

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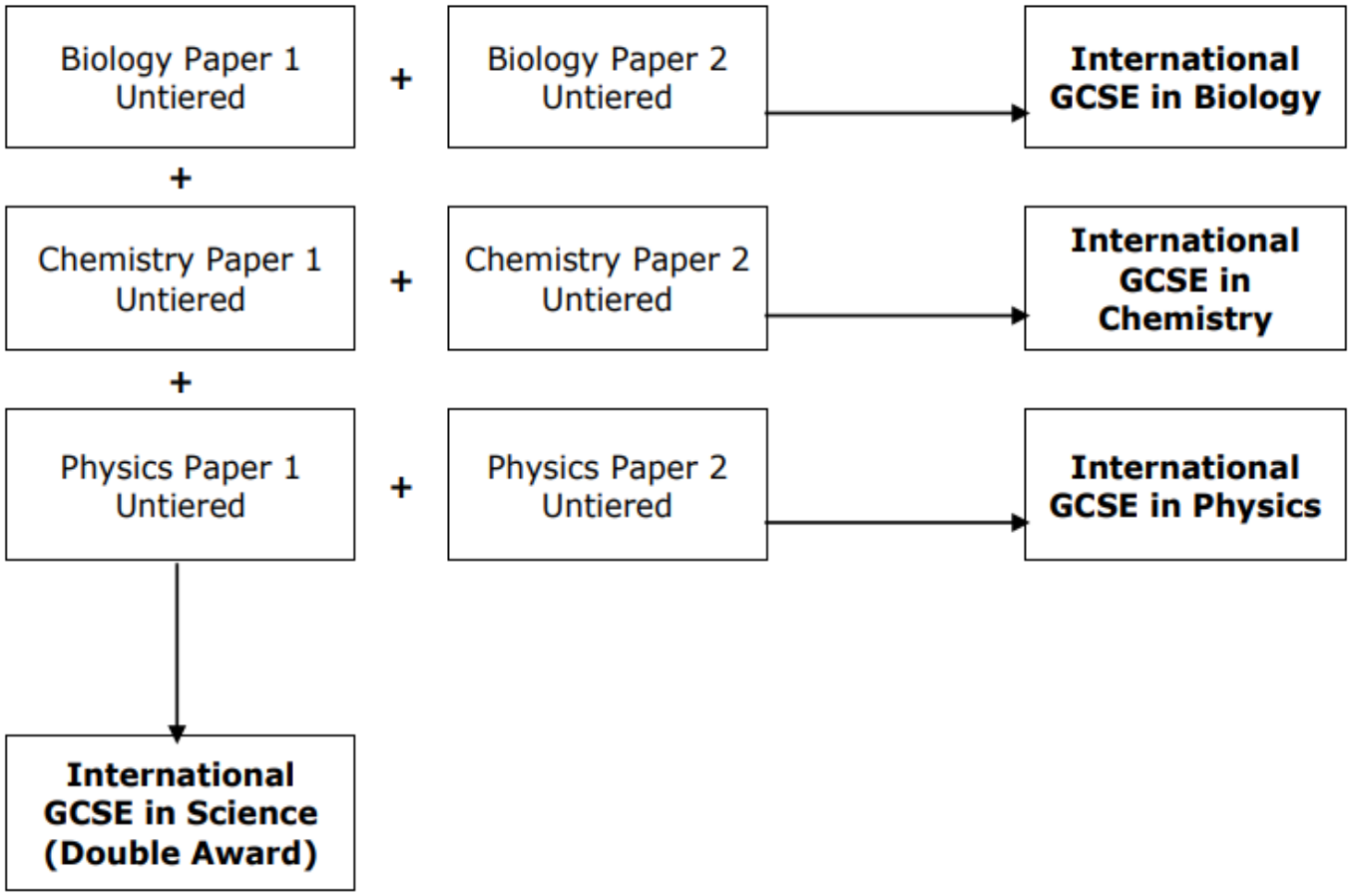
Assessment guidance

How assessment relates to the qualification is demonstrated below



A Pearson Edexcel International GCSE in Science (Single Award) qualification is also available. This will cover approximately 50 per cent of the Pearson Edexcel International GCSE in Science (Double Award) specification, while still having a comparable level of rigour and demand.

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Assessment requirements

Paper number	Level	Assessment information	Number of marks allocated in the paper
Paper 1P	1/2	Assessed through a 2-hour written examination, set and marked by Pearson. The paper is weighted at 61.1% of the qualification. A combination of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions. Assesses the content that is **not** in bold and does not have a 'P' reference. Questions may come from any topic area across the specification.	110
Paper 2P	1/2	Assessed through a 1-hour and 15-minute written examination, set and marked by Pearson. The paper is weighted at 38.9% of the qualification. A combination of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions. Assesses **all the content**, including content that is in bold and has a 'P' reference. Questions may come from any topic area across the specification. Statements in bold cover some sub-topics in greater depth.	70

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Assessment objectives and weightings

		% in International GCSE
AO1	Knowledge and understanding of physics	38–42
AO2	Application of knowledge and understanding, analysis and evaluation of physics	38–42
AO3	Experimental skills, analysis and evaluation of data and methods in physics	19–21
		100

Relationship of assessment objectives to units

Paper number	Assessment objective		
	AO1	AO2	AO3
Physics Paper 1	23.2–25.7%	23.2–25.7%	11.6–12.8%
Physics Paper 2	14.8–16.3%	14.8–16.3%	7.4–8.2%
Total for International GCSE	38–42%	38–42%	19–21%

Sample assessment materials

Sample unit assessments and mark schemes can be found in the Pearson Edexcel International GCSE Physics Sample Assessment Materials (SAMs) document.

Calculators

Learners will be expected to have access to a suitable electronic calculator for all examination papers. Calculators that allow for the retrieval of text or formulae or QWERTY keyboards will not be allowed for use in examinations.

Command word taxonomy

This table lists the command words that could be used in the examinations for this qualification and their definitions.

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Command word	Definition
Add/Label	Requires the addition or labelling of a stimulus material given in the question, for example labelling a diagram or adding units to a table.
Calculate	Obtain a numerical answer, showing relevant working.
Comment on	Requires the synthesis of a number of variables from data/information to form a judgement.
Complete	Requires the completion of a table/diagram.
Deduce	Draw/reach conclusion(s) from the information provided.
Describe	To give an account of something. Statements in the response need to be developed, as they are often linked but **do not** need to include a justification or reason.
Determine	The answer must have an element that is quantitative from the stimulus provided, or must show how the answer can be reached quantitatively. To gain maximum marks, there must be a quantitative element to the answer.
Design	Plan or invent a procedure from existing principles/ideas.
Discuss	• Identify the issue/situation/problem/ argument that is being assessed within the question. • Explore all aspects of an issue/situation/problem/ argument. • Investigate the issue/situation etc. by reasoning or argument.
Draw	Produce a diagram either using a ruler or freehand.
Estimate	Find an approximate value, number or quantity from a diagram/given data or through a calculation.
Evaluate	Review information (e.g. data, methods) then bring it together to form a conclusion, drawing on evidence including strengths, weaknesses, alternative actions, relevant data or information. Come to a supported judgement of a subject's quality and relate it to its context.
Explain	An explanation requires a justification/exemplification of a point. The answer must contain some element of reasoning/justification – this can include mathematical explanations.
Give/State/Name	All of these command words are really synonyms. They generally all require recall of one or more pieces of information.
Give a reason/reasons	When a statement has been made and the requirement is only to give the reason(s) why.
Identify	Usually requires some key information to be selected from a given stimulus/resource.
Justify	Give evidence to support (either the statement given in the question or an earlier answer).

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Command word	Definition
Plot	Produce a graph by marking points accurately on a grid from data that is provided and then draw a line of best fit through these points. A suitable scale and appropriately labelled axes must be included if these are not provided in the question.
Predict	Give an expected result.
Show that	Verify the statement given in the question.
Sketch	Produce a freehand drawing. For a graph, this would need a line and labelled axes with important features indicated. The axes are not scaled.
State what is meant by	When the meaning of a term is expected but there are different ways for how these can be described.
Suggest	Use your knowledge to propose a solution to a problem in a novel context.
Verb proceeding a command word	
Analyse the data/graph to explain	Examine the data/graph in detail to provide an explanation.
Multiple choice questions	
What, Why, Which	Direct command words used for multiple-choice questions.

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Getting Started Guide

Planning

We have provided a course planner and an editable scheme of work to support you in delivering this qualification.

This section contains a 2-year course planner for the International GCSE Physics (2017) qualification. It follows the specification and scheme of work to cover each of the units.

The course planner summarises what can be covered in each term to enable completion of the content and preparation for assessment at the end of each year. It assumes that each year is split into 3 terms and that each week accounts for roughly 2 Guided Learning Hours over 60 weeks of teaching to give a total of 120 hours for the Physics (2017).

This is only a suggested course planner with suggested timings, and it does not need to be followed. You may decide to start teaching content earlier if you would like more time.

Year	Term	Week	Topic/Sub-topic	Spec points/practicals
1	1	1	Section 1: Forces and motion a) Units b) Movement and position	1.1, 1.3, 1.4, 1.5 *Practical: investigate the motion of everyday objects such as toy cars or tennis balls*
1	1	2	b) Movement and position	1.6, 1.7, 1.8, 1.9
1	1	3	b) Movement and position c) Forces, movement, shape and momentum	1.10, 1.12, 1.13, 1.14, 1.16, 1.18
1	1	4	c) Forces, movement, shape and momentum	1.11, 1.15, 1.17, 1.21, 1.29P
1	1	5	Consolidation Assessment	
1	1	6	Feedback a) Units c) Forces, movement, shape and momentum	1.2P, 1.25P, 1.27P

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1	1	7	c) Forces, movement, shape and momentum	1.19, 1.20, **1.26P, 1.28P, 1.30P, 1.31P, 1.32P**
1	1	8	c) Forces, movement, shape and momentum	1.22, **1.33P** *Practical: investigate how extension varies with applied force for helical springs, metal wires and rubber bands*
1	1	9	c) Forces, movement, shape and momentum Consolidation	1.23, 1.24
1	1	10	Assessment Feedback	
1	1	11	Section 2: Electricity a) Units c) Energy and voltage in circuits	2.1, 2.8, 2.12, 2.14, 2.15, 2.16
1	2	1	c) Energy and voltage in circuits	2.9, 2.10, 2.13
1	2	2	c) Energy and voltage in circuits	2.6, 2.11
1	2	3	b) Mains electricity c) Energy and voltage in circuits	2.7, 2.17, 2.18, 2.19, 2.20, 2.21
1	2	4	b) Mains electricity	2.2, 2.3, 2.4, 2.5
1	2	5	d) Electric charge	**2.22P, 2.23P, 2.24P, 2.25P, 2.26P** ***Practical: investigate how insulating materials can be charged by friction***
1	2	6	d) Electric charge Consolidation	**2.27P, 2.28P**
1	2	7	Assessment Feedback	
1	2	8	Section 3: Waves a) Units b) Properties of waves	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7

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1	2	9	b) Properties of waves c) The electromagnetic spectrum	3.8, 3.10, 3.11, 3.12, 3.13
1	2	10	b) Properties of waves c) The electromagnetic spectrum d) Light and sound	3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16
1	3	1	d) Light and sound	3.17, 3.18, 3.19 *Practical: investigate the refraction of light, using rectangular blocks, semicircular blocks and triangular prisms* *Practical: investigate the refractive index of glass, using a glass block*
1	3	2	d) Light and sound	3.20, 3.21, 3.22, 3.23, **3.25P** ***Practical: investigate the speed of sound in air***
1	3	3	d) Light and sound Consolidation	**3.24P, 3.26P, 3.27P, 3.28P, 3.29P**
1	3	4	Assessment Feedback	
1	3	5	Section 4: Energy resources and energy transfers a) Units b) Energy transfers	4.1, 4.2, 4.3, 4.4
1	3	6	b) Energy transfers	4.5, 4.6, 4.9 *Practical: investigate thermal energy transfer by conduction, convection and radiation*
1	3	7	b) Energy transfers	4.7, 4.8, 4.9 *Practical: investigate thermal energy transfer by conduction, convection and radiation*
1	3	8	b) Energy transfers c) Work and power	4.10, 4.11, 4.12, 4.13

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1	3	9	c) Work and power	4.14, 4.15, 4.16, 4.17
1	3	10	d) Energy resources and electricity generation Consolidation	4.18P, 4.19P
2	1	1	Assessment Feedback	
2	1	2	Section 5: Solids, liquids and gases a) Units b) Density and pressure	5.1, 5.2P, 5.3, 5.4 *Practical: investigate density using direct measurements of mass and volume*
2	1	3	b) Density and pressure	5.5, 5.6, 5.7
2	1	4	c) Change of state	*5.8P, 5.9P, 5.10P, 5.11P, 5.12P, 5.13P* *Practical: obtain a temperature-time graph to show the constant temperature during changes of state*
2	1	5	c) Change of state d) Ideal gas molecules	5.14P, 5.15, 5.16, 5.17, 5.18, 5.19 *Practical: investigate the specific heat capacity of materials including water and some solids and obtain a temperature time graph to show the constant temperature during a change of state*
2	1	6	d) Ideal gas molecules	5.20, 5.21, 5.22
2	1	7	Consolidation Assessment	
2	1	8	Feedback Section 6: Magnetism and electromagnetism a) Units b) Magnetism	6.1, 6.2, 6.3, 6.5

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2	1	9	b) Magnetism c) Electromagnetism	6.4, 6.6, 6.7, 6.8, **6.9P, 6.10P** *Practical: Investigate the magnetic field pattern for a permanent bar magnet and that between two bar magnets*
2	1	10	c) Electromagnetism	6.11P, 6.12, 6.13, 6.14
2	1	11	d) Electromagnetic induction	6.15, 6.16, **6.17P, 6.18P**
2	2	1	d) Electromagnetic induction Consolidation	**6.19P, 6.20P**
2	2	2	Assessment Feedback	
2	2	3	Section 7: Radioactivity and particles a) Units b) Radioactivity	7.1, 7.2, 7.3, 7.4, 7.5
2	2	4	b) Radioactivity	7.6, 7.7, 7.8 *Practical: investigate the penetration powers of different types of radiation using either radioactive sources or simulation*
2	2	5	b) Radioactivity	7.9, 7.10, 7.11, 7.12, 7.13
2	2	6	b) Radioactivity	7.14, 7.15, 7.16
2	2	7	c) Fission and fusion	7.17, 7.18, 7.19, 7.20, 7.21, 7.22
2	2	8	c) Fission and fusion	7.23, 7.24, 7.25, 7.26
2	2	9	Conclusion Assessment	
2	2	10	Feedback Section 8: Astrophysics	8.1, 8.2, 8.3, 8.4

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			a) Units b) Motion in the universe	
2	3	1	b) Motion in the universe c) Stellar evolution	8.5, 8.6, 8.7, 8.8
2	3	2	c) Stellar evolution	8.9, 8.10, **8.11P, 8.12P**
2	3	3	d) Cosmology	**8.15P, 8.16P, 8.17P, 8.18P**
2	3	4	d) Cosmology Consolidation	**8.13P, 8.14P**
2	3	5	Assessment Feedback	
2	3		Revision	

We also have a dedicated scheme of work for this qualification here.

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Delivery of the qualification – transferable skills

The need for transferable skills

In recent years, higher education institutions and employers have consistently flagged the need for learners to develop a range of transferable skills to enable them to respond with confidence to the demands of undergraduate study and the world of work.

The Organisation for Economic Co-operation and Development (OECD) defines skills, or competencies, as 'the bundle of knowledge, attributes and capacities that can be learned and that enable individuals to successfully and consistently perform an activity or task and can be built upon and extended through learning.'[1]

To support the design of our qualifications, the Pearson Research Team selected and evaluated seven global 21st-century skills frameworks. Following on from this process, we identified the National Research Council's (NRC) framework [2] as the most evidence-based and robust skills framework, and have used this as a basis for our adapted skills framework.

The framework includes cognitive, intrapersonal skills and interpersonal skills.

The NRC framework is included alongside literacy and numeracy skills.

The skills have been interpreted for this specification to ensure they are appropriate for the subject. All of the skills listed are evident or accessible in the teaching, learning and / or assessment of the qualification. Some skills are directly assessed. Pearson materials will support you in identifying these skills and developing these skills in learners.

A full subject interpretation of each skill, with mapping to show opportunities for learner development is given on the subject pages of our website: qualifications.pearson.com

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