Pearson Edexcel

International GCSE

Science (Double Award) (9–1)

Getting Started Guide

Pearson Edexcel International GCSE in Science (Double Award) (4SD0)

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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Science (Double Award) (2017) (4SD0)
Getting Started Guide

Introduction

This Getting Started Guide provides an overview of our International GCSE Science (Double Award) (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.

Key features of the qualification

Why choose Pearson Edexcel International GCSE in Science (Double Award) (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 science and a range of other 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 and Double Award Science, as well as a linear Single Award Science and Human Biology 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 science-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 Science (Double Award) (2017) is a linear qualification. Three untiered written examinations must be taken in the same series at the end of the course of study.

The assessment model has three papers – 1 Biology, 1 Chemistry and 1 Physics. Each paper is 2 hours long and assesses core (non-bold) content from across the specification. All papers will have a range of question styles and calculators can be used in all 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 all learners of all ability ranges and learning styles. 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' science 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 professors to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

Courses to suit your learners' needs and interests

Teachers of science 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 Science (Double Award) (2017), learners can also be taught our International GCSE in Science (Double Award) (Modular), International GCSE in Physics (2017), International GCSE in Chemistry (2017), International GCSE in Biology (2017), and their modular equivalents.

This 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 Biology, Chemistry and Physics.

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

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Qualification overview

Biology Paper 1	Paper code 4BI1/1B and 4SD0/1B
Externally assessed Written examination: 2 hours Availability: November and June First assessment: June 2019 110 marks	*33.3% of the total International GCSE*
Content summary Topics covering core content areas: 1 The nature and variety of living organisms 2 Structures and functions in living organisms 3 Reproduction and inheritance 4 Ecology and the environment 5 Use of biological resources.	
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.	

Chemistry Paper 1	Paper code 4CH1/1C and 4SD0/1C
Externally assessed Written examination: 2 hours Availability: November and June First assessment: June 2019 110 marks	*33.3% of the total International GCSE*
Content summary Topics covering core content areas: 1 Principles of chemistry 2 Inorganic chemistry 3 Physical chemistry 4 Organic chemistry.	
Assessment A combination of different question styles, including multiple-choice questions, short-answerquestions, calculations and extended open-response questions. A calculator may be used in the examinations.	

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Physics Paper 1	Paper code 4PH1/1P and 4SD0/1P
Externally assessed Written examination: 2 hours Availability: November and June First assessment: June 2019 110 marks	*33.3% of the total International GCSE*
Content summary Topics covering core content areas: 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-answerquestions, 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 and objectives of this qualification are to enable learners to:

- learn about unifying patterns and themes in science and use them in new and changing situations
- acquire knowledge and understanding of scientific facts, terminology, concepts, principles and practical techniques
- apply the principles and concepts of science, including those related to the applications of science, to different contexts
- evaluate scientific information, making judgements on the basis of this information
- appreciate the practical nature of science, 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 methodsin science
- 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 science as set out under each topic
- prepare for more advanced courses in science and for other courses that require knowledge of science.

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, learners 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 skillful practical techniques

- make observations and measurements with appropriate precision, record these methodically and present them in appropriate ways
- 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 Science content as specification points in italics, and are summarized below:

Biology
2.9 practical: investigate food samples for the presence of glucose, starch, protein and fat *2.12 practical: investigate how enzyme activity can be affected by changes in temperature* *2.17 practical: investigate diffusion and osmosis using living and non-living systems* *2.23 practical: investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll* *2.39 practical: investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms* *2.50 practical: investigate breathing in humans, including the release of carbon dioxide and the effect of exercise* *3.5 practical: investigate the conditions needed for seed germination* *4.2 practical: investigate the population size of an organism in two different areas using quadrats* *5.6 practical: investigate the role of anaerobic respiration by yeast in different conditions*
Chemistry
1.13 practical: investigate paper chromatography using inks/food colourings

1.36 practical: know how to determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper(II) oxide)

2.14 practical: determine the approximate percentage by volume of oxygen in air using a metal or a non-metal

2.21 practical: investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron)

2.42 practical: prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide

3.8 practical: investigate temperature changes accompanying some of the following types of change:

- *salts dissolving in water*
- *neutralisation reactions*
- *displacement reactions*
- *combustion reactions.*

3.15 practical: investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid

3.16 practical: investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution

Physics

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

Suggested practical investigations

The following suggestions are *additional* practical investigations that exemplify the scientific process. They can be used to supplement learners' understanding of biology, chemistry and physics in addition to the practical investigations found in the main body of the content.

Biology

- Investigate human responses to external stimuli.
- Investigate reaction times.
- Investigate the effect of pollutants on plant germination and plant growth.
- Investigate inheritance using suitable organisms or models.
- Investigate the speed of transmission of electrical impulses in the nervous system.
- Investigate the presence of glucose in simulated urine/body fluids.
- Investigate the effect of light and/or gravity on plant growth.
- Investigate the effect of exercise on heart rate.
- Investigate the relationship between organisms and their environment, using fieldwork techniques.
- Investigate the distribution of organisms in an ecosystem, using sampling techniques including:
  - pooters
  - sweep nets/pond nets
  - pitfall traps and measure environmental factors including:
    - temperature
    - light intensity
    - pH.
- Investigate plant and animal cells with a light microscope.
- Investigate the effect of glucose concentration on rate of anaerobic respiration in yeast.
- Investigate how the structure of the leaf is adapted for photosynthesis.
- Investigate the effect of different factors on yoghurt making.
- Investigate the use of enzymes in washing powders.
- Investigate temperature loss in beakers of hot water of different sizes.

Chemistry

- Investigate the ease of thermal decomposition of carbonates, including calcium carbonate, zinc carbonate and copper carbonate.
- Compare the temperature rise produced when the same volume of water is heated by different fuels.
- Investigate the volume of air used up and products formed when candles are burned.
- Investigate the reactions of calcium compounds: the decomposition of calcium carbonate and the reaction of calcium oxide with water; the reaction of calcium carbonate with acid.
- Carry out simple neutralisation reactions of acids, using metal oxides, hydroxides and/or carbonates.
- Carry out electrolysis of sea water/acidified water.
- Investigate the rusting of iron.
- Investigate simple oxidation and reduction reactions, such as burning elements in oxygenor competition reactions between metals and metal oxides.
- Investigate the fractional distillation of synthetic crude oil and the ease of ignition and viscosity of the fractions.
- Investigate the products produced from the complete combustion of a hydrocarbon.
- Investigate the cracking of paraffin oil.
- Investigate the properties of a group of elements, e.g. Group 2.
- Investigate the properties of typical ionic compounds.
- Test predictions of whether a precipitate forms when soluble salts are mixed.
- Carry out a series of ion tests to identify unknown compounds.
- Build models of simple covalent molecules.
- Investigate the typical properties of simple and giant covalent compounds.
- Investigate the rate of reactions, such as magnesium and hydrochloric acid, or sodium thiosulfate and hydrochloric acid.
- Determine the formula of a hydrated salt such as barium chloride or copper sulfate by heating to drive off water of crystallisation.
- Prepare a substance and calculate the percentage yield, given the theoretical yield.
- Evaporate a solution to dryness to determine the mass of solute in a given mass of solution.
- Investigate the mass changes at the electrodes during the electrolysis of copper sulfate solution using copper electrodes.
- Investigate the migration of ions in, e.g. potassium manganate (VII) solution.
- Electroplate a metal object.
- Determine the volume of one mole of hydrogen gas by using the reaction of magnesium with hydrochloric acid.
- Determine the molar volume by measuring the volume and mass of a gas (e.g. carbon dioxide).

- Investigate simple reversible reactions, such as the decomposition of ammonium chloride.

Physics

- 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 forensuring that whenever their learners complete practical work, appropriate safety procedures are followed.

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			✓

		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	✓		✓

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

**** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.***

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.

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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 density, mass and volume:

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

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

work done = force × distance moved

(6) the energy relationships:

energy transferred = work done

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

gravitational potential energy = mass × g × height

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

weight = mass × gravitational field strength

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

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

(9) 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

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

wave speed = frequency × wavelength

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

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

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

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

(13) the relationship for efficiency:

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

(14) the relationship for pressure difference:

pressure difference = height × density × gravitational field strength

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

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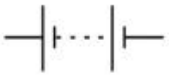
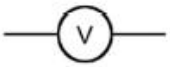
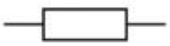
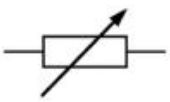
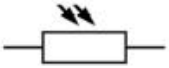
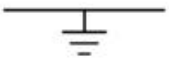
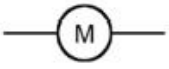
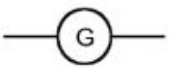
Electrical circuit symbols

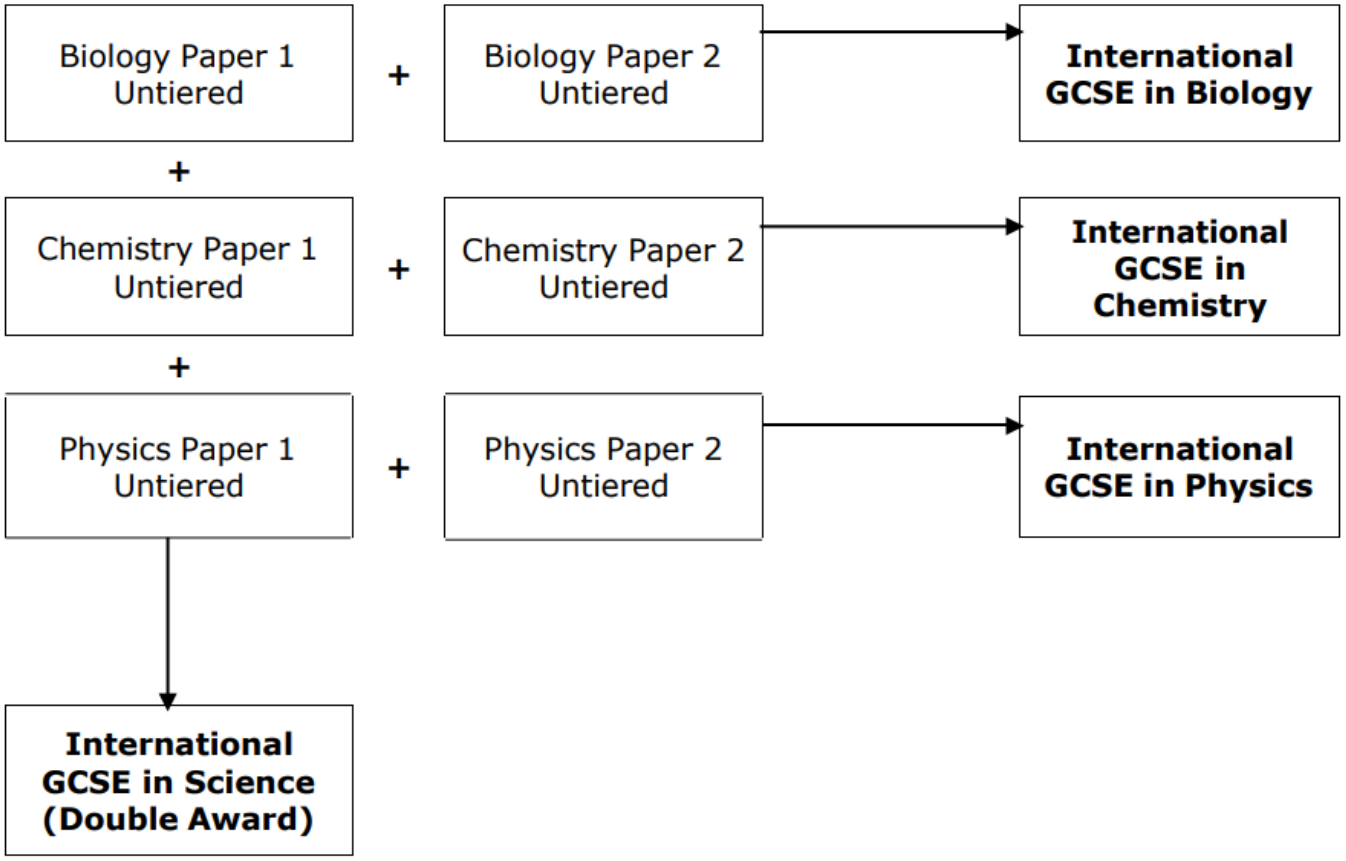
Description	Symbol
Conductors crossing with no connection	
Junction of conductors	
Open switch	
Cell	
Battery of cells	
Power supply (DC)	
Power supply (AC)	
Transformer	
Ammeter	
Voltmeter	
Fixed resistor	
Variable resistor	

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.

Assessment guidance

How assessment relates to the qualification is demonstrated below



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Assessment requirements

Paper number	Level	Assessment information	Number of marks allocated in the paper
Paper 1B	1/2	Assessed through a 2-hour written examination set and marked by Pearson. The paper is weighted at 33.3% 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.	110
Paper 1C	1/2	Assessed through a 2-hour written examination set and marked by Pearson. The paper is weighted at 33.3% 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.	110
Paper 1P	1/2	Assessed through a 2-hour written examination set and marked by Pearson. The paper is weighted at 33.3% 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.	110

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Assessment objectives and weightings

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

Relationship of assessment objectives to units

Unit number	Assessment objective		
	AO1	**AO2**	**AO3**
Biology Paper 1	12.7–14.0%	12.7–14.0%	6.3–7.0%
Chemistry Paper 1	12.7–14.0%	12.7–14.0%	6.3–7.0%
Physics Paper 1	12.7–14.0%	12.7–14.0%	6.3–7.0%
Total for International GCSE	38–42%	38–42%	19–21%

Sample assessment materials

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

Calculators

Learners will be expected to have access to a suitable electronic calculator for all unit assessments. 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

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	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.

Command word	Definition
Justify	Give evidence to support (either the statement given in the question or an earlier answer).
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 preceding 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.

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 Science (Double Award) (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 4 Guided Learning Hours over 60 weeks of teaching to give a total of roughly 250 hours for the Science (Double Award) (2017). How this time is divided up to cover the three sciences will vary from centre to centre, but this planner is based on dividing the total time into roughly three equal parts.

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. You will find a more detailed lesson plan in the scheme of work document, which gives suggested teaching times for each unit. This is editable so that you can customise it to meet your own needs.

Year	Term	Week	Topic/Sub-topic	Spec points/practicals
Chemistry				
1	1	1	Section 1: Principles of chemistry a) States of matter b) Elements, compounds and mixtures	1.1, 1.2, 1.3, 1.4, 1.8, 1.9, 1.10
1	1	2	b) Elements, compounds and mixtures c) Atomic structure	1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16 *Practical: investigate paper chromatography using inks/food colourings*
1	1	3	c) Atomic structure d) The Periodic Table	1.17, 1.18, 1.19, 1.20, 1.21

1	1	4	d) The Periodic Table f) Ionic bonding	1.22, 1.23, 1.24, 1.37, 1.38, 1.39, 1.40, 1.41, 1.42, 1.43
1	1	5	g) Covalent bonding	1.44, 1.45, 1.46, 1.47, 1.48, 1.49, 1.50, 1.51
1	1	6	e) Chemical formulae, equations and calculations Consolidation & assessment Feedback	1.25, 1.26
1	1	7	Section 2: Inorganic chemistry a) Group 1 (alkali metals) b) Group 7 (halogens) c) Gases in the atmosphere	2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.9, 2.10, 2.13, 2.14 *Practical: determine the approximate percentage by volume of oxygen in air using a metal or a non-metal*
1	1	8	c) Gases in the atmosphere d) Reactivity series	2.11, 2.12, 2.15, 2.16, 2.18, 2.19, 2.20, 2.21 *Practical: investigate reactions between dilute hydrochloric and sulfuric acids and metals (e.g. magnesium, zinc and iron)*
1	1	9	e) Acids, alkalis and titrations f) Acids, bases and salt preparations	2.28, 2.29, 2.30, 2.31, 2.32, 2.34, 2.35, 2.36, 2.37, 2.38, 2.39, 2.42 *Practical: prepare a sample of pure, dry hydrated copper(II) sulfate crystals starting from copper(II) oxide*
1	1	10	g) Chemical tests	2.44, 2.45, 2.46, 2.47, 2.48, 2.49, 2.50
1	1	11	Consolidation & assessment Feedback	
Physics				
1	2	1	Section 1: Forces and movement	1.1, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10

			a) Units b) Movement and position	*Practical: investigate the motion of everyday objects such as toy cars or tennis balls*
1	2	2	c) Forces, movement, shape and momentum	1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20, 1.21
1	2	3	c) Forces, movement, shape and momentum Section 2: Electricity a) Units c) Energy and voltage in circuits	1.22, 1.23, 1.24, 2.1, 2.8, 2.12, 2.14, 2.15, 2.16 *Practical: investigate how extension varies with applied force for helical springs, metal wires and rubber bands*
1	2	4	b) Mains electricity c) Energy and voltage in circuits	2.6, 2.7, 2.9, 2.10, 2.11, 2.13, 2.19
1	2	5	b) Mains electricity c) Energy and voltage in circuits Consolidation & assessment Feedback	2.2, 2.3, 2.4, 2.5, 2.17, 2.18, 2.20, 2.21
1	2	6	Section 3: Waves a) Units b) Properties of waves c) The electromagnetic spectrum	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.10, 3.11, 3.12, 3.13
1	2	7	b) Properties of waves d) Light and sound	3.9, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23 *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	2	8	Section 4: Energy resources and energy transfers a) Units b) Energy transfers	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.9 *Practical: investigate thermal energy transfer by conduction, convection and radiation*

1	2	9	b) Energy transfers c) Work and power	4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13 *Practical: investigate thermal energy transfer by conduction, convection and radiation*
1	2	10	c) Work and power Consolidation & assessment Feedback	4.14, 4.15, 4.16, 4.17
Biology				
1	3	1	<u>Section 1: The nature and variety of living organisms</u> a) Characteristics of living organisms b) Variety of living organisms	1.1, 1.2, 1.3, 1.4
1	3	2	<u>Section 2: Structures and functions in living organisms</u> a) Levels of organisation b) Cell structure	2.1, 2.2, 2.3, 2.4, 2.7, 2.8, 2.9, 2.10, 2.11, 2.13 *Practical: investigate food samples for the presence of glucose, starch, protein and fat*
1	3	3	c) Biological molecules d) Movement of substances into and out of cells	2.12, 2.15, 2.16 *Practical: investigate how enzyme activity can be affected by changes in temperature*
1	3	4	d) Movement of substances into and out of cells Consolidation & assessment Feedback	2.15, 2.16, 2.17 *Practical: Investigate osmosis using living and non-living systems*
1	3	5	e) Nutrition	2.18, 2.19, 2.20, 2.21, 2.22, 2.23 *Practical: investigate photosynthesis, showing the evolution of oxygen from a water plant, the production of starch and the requirements of light, carbon dioxide and chlorophyll*

1	3	6	e) Nutrition	2.24, 2.25, 2.26, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32
1	3	7	f) Respiration	2.34, 2.35, 2.36, 2.37, 2.38, 2.39 *Practical: investigate the evolution of carbon dioxide and heat from respiring seeds or other suitable living organisms*
1	3	8	g) Gas exchange h) Transport	2.46, 2.47, 2.48, 2.49, 2.50, 2.51, 2.52 *Practical: investigate breathing in humans, including the release of carbon dioxide and the effect of exercise*
1	3	9	h) Transport	2.53, 2.54, 2.59, 2.60, 2.61, 2.62, 2.65, 2.66, 2.67, 2.68, 2.69
1	3	10	i) Excretion Consolidation & assessment Feedback	2.70, 2.71
Chemistry				
2	1	1	Section 1: Principles of chemistry e) Chemical formulae, equations and calculations	1.27, 1.28, 1.29, 1.30, 1.31, 1.32, 1.33, 1.36 *Practical: know how to determine the formula of a metal oxide by combustion (e.g. magnesium oxide) or by reduction (e.g. copper(II) oxide)*
2	1	2	Section 3: Physical chemistry a) Energetics	3.1, 3.2, 3.3, 3.4, 3.8 *Practical: investigate temperature changes accompanying some of the following types of change:* • *Salts dissolving in water* • *Neutralisation reactions* • *Displacement reactions* • *Combustion reactions*

2	2	3	Section 4: Organic chemistry a) Introduction b) Crude oil	4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10
2	1	4	b) Crude oil	4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18
2	1	5	Consolidation & assessment Feedback Section 3: Physical chemistry b) Rates of reaction	3.10, 3.11, 3.12
2	1	5	b) Rates of reaction Section 4: Organic Chemistry c) Alkanes	3.13, 3.15, 3.16, 3.17, 3.18, 4.19, 4.20, 4.21 *Practical: investigate the effect of changing the surface area of marble chips and of changing the concentration of hydrochloric acid on the rate of reaction between marble chips and dilute hydrochloric acid* *Practical: investigate the effect of different solids on the catalytic decomposition of hydrogen peroxide solution*
2	1	6	c) Alkanes d) Alkenes e) Synthetic polymers	4.22, 4.23, 4.24, 4.25, 4.26, 4.27, 4.28, 4.44, 4.45, 4.46, 4.47
2	1	7	Consolidation & assessment Feedback	
Physics				
2	1	7	Section 5: Solids, liquids and gases a) Units b) Density and pressure	5.1, 5.3, 5.4, 5.5, 5.6, 5.7 *Practical: Investigate density using direct measurements of mass and volume*

2	1	8	c) Ideal gas molecules Section 6: Magnetism and electromagnetism a) Units b) Magnetism	5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.21, 5.22, 6.1, 6.2, 6.3, 6.5
2	1	9	b) Magnetism c) Electromagnetism	6.4, 6.6, 6.7, 6.8, 6.12, 6.13, 6.14, 6.15, 6.16 *Practical: investigate the magnetic field pattern for a permanent bar magnet and that between bar magnets*
2	1	10	Section 7: Radioactivity and particles a) Units b) Radioactivity	7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 *Practical: investigate the penetration powers of different types of radiation using either radioactive sources or simulations*
2	1	11	b) Radioactivity Consolidation & assessment Feedback	7.9, 7.10, 7.11, 7.12, 7.13, 7.14, 7.15, 7.16
2	2	1	c) Fission and fusion	7.17, 7.18, 7.19, 7.20, 7.21, 7.22, 7.23, 7.24, 7.25, 7.26
2	2	2	Section 8: Astrophysics a) Units b) Motion in the Universe c) Stellar evolution	8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10
2	2	3	Consolidation & assessment Feedback	
Biology				
2	2	4	Section 2: Structures and functions in living organisms j) Co-ordination and response	2.80, 2.81, 2.82, 2.83, 2.84, 2.85, 2.87, 2.88, 2.89, 2.90, 2.91, 2.92, 2.93

2	2	5	j) Co-ordination and response Section 3: Reproduction and inheritance a) Reproduction	2.86, 2.94, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.13 *Practical: Investigate the conditions needed for seed germination*
2	2	6	a) Reproduction b) Inheritance	3.11, 3.12, 3.14, 3.15, 3.28, 3.29, 3.32, 3.26, 3.27, 3.30, 3.31
2	2	7	b) Inheritance	3.19, 3.20, 3.22, 3.23, 3.24, 3.25, 3.33, 3.34, 3.38, 3.39
2	2	8	Consolidation & assessment Feedback Section 4: Ecology and the environment a) The organism in the environment	4.1, 4.2, 4.5 *Practical: investigate the population size of an organism in two different areas using quadrats*
2	2	9	b) Feeding relationships c) Cycles within ecosystems	4.6, 4.7, 4.8, 4.9, 4.10
2	2	10	d) Human influences on the environment	4.12, 4.13, 4.14, 4.15, 4.16, 4.17
2	3	1	Section 5: Use of biological resources a) Food production b) Selective breeding	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.10, 5.11 *Practical: investigate the role of anaerobic respiration by yeast in different conditions*
2	3	2	c) Genetic modification (genetic engineering)	5.12, 5.13, 5.14, 5.15, 5.16
2	3	3	Consolidation & assessment Feedback	
2	3		Revision	

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

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

For information about Pearson Qualifications, including Pearson Edexcel and BTEC qualifications, visit qualifications.pearson.com

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