Your guide to Pearson Edexcel International Advanced Level (IAL) Science (Biology, Chemistry and Physics)

First teaching September 2018
Welcome

Our International Advanced Level (IAL) qualifications have been developed in consultation with the international school community, including a large number of teachers and university lecturers, to be engaging for international learners and to give them the necessary skills to support progression to higher and further study.


This guide provides an overview of our International Advanced Level (IAL) qualifications in Biology, Chemistry and Physics.

For further information, updates and support, visit qualifications.pearson.com/ial

“I gained a lot of knowledge and skills as well as the academic side in lectures. I gained great grades with my IALs and feel confident to move forward.”

Wae Yee Hew, now studying Actuarial Science at Herriot Watt University, Malaysia
Why choose Pearson Edexcel International Advanced Level (IAL)?

Pearson Edexcel International Advanced Level (IAL) qualifications are popular for many reasons including:

**Flexible and modular structure**

Pearson Edexcel IAL provides the flexibility to teach a modular A level qualification. This allows learners to take examinations at the right time for them. The modular structure includes a synoptic approach to assessment, which means learners are examined on their learning from each unit and are also able to demonstrate their knowledge and understanding across the whole subject.

The modular approach exam results provide formal feedback throughout the course. Learners are able to more quickly understand the standard required to reach the level of achievement they are aiming for. This understanding motivates them to improve, and builds a sense of ownership through bite-size, short-term goals.

**AS results contribute to A level grade**

International AS qualifications can be taken separately, as a stand alone qualification, or used as a stage on the way to completing an Advanced Level qualification. This provides international schools and learners with greater choice and flexibility to meet their needs and aspirations.

**Multiple examination opportunities**

Examinations are available in January, June and October. As exams are spread throughout the course, revision is broken down into unit-sized chunks, and there are less 'all-or-nothing' exam periods, enabling learners to focus their revision appropriately.

**Clear and straightforward question papers**

Our question papers are clear and provide sufficient challenge and support for students of all ability ranges. Our mark schemes are straightforward so that the assessment requirements are clear.

**Recognised by universities worldwide**

Our IALs are fully comparable to UK reformed GCE A levels and provide the same progression routes to university and employment. Crucially, Pearson Edexcel IALs are widely recognised by universities across the world for entry on to undergraduate degree level programmes. Global universities that recognise these qualifications include the UK Russell Group, the Australia Group of 8 (Go8) and top ranked universities in North America and Asia.

**International focus**

Pearson Edexcel IAL qualifications and accompanying published resources contain international content where possible, such as topic themes, examples, case studies, photos and currencies, making content more relevant and engaging for all learners. Language is also reviewed by a specialist to ensure materials are written with EAL learners in mind, in a clear and accessible style.

**100% externally assessed**

Learners can resit individual unit examinations.
Pearson Edexcel International Advanced Level (IAL) Biology, Chemistry and Physics from 2018

We have listened to feedback from all parts of the international school community, including a large number of teachers and universities, to ensure we develop our science qualifications to be engaging for international learners and to give them the necessary skills to support progression to higher education or further study in biology, chemistry or physics.

Our IALs in Biology, Chemistry and Physics are designed to be studied over two years, with the option of a one-year AS level course. Results of the IAS qualification can contribute to the overall IAL grade.

The IAL Biology, Chemistry and Physics qualifications have several features which we know teachers and students love including:

- up-to-date, engaging content with an international focus to suit different schools around the world
- clear and straightforward question papers – our mark schemes are straightforward so that the assessment requirements are clear
- examinations are available 3 times a year in January, June and October to suit different delivery models
- students have the opportunity to re-sit individual units
- progression – IAS results will continue to contribute to IAL
- curriculum-matched textbooks and teacher supports have been developed to support teaching and learning from September 2018.
Biology

Your guide to assessment timelines

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Helping students make the best progress they can

Covering biological laws, theories, models and their practical applications, our IAL Biology will extend learners’ knowledge by broadening and deepening skills.

Students will:

- develop and use a range of mathematical skills that support their knowledge and understanding of biology
- gain experience in a variety of practical techniques and procedures, which will be assessed separately in Unit 3 (AS) and Unit 6 (A Level)
- widen their learning through a number of key transferable skills, which may be cognitive, intrapersonal or interpersonal (see Page 9 for more information on developing transferable skills)
- benefit from modular assessment, offered at different times of year to suit your delivery model
- be exposed to a range of question types in exams – testing breadth of knowledge, as well as allowing depth of understanding to be examined.
Chemistry

Your guide to assessment timelines

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Helping students make the best progress they can

Covering the core chemical principles and laboratory skills, our IAL Chemistry will extend learners’ knowledge by broadening and deepening skills.

Students will:

- develop and use a range of mathematical skills that support their knowledge and understanding of chemistry
- gain experience in a variety of practical techniques and procedures, which will be assessed separately in Unit 3 (AS) and Unit 6 (A Level)
- widen their learning through a number of key transferable skills, which may be cognitive, intrapersonal or interpersonal (see Page 9 for more information on developing transferable skills)
- benefit from modular assessment, offered at different times of year to suit your delivery model
- be exposed to a range of question types in exams – testing breadth of knowledge, as well as allowing depth of understanding to be examined.
Physics

Your guide to assessment timelines

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| NEW PHYSICS 2018 SPECIFICATION             |       |       |          |          |          |          |          |          |          |          |          |
| Physics 2018        | AS    | WPH11 | ✗         | ✗         | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         |
| Physics 2018        | AS    | WPH12 | ✗         | ✗         | x         | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         |
| Physics 2018        | AS    | WPH13 | ✗         | ✗         | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         | ✓         |
| Physics 2018        | A2    | WPH14 | ✗         | ✗         | x         | x         | x         | ✓         | ✓         | ✓         | ✓         |
| Physics 2018        | A2    | WPH15 | ✗         | ✗         | x         | x         | x         | x         | ✓         | ✓         | ✓         |
| Physics 2018        | A2    | WPH16 | ✗         | ✗         | x         | x         | x         | x         | ✓         | ✓         | ✓         |

Helping students make the best progress they can

Covering physical laws, theories, models and their practical applications, our IAL Physics will extend learners’ knowledge by broadening and deepening skills.

Students will:

- develop and use a range of mathematical skills that support their knowledge and understanding of physics
- gain experience in a variety of practical techniques and procedures, which will be assessed separately in Unit 3 (AS) and Unit 6 (A Level)
- widen their learning through a number of key transferable skills, which may be cognitive, intrapersonal or interpersonal (see Page 9 for more information on developing transferable skills)
- benefit from modular assessment, offered at different times of year to suit your delivery model
- be exposed to a range of question types in exams – testing breadth of knowledge, as well as allowing depth of understanding to be examined.
Units studied at a glance

**Edexcel International Advanced Level (IAL) Biology**
- Unit 1: Molecules, Diet, Transport and Health
- Unit 2: Cells, Development, Biodiversity and Conservation
- Unit 3: Practical Skills in Biology I
- Unit 4: Energy, Environment, Microbiology and Immunity
- Unit 5: Respiration, Internal Environment, Coordination and Gene Technology
- Unit 6: Practical Skills in Biology II

**Edexcel International Advanced Level (IAL) Chemistry**
- Unit 1: Structure, Bonding and Introduction to Organic Chemistry
- Unit 2: Energetics, Group Chemistry, Halogenoalkanes and Alcohols
- Unit 3: Practical Skills in Chemistry I
- Unit 4: Rates, Equilibria and Further Organic Chemistry
- Unit 5: Transition Metals and Organic Nitrogen Chemistry
- Unit 6: Practical Skills in Chemistry II

**Edexcel International Advanced Level (IAL) Physics**
- Unit 1: Mechanics and Materials
- Unit 2: Waves and Electricity
- Unit 3: Practical Skills in Physics I
- Unit 4: Further Mechanics, Fields and Particles
- Unit 5: Thermodynamics, Radiation, Oscillations and Cosmology
- Unit 6: Practical Skills in Physics II
Developing transferable skills valued by universities and employers

In recent years, universities and employers have highlighted the need for students and graduates to develop a range of transferable skills, often referred to as ‘soft skills’, to enable them to better meet the demands of undergraduate study and the world of work.

In fact, universities and employers consider transferable skills to be the largest skills gap overall.

1 in 6 employers have difficulty finding candidates with the skills they require

54% of companies say that skills shortages impact their ability to serve their customers

1 in 3 skills in a job posting is a “soft skill”

87% of university professors do not think students have the research skills needed for degree-level study

Pearson Edexcel International Advanced Levels (IALs) equip students with these embedded transferable skills sought after by universities and employers. They develop core competencies, such as problem-solving, critical thinking and verbal reasoning. Transferable skills are signposted in our IAL qualifications and learning materials to support student development of them.

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2 Employability report from PSB for Pearson, 2016.
3 Bridging the Gap: Understanding the Differing Research Expectations of First-Year Students and Professors, Meg Raven, Mount Saint Vincent University, 2016.
Supporting you at every stage

We provide an unparalleled level of support services, tools, resources and training alongside our qualifications, making teachers and students lives easier at every stage.

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| Additional paid for resources              |                                |                                |                 |
| Printed and digital courseware (such as textbooks) | ✓                              | ✓                              |                 |

Your free subject support

- **Our subject advisors provide** fast, reliable, expert help and aim to answer all emailed questions within 48 hours and resolve 90% of issues phoned in on the first call. Email TeachingScience@pearson.com or call + 44 (0)20 7010 2190

- **Connect with other educators** around the world, share ideas and resources and stay up to date with the latest subject developments by joining our international schools community at community.pearsoninternationalschools.com.
Offering more advanced support services and tools

Our technology capability also allows us to provide the following unique services and tools to teachers and students:

- **ResultsPlus** provides detailed information on exam performance and a platform to view and compare student results – as individuals or as groups – across the world. It helps with planning improvements in teaching and learning. ResultsPlus Direct is a free online service that gives students a detailed breakdown and comparison of their performance in Pearson Edexcel exams, globally, to help them identify areas of improvement.

- **examWizard** is our free exam preparation tool containing a bank of past Pearson Edexcel exam questions, mark schemes and examiners’ reports for a range of subjects. It saves you time by enabling you to create your own mock exams, topic tests, homework or revision activities in minutes and links directly to associated examiner reports and mark schemes!

- **Access to Scripts Service (ATS)** is an online service which allows access to view electronically marked exam papers, free of charge, providing enhanced transparency and support for teachers to evaluate a student’s performance on particular questions in relation to what they have been taught.

- **Awarding reliability**. We use ePEN, our unique, image-based marking system ensuring real time monitoring, quality control and reporting to ensure the highest quality marking and provision of data for tools such as ResultsPlus. Pearson Edexcel exam marking processes have been proven to produce the most reliable results. This demonstrates that our qualifications maintain the highest standards and can be relied upon to deliver to expectation.

> Because of ResultsPlus, students can learn about their mistakes and rectify.

Kanagambigai, Chief Counsellor, Chemistry Lecturer, A levels Department, HELP Academy, Malaysia commenting on the ResultsPlus mocks service.
Published resources

Developed for the 2018 International Advanced Level (IAL) specification, these new resources are specifically designed for international students, with a strong focus on progression, recognition and transferable skills, allowing learning in a local context to a global standard.

Matched to the new 2018 specifications
These new resources are written specifically to offer a complete match to the content, structure and modular approach of the new 2018 specifications. Offering support to a qualification that is fully comparable to the reformed UK GCE A levels, and recognised as equal to the GCE by universities worldwide.

Internationally appropriate content
Appropriate international content puts learning in a real-world context and includes a range of different contexts, photos, examples and currencies – making it engaging and relevant for all learners. Language is reviewed by a specialist to ensure materials are written in a clear and accessible style.

Lots of exam practice
Exam practice provides opportunities to assess understanding at key points, so students can make the best progress they can.

Signposted transferable skills
Transferable skills, needed for progression into higher education and employment, are embedded throughout the Student Books. They are explicitly signposted so students understand what skills they are developing and therefore go on to use these skills more effectively in the future.

Supporting learning beyond the classroom
Each Student Book provides access to an ActiveBook, which is a digital version of the Student Book, and can be accessed online, anytime, anywhere.

Better support for you
The online teacher resources provide a range of planning, teaching and assessment resources, saving you valuable time.

*Pearson highly recommends, but does not mandate, the use of our resources for teaching and learning the International Advanced Level (IAL).
What prior knowledge do I need?

- Classification
- The importance of biodiversity
- The impact of developments in biology on classification systems
- The evidence for the three-domain model of classification as an alternative to the five-kingdom model
- The reasons for classification
- The hierarchy of classification: domain, kingdom, phylum, class, order, family, genus and species
- The common definition of a species as a group of organisms with similar characteristics that normally interbreed to produce fertile offspring
- How reproductive isolation can cause the formation of new species
- The concept of a gene pool and how the proportion of alleles can change within a population
- The reasons for classifying different organisms
- Why there are problems in assigning organisms to species
- The need to conserve endangered species
- Other ways in which a species can be defined
- The reasons for classification

What will I study later?

- Topic 3B
  - Biodiversity
  - How to measure biodiversity
  - How species are well adapted to their habitat
  - That variation within a species is important
  - How a species can be defined in terms of natural selection
  - How reproductive isolation can cause the formation of new species
  - The concept of a gene pool and how the proportion of alleles can change within a population
  - The need to conserve endangered species
  - The need to be able to classify organisms for practical investigations of populations in the field

- Topic 4C
  - That there is extensive genetic variation within a species
  - Gene mutations and genetic variation caused by meiosis and sexual reproduction
  - The evidence for the three-domain model of classification as an alternative to the five-kingdom model
  - The importance of biodiversity
  - The impact of developments in biology on classification systems

MATHS SKILLS FOR THIS CHAPTER

- Recognise and use expressions in decimal and standard form (e.g. regarding the proportion of base pairs shared in genes from different species)
- Use scales for measuring (e.g. size and parts of different organisms for comparisons when classifying)
- Use ratios, fractions and percentages (e.g. regarding the proportion of base pairs shared in genes from different species)
A suitable definition of relative atomic mass is: It is often useful to remember this expression: shows values for some common elements taken from masses. Molecular masses are used for molecules of both elements and relative atomic masses are used for atoms of elements. Relative atomic masses are used for atoms of elements.

After the discovery of isotopes, the 12C isotope of carbon was fixed as the smallest mass; hence the so-called relative atomic mass of an atom to several decimal places. The Periodic Table in the Data Booklet uses 1 decimal place for lighter elements and whole numbers for heavier ones. Data Booklet uses 1 decimal place for lighter elements and whole numbers were used, but eventually it was possible to find the mass numbers for heavier ones.

The chemists soon realised that the element whose atoms had the smallest mass was hydrogen, so the relative atomic mass of hydrogen was 1. At first, mostly whole numbers were used, but eventually it was possible to find the mass number of an atom to several decimal places. The Periodic Table in the Data Booklet uses 1 decimal place for lighter elements and whole numbers for heavier ones.

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In the Student Book, the Core Practical specification and Lab Book references are supplied in the relevant sections.

Practical skills boxes explain techniques used in the Core Practicals, and also detail useful skills and knowledge gained in other related investigations.

This Student Book is accompanied by a Lab Book, which includes instructions and writing frames for the Core Practicals, as well as practical skills practice questions and answers.

Exam-style questions at the end of each chapter are tailored to the specification to allow for practice and development of exam writing technique. They also allow for practice responding to the command words used in the exams.

At the end of most chapters there is an opportunity to read and work with real-life research and writing about science.

The activities help you to read real-life material that's relevant to your course, analyse how scientists write, think critically and consider how different aspects of your learning piece together.

Transferable skills are practised both here and in the checkpoint questions.

Sample pages from Edexcel International AS/A Level Physics Student Book 1

Learn more at www.pearsonglobalschools.com
About Pearson Edexcel
At the core of everything we do at Pearson is the desire to make a measurable impact on improving people’s lives through learning. From primary school to secondary school, through to professional certification; our qualifications help educate millions of people worldwide.

Foundations for success
Pearson Edexcel International Advanced Level (IAL) is part of the iProgress family for ages 5 to 19, which also includes iPrimary, iLowerSecondary and International GCSE (IG). We offer more than just a qualification, with professional development training that keeps teachers up-to-date with the latest educational practices, supporting materials that make planning and teaching lessons easier, and student textbooks and online resources, you’ll have more time to focus on the individual development of your students’ progress.

Progress to University
Developed by education specialists specifically for international learners, Pearson Edexcel IAL qualifications are recognised by leading universities across the world - including Oxford, Cambridge, Columbia University and Yale University. IAL qualifications provide learners with access to the world’s top universities and prestigious employment opportunities.

Find out more
To find out more about our Pearson Edexcel International Advanced Level (IAL) Science qualifications, visit our website qualifications.pearson.com/ial