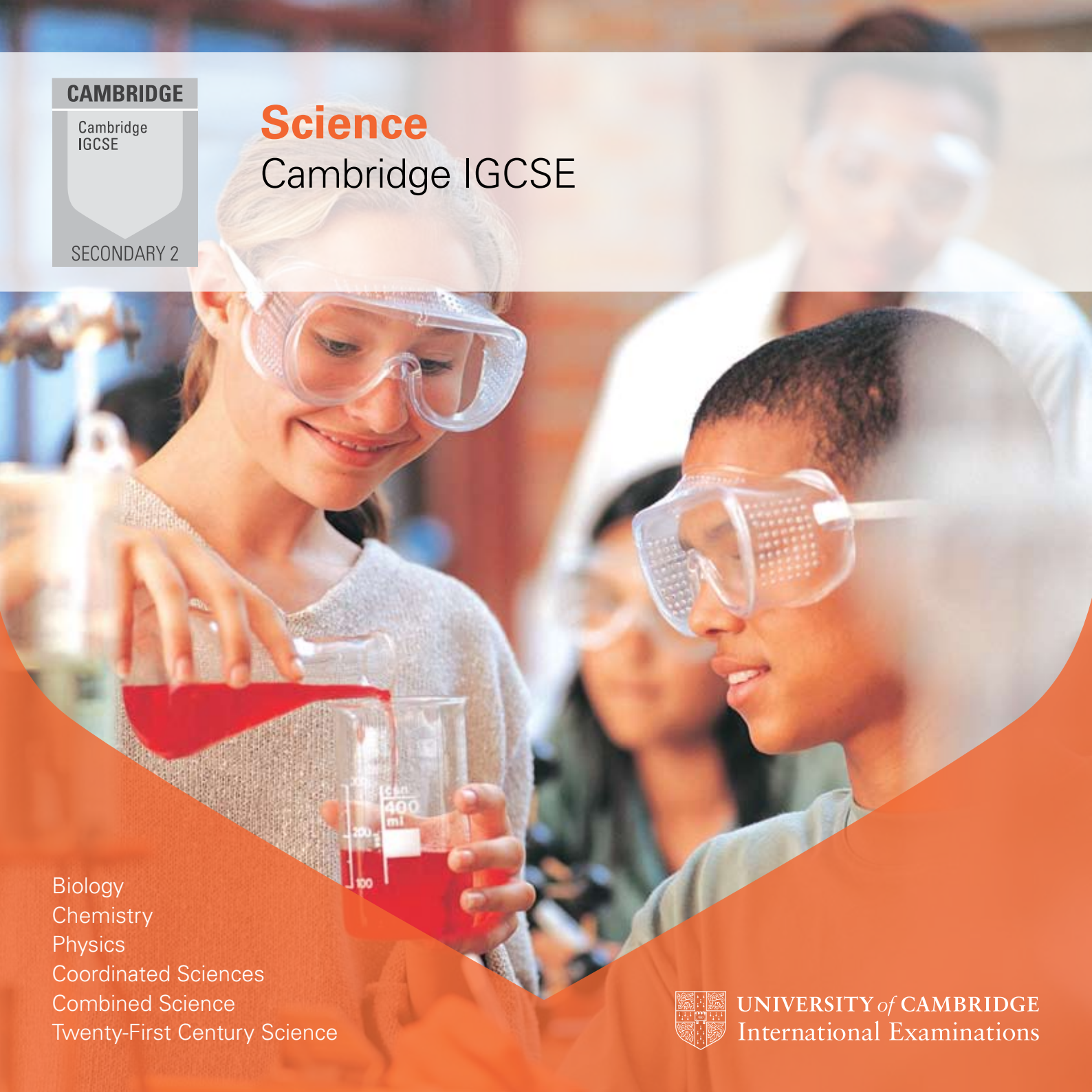
CAMBRIDGE

Cambridge IGCSE

SECONDARY 2

Science

Cambridge IGCSE

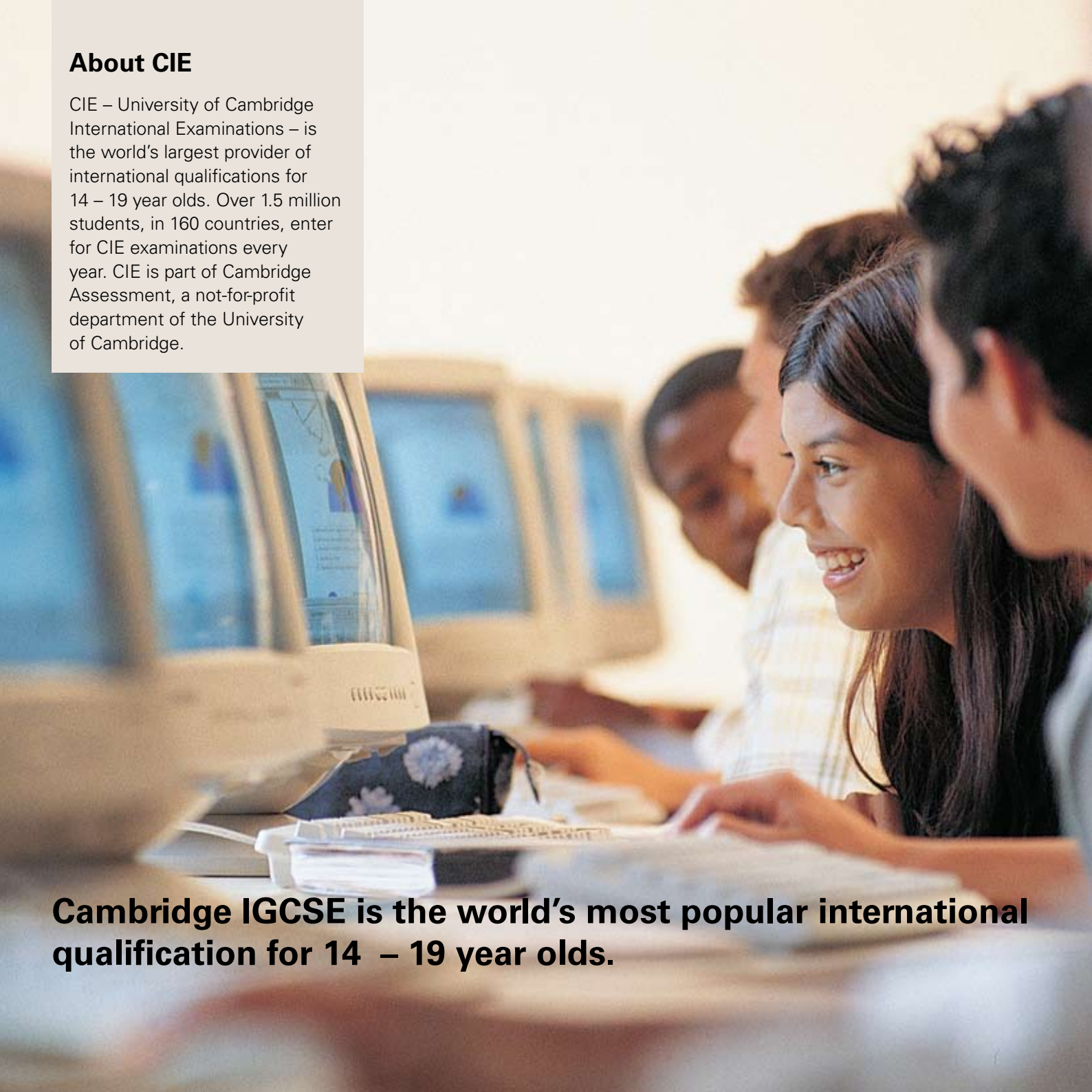


Biology
Chemistry
Physics
Coordinated Sciences
Combined Science
Twenty-First Century Science

UNIVERSITY of CAMBRIDGE
International Examinations

About CIE

CIE – University of Cambridge International Examinations – is the world's largest provider of international qualifications for 14 – 19 year olds. Over 1.5 million students, in 160 countries, enter for CIE examinations every year. CIE is part of Cambridge Assessment, a not-for-profit department of the University of Cambridge.



Cambridge IGCSE is the world's most popular international qualification for 14 – 19 year olds.

Cambridge IGCSE

Cambridge IGCSE (International General Certificate of Secondary Education) is the world's most popular international qualification for 14 – 16 year olds. Created by CIE in 1985, and based on best practice in the UK, Cambridge IGCSE is available in over 70 subjects. It equips students not only with knowledge of specific subjects, but also with problem solving and critical thinking skills, and an ability to work independently and as part of a team.

Recognition

Cambridge IGCSE is internationally recognised by universities in the UK and overseas as equivalent grade-for-grade to UK GCSE – learn more at **www.cie.org.uk/recognition**. Cambridge IGCSE is an excellent preparation for both A/AS Level and the International Baccalaureate Diploma.

The standard is benchmarked to UK GCSE. CIE runs regular comparability checks through the Cambridge Assessment Research Division and shares examiners with its sister organisation OCR to make sure standards are the same.

International reach

Cambridge IGCSE is taken in 127 countries and suits both national and international teaching contexts. The syllabuses use international examples and avoid terminology only used in the UK. Non-native speakers of English are treated fairly.

Cambridge IGCSE in the UK

Cambridge IGCSE Biology, Chemistry and Physics are accredited and funded for schools in the state sector. Combined Science and Coordinated Science have also been submitted for accreditation and funding.

Cambridge IGCSE Science syllabuses help students gain knowledge and understanding of the subject, learn how to handle information and solve problems, and learn experimental skills and techniques of investigation.

The Cambridge IGCSE Science suite

Science plays an essential role in all our lives. It's vital that students undertake their scientific education in a compelling, relevant and exciting environment, and at a level appropriate to their abilities and their future ambitions.

Cambridge IGCSE Science syllabuses help students gain knowledge and understanding of the subject, learn how to handle information and solve problems, and learn experimental skills and techniques of investigation. Together, these will help students both develop a deep understanding of the subject, and prepare them to become confident citizens of an increasingly technical world.

The Cambridge IGCSE Science suite provides options for different pathways:

- keen scientists can develop their skills fully and gain an excellent preparation for more advanced study, such as A/AS Level or the IB Diploma.
- students for whom sciences are not core subjects can gain a solid grounding in the essential concepts.

Qualifications

Cambridge IGCSE Biology

Cambridge IGCSE Chemistry

Cambridge IGCSE Physics

Cambridge IGCSE Coordinated Sciences (a double-award IGCSE, cross-referencing biology, chemistry and physics)

Cambridge IGCSE Combined Science (a single-award IGCSE, covering biology, chemistry and physics separately)

Cambridge IGCSE Twenty-First Century Science

Two exam sessions every year

CIE runs two sessions for Cambridge IGCSE – May/June and October/November. Cambridge IGCSE is linear, not modular, so results in one session do not carry over to the next.

With or without coursework or practical?

Many teachers consider practical work a fundamental element of scientific study. All Cambridge IGCSE Science students complete a practical assessment and all our IGCSE Science syllabuses offer different options, so schools can choose the one that suits their students' needs best – either a practical test, an 'Alternative to Practical' written paper (both externally assessed by CIE) or practical coursework (internally assessed by the school).

A tiered approach

Students follow a Core curriculum. Teachers can also stretch their students with an Extended curriculum. Students can change level during the course according to their progress.

Core curriculum students are eligible for grades C to G. Extended curriculum students are eligible for grades A* to E.

Cambridge IGCSE Biology

Cambridge IGCSE Biology offers a combination of theoretical and practical studies leading to an understanding of the concerns and basic principles of biology, with emphasis on human biology.

Students will develop scientific abilities and skills relevant to the study of biology. These will be of use in everyday life and can form the basis for more advanced study.

Syllabus

Relationships of Organisms

- Energy flow
- Food chains and food webs
- Nutrient cycles
- Population size
- Human influences on the ecosystem

Living Organisms

- Characteristics of Living Organisms
- Classification and diversity
- Simple keys

Development of the Organism and Continuity of Life

- Reproduction
- Growth and Development
- Inheritance

Organisation and Maintenance of Organisms

- Cell structure and organisation
- Levels of organisation
- Size of specimens
- Movement in and out of cells
- Enzymes
- Nutrition
- Transportation
- Respiration
- Excretion in humans
- Coordination and response

Assessment

Assessment	Duration	Weighting
Paper 1	45 mins	30%
One of the following:		50%
Paper 2 (Core theory paper)	1 hr 15 mins	
Paper 3 (Extended theory paper)	1 hr 15 mins	
One of the following:		20%
Paper 4 Coursework	–	
Paper 5 Practical	1 hr	
Paper 6 Alternative to Practical – written paper	1 hr	

Cambridge IGCSE Chemistry

Cambridge IGCSE Chemistry offers a combination of theoretical and practical studies and gives students an understanding of the basic principles of chemistry.

Students will develop scientific abilities and skills relevant to the study of chemistry. These will be of use in everyday life and can form the basis for more advanced study.

Syllabus

- The particulate nature of matter
- Atoms, elements and compounds
- Electricity and chemistry
- Acids, bases and salts
- Metals
- Sulphur
- Organic chemistry
- Experimental techniques
- Stoichiometry
- Chemical changes and reactions
- The Periodic Table
- Air and water
- Carbonates

Assessment

Assessment	Duration	Weighting
Paper 1	45 mins	30%
One of the following:		50%
Paper 2 (Core theory paper)	1 hr 15 mins	
Paper 3 (Extended theory paper)	1 hr 15 mins	
One of the following:		20%
Paper 4 Coursework	–	
Paper 5 Practical	1 hr 15 mins	
Paper 6 Alternative to Practical – written paper	1 hr	

Cambridge IGCSE Physics

Cambridge IGCSE Physics offers a combination of theoretical and practical studies and gives students an understanding of the basic principles of physics.

Students will develop scientific abilities and skills relevant to the study of physics. These will be of use in everyday life and can form the basis for more advanced study.

Syllabus

General Physics

- Length and time
- Speed, velocity, acceleration
- Mass and weight
- Density
- Forces
- Energy, work and power
- Pressure

Electricity and Magnetism

- Phenomena of magnetism
- Electrical quantities
- Electric circuits
- Dangers of electricity
- Electromagnetic effects
- Cathode ray oscilloscopes

Thermal Physics

- Simple kinetic model of matter
- Thermal properties
- Transfer of thermal energy

Waves – Light and Sound

- General wave properties
- Light
- Sound

Atomic Physics

- Radioactivity
- The nuclear atom

Assessment

Assessment	Duration	Weighting
Paper 1	45 mins	30%
One of the following:		50%
Paper 2 (Core theory paper)	1 hr 15 mins	
Paper 3 (Extended theory paper)	1 hr 15 mins	
One of the following:		20%
Paper 4 Coursework	–	
Paper 5 Practical	1 hr 15 mins	
Paper 6 Alternative to Practical – written paper	1 hr	

Cambridge IGCSE Coordinated Sciences

Double award

Cambridge IGCSE Coordinated Sciences is a double award – students will be awarded two identical grades, e.g. AA or CC. Curriculum content is set out in clearly defined Biology, Chemistry and Physics sections, but are extensively cross-referenced to present subject content as a coherent scientific whole. Teachers can not only reduce duplication of common themes, but also encourage students to see ideas common to all sciences, such as energy. Teaching in one subject reinforces another and stimulates interest in a third. Students will develop scientific abilities and skills relevant to the study of science. These will be of use in everyday life and will form a basis for more advanced study, including A Levels and the IB Diploma.

Syllabus

Biology
Biological classification
Cellular organisation
Support and movement
Photosynthesis
Gaseous exchange in animals
Transport systems
Respiration
Diet and health
Digestion
Responding to the environment
Homeostasis
Reproduction and human reproduction
Inheritance
Evolution
Organisms in their environment
Cycles and effects

Chemistry
Elements of chemistry
Petrochemicals
Chemicals from plants
Materials and structures
Oxidation and reduction
Ions and electrolysis
Solvents and solutions
Acids and alkalis
Soil, rocks and rates
Fertilisers
Dyes and drugs
Colloids
Fuels
Batteries
Metals and alloys
Atoms, bonding, the Periodic Table

Physics
Strength of solids
Particles in motion
Motion
Force and motion
Energy transfer
Transferring energy by heating
Using electricity
Energy and electricity
Light and sound
Making waves
Making use of waves
Kinetic energy and momentum
Gravity
Magnetism and electricity
Communications
Electrons
Radioactivity
Energy resources and distribution
Electronics

Assessment

Assessment	Duration	Weighting
Paper 1	45 mins	30%
One of the following:		50%
Paper 2 (Core curriculum)	2 hrs	
Paper 3 (Extended curriculum)	2 hrs	
One of the following:		20%
Paper 4 Coursework	–	
Paper 5 Practical	2 hrs	
Paper 6 Alternative to Practical – written paper	1 hr	

Cambridge IGCSE Combined Science

Cambridge IGCSE Combined Science offers students a combination of theoretical and practical studies leading to an understanding and knowledge of the concepts, principles and applications of biology, chemistry and physics.

Students will develop scientific abilities and skills relevant to the study of science which will be of use in everyday life. Students will gain an awareness of the study and practice of science and will understand that scientific applications have both beneficial and detrimental effects on the individual and the environment.

Syllabus

	Biology	Chemistry	Physics
Topic 1	Cells	Atomic structure and bonding	Measurement and motion
Topic 2	Energy in living organisms	Periodic Table, formulae, equations	Energy
	Transport and coordination	Metals and non-metals	Electricity
Topic 4	Reproduction and genetics	Acids, bases and salts	Heat
Topic 5	Organisms in their environment	Chemical reactions	Waves
Topic 6	–	Fuels and polymers	Radioactivity

Assessment

Assessment	Duration	Weighting
Paper 1	45 mins	30%
One of the following: Paper 2 (Core curriculum) Paper 3 (Extended curriculum)	 1 hr 15 mins 1 hr 15 mins	50%
One of the following: Paper 4 Coursework Paper 5 Practical Paper 6 Alternative to Practical – written paper, externally assessed	 – 1 hr 30 mins 1 hr	20%

Cambridge IGCSE Twenty-First Century Science

This is a new course from CIE. Cambridge IGCSE Twenty-First Century Science emphasises scientific literacy – the knowledge and understanding which candidates need to engage, as informed citizens, with science-based issues. This qualification uses contemporary, relevant contexts of interest to candidates, which can be approached through a range of teaching and learning activities.

This syllabus is supported by the Nuffield Curriculum Centre and The University of York Science Education Group. It aims to enhance candidates' 'scientific literacy', leading to better engagement with science. It is based on a highly successful UK syllabus, but with changes to the learning outcomes to make it 'international' and a different scheme of assessment.

The course is designed to enable candidates to:

- recognise the impact of science and technology on everyday life;
- make informed personal decisions about issues and questions that involve science;
- understand and reflect on the information included in (or omitted from) media reports and other sources of information.

CIE is only offering a single IGCSE Twenty-First Century Science syllabus from 2010, but is planning to introduce an Additional Science syllabus in the near future. Candidates will then be able to obtain two IGCSE passes in Science and Additional Science. Candidates with suitable grades will then be equipped to study science at AS/A level or equivalent.

Syllabus

Biology	Chemistry	Physics
Module B1: You and Your Genes	Module C1: Air Quality	Module P1: The Earth in the Universe
Module B2: Keeping Healthy	Module C2: Material Choices	Module P2: Radiation and Life
Module B3: Life on Earth	Module C3: Food Matters	Module P3: Radioactive Materials

Assessment

Core (Target grade C to G)			Extended (Target grade A* to D)		
Paper 1	Multiple Choice	1 hour	Paper 2	Multiple Choice	1 hour
Paper 3	Core written	1½hours	Paper 4	Extended written	1½hours
Paper 5	Scientific comprehension and practical procedures				1½hours
Paper 6	Coursework: a report of an investigation of a local issue				-

What curriculum pathways are possible with Cambridge IGCSE Science?

CIE Science syllabuses offer many options for creative curriculum planning. For example, you can offer pathways both for keen scientists who want to study science at more advanced level, and for students who need science as part of their general education but are likely to specialise in non-science subjects. To assist you, the table below shows some of the main pathways you could follow – many other pathways exist that are not listed here.

Pathway	Age 11–14	Age 14–15	Age 15–16	Post 16
Cambridge International Curriculum				
A	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE in the separate sciences: Biology, Chemistry, Physics		International A/AS Level in Biology, Chemistry, Physics
B	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE Coordinated Sciences (double award)		International A/AS Level in Biology, Chemistry, Physics
C	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE Combined Science		No further science study
D	Cambridge Lower Secondary Programme or Cambridge Checkpoint	One IGCSE in either Biology, Chemistry or Physics		International A/AS Level in that subject, or no further science study
E	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE Coordinated Sciences (double award)		Cambridge Pre-U in Biology, Chemistry, Physics
F	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE in the separate sciences: Biology, Chemistry, Physics		Cambridge Pre-U in Biology, Chemistry, Physics
G	Cambridge Lower Secondary Programme or Cambridge Checkpoint	IGCSE in the separate sciences: Biology, Chemistry, Physics in parallel	AS Level in Biology, Chemistry, Physics	International A/AS Level in Biology, Chemistry, Physics
Other international and national programmes				
H	UK KS3	IGCSE in the separate sciences: Biology, Chemistry, Physics in parallel		A/AS Level in Biology, Chemistry, Physics
I	IB Middle Years Programme	IB Middle Years Programme, culminating in IGCSEs in science subjects		IB Diploma
J	India: local curriculum	IGCSE in the separate sciences: Biology, Chemistry, Physics		Local curriculum + 2 qualifications in science
K	USA: local curriculum	IGCSE in the separate sciences: Biology, Chemistry, Physics		US Advanced Placement tests
L	New Zealand: local curriculum	IGCSE in the separate sciences: Biology, Chemistry, Physics and IGCSE Coordinated Science		International A/AS Level in Biology, Chemistry, Physics

Standards

Standards are of great interest and keenly debated among teachers, parents, government bodies and many other interested parties. Cambridge IGCSE is benchmarked to UK GCSE and recognised by universities in the UK and worldwide as equivalent grade-for-grade to UK GCSE.

You may find it useful to refer to question papers, mark schemes, examiner reports and exemplar student answers at particular grades – all available on the Cambridge Teacher Support website.

Support for Teachers and Centres

CIE offers access to world-class support services, designed to help teachers deliver engaging, effective courses. CIE also helps teachers develop as professionals.

Teacher Resources

- **Textbooks and resources**
  A wide range of textbooks is available for Cambridge IGCSE Science – a full resource list is in the syllabus at **www.cie.org.uk**. It includes materials relevant to both classroom teaching and professional development.
- **Teacher Support website**
  Registered CIE Centres can access all the materials they need to teach CIE syllabuses, including past question papers, mark schemes, examiners' reports, schemes of work (lesson plans) and online progress tests.
- **www.learncie.org.uk**
  Access to thousands of pages of up-to-date resources, written by teachers and ready for classroom use. The learnCIE Teacher Test Centre enables teachers to create tests for students to take online, or as homework.
- **www.cambridgestudents.org.uk**
  Information and reference materials for students following Cambridge international courses, designed to complement classroom teaching.

Training

CIE offers regular face-to-face training on Cambridge IGCSE Science, giving teachers the knowledge and skills they need to help students perform well in examinations. Online training is also available, increasing access for teachers who have limited time or who are a long way from training events.

Expert advice

You can send us queries about any element of Cambridge IGCSEs in Science. Our subject experts will advise you further.

Easy to administer

CIE offers simple, fast, efficient and friendly administration. Centres receive comprehensive assistance from CIE's Customer Support team and local representatives. Administration and results can be handled online. CIE aims to respond in full to all queries within two working days.

Learn more!

Learn more about Cambridge IGCSE Sciences, or about becoming a CIE Centre.

Visit our website at **www.cie.org.uk**
Contact us at **international@cie.org.uk**, or telephone **+44 1223 553554**.

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