Pearson Edexcel

iLowerSecondary SCIENCE Specification

Pearson Edexcel International Award in Lower Secondary Science (LSC11)
For first teaching September 2018
First examination June 2019

Issue 2

About Pearson

We are the world's leading learning company operating in countries all around the world. We provide content, assessment and digital services to learners, educational institutions, employers, governments and other partners globally. We are committed to helping equip learners with the skills they need to enhance their employability prospects and to succeed in the changing world of work. We believe that wherever learning flourishes so do people.

References to third party materials made in this specification are made in good faith. Pearson does not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Materials may include textbooks, journals, magazines and other publications and websites.)

All information in this specification is correct at time of publication.

ISBN 978 1 446 95663 2

Summary of Pearson Edexcel International Award in Lower Secondary Science specification

Issue 2 changes

Summary of changes made between previous issue and this current issue 2	Page number
Added the second assessment session of October	3

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Contents

1 Introduction

Why choose the Pearson Edexcel International Award in Lower Secondary Science?

We have listened to feedback from all parts of the International School subject 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 to lower secondary science has been developed alongside lower secondary English and, in particular, lower secondary mathematics, to ensure a consistent approach across the whole Pearson Edexcel iLowerSecondary programme.

The content and assessment approach for lower secondary science has been designed to meet students' needs in the following ways:

- content is interesting and engaging but is also designed to ensure good preparation for further study at Pearson Edexcel International GCSE in Science
- opportunities are provided to 'localise' the content to make it more relevant for students
- achievement tests are clear and straightforward – our achievement tests are clear and accessible for students of all ability ranges and for all learning styles; our mark schemes are straightforward, so that the assessment requirements are clear
- students' skills are broadly developed – the skills developed will be assessed through questions in written examinations; applying understanding of scientific concepts and principles to a range of situations improves their analytical and logic skills.

Progression to International GCSE

The Pearson Edexcel iLowerSecondary programme provides the ideal preparation for progression to International GCSE qualifications.

Through our World Class Qualification development process, we have consulted with International GCSE teachers and examiners to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

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

Supporting you in planning and implementing this qualification

The Pearson Edexcel iLowerSecondary programme is more than just a curriculum and specification – it is a complete toolkit for teachers consisting of the following elements to improve student outcomes.

Planning

- Full, editable Schemes of Work are supplied for all three years of the iLowerSecondary curriculum.
- Transition documents highlight key differences between the legacy Primary and Lower Secondary School (PLSC) qualifications from 2011, they help you to make a smooth transition from teaching the legacy qualifications to teaching the new qualifications. Transition documents are also available for switching over from the Science National Curriculum (2014) and other internationally recognised curricula.

Teaching and learning

- Subject-specific teacher's guides at each level provide support for specialist- and non-specialist teachers, and cover teaching techniques, pedagogy and short-, medium- and long-term planning.
- Print and digital learning and teaching resources mapped to the iLowerSecondary curriculum promote 'any time, any place' learning to improve student motivation and encourage new ways of working.

Training and professional development

- Face-to-face teacher professional development is included as part of your iLowerSecondary subscription.
- Additional, ongoing online and interactive webinar support is also included as part of the programme.

Preparing for assessments

Exam support

We will give you resources to help you prepare your students for their assessments, for example examiner commentaries following each examination series.

ResultsPlus

ResultsPlus provides the most detailed analysis available of your students' exam performance. It can help you to identify the topics and skills where further learning would benefit your students.

Get help and support

Get support from both Pearson and the wider iLowerSecondary community via our dedicated online forum.

Qualification at a glance

Content and assessment overview

The Pearson Edexcel International Award in Lower Secondary Science consists of one externally-set achievement test.

Achievement test	***(LSC11/01)**
Externally assessed Written examination: 1 hour 20 minutes Availability: June and October First assessment: June 2019 80 marks	

Content overview

There are four core content areas: Biology, Chemistry, Physics and Scientific Enquiry. Overarching topics that cover these areas are given below.

Biology

- Structure and function of living organisms
- Humans and animals
- Plants
- Organisms and their environment.

Chemistry

- Matter
- Periodic Table
- Earth and atmosphere
- Chemical reactions.

Physics

- Energy
- Electricity
- Waves
- Forces.

Scientific Enquiry

- Scientific ideas
- Investigating
- Obtaining and presenting evidence
- Conclusions
- Evaluating.

Achievement test	***(LSC11/01)**

Assessment overview

- Section A consists of 60 marks, it covers the content from Biology, Chemistry and Physics.
- Section B consists of 20 marks, it covers the skills in Scientific Enquiry.
- Students must answer all questions.
- The test consists of multiple-choice and closed-response questions, some use of direct questions, and graphical and short-open response questions; there may be some basic calculations.
- Calculators may be used in the test. Please see *Appendix 4: Calculators*.

*The subject code is used by centres to enter students for a qualification. Centres will need to use the entry codes only when claiming students' qualifications.

2 Subject content and assessment information

Qualification aims and objectives

The sciences should be taught in ways that ensure that students have the knowledge to enable them to develop curiosity about the natural world, insight into working scientifically, and appreciation of the relevance of science to their everyday lives, so that they develop:

- scientific knowledge and conceptual understanding in the areas of biology, chemistry and physics
- understanding of the nature, processes and methods of science through scientific enquiry, which helps them to answer scientific questions on the world around them
- learning of how to apply observational, practical and enquiry-based skills to the world around them
- their ability to evaluate claims based on science through critical analysis of methods, evidence and conclusions, both qualitative and quantitative.

Scientific enquiry is set out separately but must always be taught through, and be clearly related to, the Pearson Edexcel International Award in Lower Secondary Science learning objectives.

Content

Overview

This Pearson Edexcel International Award in Lower Secondary Science requires students to demonstrate knowledge, understanding and application of the following learning objectives drawn from years 7, 8 and 9 of the Pearson Edexcel iLowerSecondary Curriculum in Science.

A full list of units that can be used in the assessment is given in *Appendix 3: Units*.

Content detail

Biology

Topic 1: Structure and function of living organisms – Life processes

Students should:		Guidance *iLowerSecondary Curriculum reference*
1.1	know the seven shared characteristics of living things	movement (even plants move, for example to track the Sun), respiration, sensitivity, growth, reproduction, excretion and nutrition *Year 7: Structure and function of living organisms – Life processes*
1.2	understand how the seven shared characteristics relate to a wide range of organisms in the local and the wider environment	*Year 7: Structure and function of living organisms – Life processes*
1.3	know the difference between breathing and respiration	*Year 8: Structure and function of living organisms – Life processes*
1.4	know that plant and animal cells respire to produce ATP to provide energy for cells	detailed knowledge of ATP is **NOT** required *Year 9: Structure and function of living organisms – Life processes*
1.5	know how to model aerobic and anaerobic respiration using word equations and a balanced symbol equation for aerobic respiration only	*Year 9: Structure and function of living organisms – Life processes*
1.6	know the structure of a virus and how it reproduces	*Year 9: Structure and function of living organisms – Life processes*
1.7	understand that viruses are obligate parasites causing harm to the cells of living things	*Year 9: Structure and function of living organisms – Life processes*
1.8	explain why viruses may not be classed as living organisms	*Year 9: Structure and function of living organisms – Life processes*

Topic 2: Structure and function of living organisms – Cells and organisation

Students should:		Guidance *iLowerSecondary Curriculum reference*
2.1	know the structure of a typical animal cell	membrane surrounds cell, cell contains cytoplasm, mitochondria and nucleus *Year 7: Structure and function of living organisms – Cells and organisation*
2.2	know the similarities and differences between plant and animal cells	know that plant cells have a cell wall, chloroplasts and a permanent vacuole in addition to the parts an animal cell has *Year 7: Structure and function of living organisms – Cells and organisation*
2.3	know how to identify the cell wall, cell membrane, cytoplasm, nucleus, permanent vacuole, mitochondria and chloroplasts in a range of familiar and less familiar animal and plant cells	*Year 7: Structure and function of living organisms – Cells and organisation*
2.4	know the functions of the cell wall, cell membrane, cytoplasm, nucleus, permanent vacuole, mitochondria and chloroplasts	*Year 7: Structure and function of living organisms – Cells and organisation*
2.5	know the hierarchical organisation of multicellular organisms from cells to tissues to organs to organ systems to organisms	*Year 7: Structure and function of living organisms – Cells and organisation*
2.6	know the major organs and organ systems of the human body and their functions	lungs, kidney, skin, brain, heart, liver, stomach (small and large intestine), nervous system, skeleton and muscles *Year 7: Structure and function of living organisms – Cells and organisation*
2.7	know the similarities and differences between generalised plant, animal and bacterial cells	similarities – plant, animal and bacterial cells all possess cell membranes and cytoplasm differences – bacteria cells possess no nucleus and no mitochondria and are much smaller *Year 8: Structure and function of living organisms – Cells and organisation*

Topic 3: Structure and function of living organisms – Pathogens

Students should:		Guidance *iLowerSecondary Curriculum reference*
3.1	know the difference between the terms *pathogen* and *parasite*	*Year 9: Structure and function of living organisms – Pathogens*
3.2	understand that, in addition to viruses, some bacteria, some fungi and some protoctists cause disease	for example, flu is caused by a virus; cholera and salmonella are caused by bacteria; athlete's foot is caused by a fungus; malaria is caused by a protoctist recall that viruses are smaller than bacteria viruses have no cell wall, no mitochondria and no nucleus, they cannot live independently, they reproduce inside the cells of other living organisms bacteria are single celled organisms that have a cell wall, cell membrane and cytoplasm but no nucleus fungi cells have cell walls, cell membranes, cytoplasm, mitochondria and a nucleus and vary in size from single cell fungi, for example yeast, to large multicellular organisms, for example mushrooms *Year 9: Structure and function of living organisms – Pathogens*
3.3	understand that antibiotics are effective against bacteria but not against viruses	*Year 9: Structure and function of living organisms – Pathogens*
3.4	know the problems associated with overuse of antibiotics in humans and farmed animals	*Year 9: Structure and function of living organisms – Pathogens*
3.5	understand how vaccination helps to prevent the spread of disease in communities	*Year 9: Structure and function of living organisms – Pathogens*

Topic 4: Structure and function of living organisms – Movement of molecules

Students should:		Guidance *iLowerSecondary Curriculum reference*
4.1	know the process of diffusion and relate this to the movement of substances in and out of cells	*Year 8: Structure and function of living organisms – Movement of molecules*
4.2	understand the concept of a diffusion gradient	*Year 8: Structure and function of living organisms – Movement of molecules*
4.3	explain how temperature and concentration affect rate of diffusion	for example, increasing the temperature, increases the kinetic energy of molecules, increasing the rate of diffusion (and vice versa) increasing the difference in concentration, increases the concentration gradient, increasing the rate of diffusion *Year 9: Structure and function of living organisms – Movement of molecules*
4.4	know how to calculate and compare surface area: volume ratios	*Year 9: Structure and function of living organisms – Movement of molecules*

Topic 5: Humans and animals – The digestive system

Students should:		Guidance *iLowerSecondary Curriculum reference*
5.1	know the main components of the digestive system and their functions	to include teeth, salivary glands, oesophagus, stomach, pancreas and small/large intestine *Year 8: Humans and animals – The digestive system*
5.2	know the components of a balanced diet	*Year 8: Humans and animals – The digestive system*
5.3	know the difference between starvation and malnutrition and the effects of nutritional deficiencies	illnesses caused by nutritional deficiencies to include anaemia (iron), blindness (vitamin A), scurvy (vitamin C), rickets (vitamin D) *Year 8: Humans and animals – The digestive system*
5.4	know how energy requirements vary with age and activity levels	*Year 8: Humans and animals – The digestive system*
5.5	know that different foods have different energy values	*Year 8: Humans and animals – The digestive system*

Topic 6: Humans and animals – The circulatory system

Students should:		Guidance *iLowerSecondary Curriculum reference*
6.1	know the difference between single and double circulatory systems	*Year 9: Humans and animals – The circulatory system*
6.2	know the main components of the circulatory system and their functions	to include heart, arteries, veins, capillaries *Year 9: Humans and animals – The circulatory system*
6.3	explain the differences in pressure and rate of flow in arteries, veins and capillaries	recognise cross-sectional diagrams of arteries, veins and capillaries *Year 9: Humans and animals – The circulatory system*
6.4	know the effect of exercise on the heart rate and explain why these changes are important	*Year 9: Humans and animals – The circulatory system*
6.5	understand how to measure average pulse rate by counting beats per minute	*Year 9: Humans and animals – The circulatory system*
6.6	know how to interpret line graphs, showing how pulse rate changes with exercise	*Year 9: Humans and animals – The circulatory system*
6.7	explain how lifestyle factors may contribute to cardiovascular disease	*Year 9: Humans and animals – The circulatory system*

Topic 7: Plants – Structure, photosynthesis and crop yield

Students should:		Guidance *iLowerSecondary Curriculum reference*
7.1	know the functions of roots, stems and leaves	know that roots anchor the plant and absorb water and minerals minerals to include nitrates for growth and magnesium ions for chlorophyll root hairs increase the surface area of the root stems support the plant and transport materials throughout the plant leaves are where photosynthesis occurs *Year 7: Plants – External structure of plants*
7.2	know the simple external features of plants living in different habitats	for example, compare leaf structure, leaf size, leaf texture and closeness of leaves in desert, arctic and temperate zone plants *Year 7: Plants – External structure of plants*
7.3	know how water and minerals are absorbed and transported in flowering plants	know that water and dissolved minerals are absorbed by the roots and transported up the stem through xylem vessels *Year 8: Plants – Transport of water and minerals*
7.4	explain how fertilisers can increase crop yield	plan/interpret simple investigations into the effect of fertiliser on plant growth understand how to interpret data from such investigations, presented as tables or graphs *Year 8: Plants – Fertilisers*
7.5	understand how the structure of the leaf is adapted for photosynthesis	know that leaves have a large surface area to capture sunlight, a waxy upper surface to prevent water loss and stomata to allow carbon dioxide into the leaf and oxygen out of the leaf use the terms *chlorophyll*, *chloroplasts* and *photosynthesis* correctly *Year 9: Plants – Photosynthesis and crop yield*
7.6	know how to model photosynthesis using a word equation and a balanced symbol equation	*Year 9: Plants – Photosynthesis and crop yield*

Students should:		Guidance *iLowerSecondary Curriculum reference*
7.7	explain how light intensity and carbon dioxide concentration affect the rate of photosynthesis	describe/interpret simple experimental procedures and results from investigating the effects of light, carbon dioxide and temperature on the rate of photosynthesis *Year 9: Plants – Photosynthesis and crop yield*
7.8	explain how crop yield may be affected by changes in abiotic factors	abiotic variables include rain, wind, temperature, soil, pollution, nutrients, pH, and sunlight *Year 9: Plants – Photosynthesis and crop yield*
7.9	know how selective breeding can lead to new plant varieties	understand the stages of selective breeding *Year 9: Plants – Photosynthesis and crop yield*

Topic 8: Organisms and their environment – Interactions with the environment

Students should:		Guidance *iLowerSecondary Curriculum reference*
8.1	know how living organisms are adapted to their habitat relating these principles to a range of organisms in the local and wider environment	given a picture or fact sheet, students should be able to identify how a plant or animal is adapted to an environment, for example polar bear/tiger *Year 7: Organisms and their environment – Interactions with the environment*
8.2	know the difference between abiotic and biotic factors, using examples of each	for example, an abiotic factor may be the temperature or the light intensity; a biotic factor may be competition with other animals, predation or disease *Year 7: Organisms and their environment – Interactions with the environment*
8.3	understand the effect of changing environmental conditions on the number and distribution of organisms in a variety of habitats	*Year 7: Organisms and their environment – Interactions with the environment*

Topic 9: Organisms and their environment – Interactions between living organisms

Students should:		Guidance *iLowerSecondary Curriculum reference*
9.1	understand the terms *producer, primary consumer, secondary consumer, tertiary consumer* and *decomposer*	*Year 7: Organisms and their environment – Interactions between living organisms*
9.2	know the interdependence of organisms in the environment, in terms of feeding relationships by drawing and interpreting food chains and food webs	use the terms *predator, prey, herbivore, carnivore* and *omnivore* correctly be able to link photosynthesis to the producers in a food chain and also to global food supplies *Year 7: Organisms and their environment – Interactions between living organisms*
9.3	know how to draw and interpret pyramids of number	*Year 8: Organisms and their environment – Interactions between living organisms*
9.4	know how to interpret food chains and food webs in terms of energy flow	*Year 8: Organisms and their environment – Interactions between living organisms*
9.5	explain ways in which energy is lost between trophic levels	*Year 8: Organisms and their environment – Interactions between living organisms*
9.6	know how to draw and interpret pyramids of biomass	*Year 9: Organisms and their environment – Interactions between living organisms*
9.7	understand the terms *species, population, community, habitat* and *ecosystem*	*Year 9: Organisms and their environment – Interactions between living organisms*
9.8	know the difference between inter- and intra-specific competition	*Year 9: Organisms and their environment – Interactions between living organisms*
9.9	know how to interpret data on population numbers	*Year 9: Organisms and their environment – Interactions between living organisms*
9.10	explain why population numbers fluctuate, including predator-prey relationships	*Year 9: Organisms and their environment – Interactions between living organisms*
9.11	know about predator-prey interactions in order to interpret data	*Year 9: Organisms and their environment – Interactions between living organisms*

Topic 10: Organisms and their environment – Further interactions with the environment

Students should:		Guidance *iLowerSecondary Curriculum reference*
10.1	know the role of decomposers in recycling carbon in an ecosystem	*Year 9: Organisms and their environment – Interactions with the environment*
10.2	know examples of the production of carbon dioxide by human activity	*Year 9: Organisms and their environment – Interactions with the environment*
10.3	understand the impact of carbon dioxide production on the climate	understand how an increase in greenhouse gases results in an enhanced greenhouse effect and that this may lead to global warming and its consequences *Year 9: Organisms and their environment – Interactions with the environment*

Chemistry

Topic 11: Matter – Particle model

Students should:		Guidance *iLowerSecondary Curriculum reference*
11.1	explain the properties of solids, liquids and gases in terms of particles	including gas pressure *Year 7: Matter – Particle model*
11.2	understand changes of state in terms of arrangement, movement and energy of particles	use of terms *melting*, *freezing*, *evaporation* and *condensation* *Year 7: Matter – Particle model*

Topic 12: Matter – Pure substances and mixtures

Students should:		Guidance *iLowerSecondary Curriculum reference*
12.1	know the difference between a pure substance and a mixture	for example, water is pure if it contains only water molecules, sugar water is a mixture *Year 7: Matter – Pure substances and mixtures*
12.2	know what is meant by the terms *solvent*, *solute*, *solution*, *saturated solution* and *suspension*	use making solutions for a simple introduction to principle of Conservation of Mass, to be built on later *Year 7: Matter – Pure substances and mixtures*

Topic 13: Matter – Separating mixtures

Students should:		Guidance *iLowerSecondary Curriculum reference*
13.1	know methods of separation: • filtration • evaporation • simple distillation • paper chromatography.	including the use of: • a filter paper and funnel to separate an insoluble solid from a liquid • an evaporating basin and Bunsen burner to separate a soluble solid from a solution • a simple distillation apparatus and condenser to separate a solvent from a solution • chromatography paper to separate coloured dyes in inks and food colourings. *Year 7: Matter – Separating mixtures*

Topic 14: Matter – Elements, atoms and compounds

Students should:		Guidance *iLowerSecondary Curriculum reference*
14.1	understand the meaning of the terms *element*, *atom*, *compound* and *molecule*	*Year 7: Matter – Elements, atoms and compounds*
14.2	know Dalton's atomic model	all matter is made of atoms atoms cannot be broken down into anything simpler atoms of the same element are identical and different to atoms of other elements compounds are formed when two or more different atoms join together a chemical reaction involves a rearrangement of atoms *Year 8: Matter – Elements, atoms and compounds*

Students should:		Guidance *iLowerSecondary Curriculum reference*
14.3	know common chemical symbols and common chemical formulae	limited to the elements: • hydrogen, H • oxygen, O • nitrogen, N • carbon, C • magnesium, Mg • copper, Cu • zinc, Zn • aluminium, Al • iron, Fe • chlorine, Cl • helium, He. the molecules: • hydrogen, H_2 • oxygen, O_2. the compounds: • carbon dioxide, CO_2 • calcium carbonate, $CaCO_3$ • copper carbonate, $CuCO_3$ • calcium chloride, $CaCl_2$ • copper chloride, $CuCl_2$ • magnesium chloride, $MgCl_2$ • sodium chloride, NaCl • zinc chloride, $ZnCl_2$ • copper oxide, CuO • magnesium oxide, MgO • zinc oxide, ZnO • water, H_2O • hydrochloric acid, HCl • sodium hydroxide, NaOH. describe reactions in terms of rearrangement of atoms to form new substance(s)/compound(s) and introduce word equations *Year 8: Matter – Elements, atoms and compounds*
14.4	understand that chemical formulae show the ratio of elements in a compound and be able to use these formulae	*Year 8: Matter – Elements, atoms and compounds*

Topic 15: Matter – Model of an atom

Students should:		Guidance *iLowerSecondary Curriculum reference*
15.1	know the structure of an atom in terms of the positions of sub-atomic particles	*Year 9: Matter – Model of an atom*
15.2	know the relative charges of protons, neutrons and electrons	*Year 9: Matter – Model of an atom*
15.3	understand and use the terms *atomic (proton) number* and *mass number*	be familiar with representing an atom of an element in the form: a **X** b a = mass number **X** = symbol of element b = atomic (proton) number *Year 9: Matter – Model of an atom*

Topic 16: Periodic Table – Periodic Table introduction

Students should:		Guidance *iLowerSecondary Curriculum reference*
16.1	know the names and chemical symbols of some common elements	see 14.3 guidance for a list of elements *Year 7: Periodic Table – Periodic Table introduction*
16.2	understand how to identify an element as a metal or a non-metal from its position in the Periodic Table	*Year 7: Periodic Table – Periodic Table introduction*
16.3	know how the physical properties of metals are related to their uses	limited to electrical conductivity and malleability *Year 7: Periodic Table – Periodic Table introduction*
16.4	know a vertical column of elements as a *group*	*Year 7: Periodic Table – Periodic Table introduction*
16.5	know a horizontal row of elements as a *period*	*Year 7: Periodic Table – Periodic Table introduction*

Topic 17: Periodic Table – Arrangement of elements and Group 1 elements

Students should:		Guidance *iLowerSecondary Curriculum reference*
17.1	know that elements are arranged in order of atomic number	*Year 9: Periodic Table – Arrangement of elements*
17.2	know that elements are arranged in groups and periods	*Year 9: Periodic Table – Arrangement of elements*
17.3	know the reactions of Group 1 metals with water	limited to lithium, sodium and potassium *Year 9: Periodic Table – Group 1*
17.4	know how trends in reactions can be predicted using the Periodic Table	Group 1 only *Year 9: Periodic Table – Group 1*

Topic 18: Earth and atmosphere – Composition of air

Students should:		Guidance *iLowerSecondary Curriculum reference*
18.1	know the approximate composition of gases found in dry air	*Year 7: Earth and atmosphere – Composition of air*
18.2	know about the experiments to find the approximate percentage of oxygen in air using iron and copper	floating candle experiment can be used to give approximate value *Year 8: Earth and atmosphere – Oxygen in air*

Topic 19: Earth and atmosphere – Materials made from substances in the Earth

Students should:		Guidance *iLowerSecondary Curriculum reference*
19.1	know the names of some common polymers and ceramic materials and their properties	for example, the polymers: • poly(ethene) • poly(chloroethene) (PVC) • rubber. the ceramics: • porcelain • pottery • glass. *Year 9: Earth and atmosphere – Materials made from substances in the Earth*
19.2	know how uses of some common polymers and ceramic materials are related to their properties	students are **NOT** expected to remember the properties of specific materials *Year 9: Earth and atmosphere – Materials made from substances in the Earth*
19.3	understand that composite materials are made by combining two or more materials and that they have some of the properties of each	*Year 9: Earth and atmosphere – Materials made from substances in the Earth*
19.4	know the names of some composite materials and relate their properties to their uses	for example, reinforced concrete, MDF and GRP *Year 9: Earth and atmosphere – Materials made from substances in the Earth*
19.5	understand that making and using some materials can cause environmental problems and appreciate ways of reducing them, including recycling	for example, plastics *Year 9: Earth and atmosphere – Materials made from substances in the Earth*
19.6	understand the term *biodegradable*	*Year 9: Earth and atmosphere – Materials made from substances in the Earth*

Topic 20: Chemical reactions – Chemical reactions introduction

Students should:		Guidance *iLowerSecondary Curriculum reference*
20.1	understand the difference between physical changes and chemical changes	*Year 7: Chemical reactions – Chemical reactions introduction*
20.2	know combustion is a type of reaction	for example, burning magnesium or methane *Year 7: Chemical reactions – Chemical reactions introduction*
20.3	understand what is meant by a thermal decomposition reaction	including the thermal decomposition of copper carbonate to form copper oxide and carbon dioxide; know how to write a word equation for this reaction and to test for carbon dioxide using limewater *Year 7: Chemical reactions – Chemical reactions introduction*

Topic 21: Chemical reactions – More on combustion

Students should:		Guidance *iLowerSecondary Curriculum reference*
21.1	know about an experiment to show the products of combustion of a hydrocarbon	for example, burning a candle *Year 8: Chemical reactions – More on combustion*
21.2	know about a test for the presence of water using anhydrous copper(II) sulfate	*Year 8: Chemical reactions – More on combustion*
21.3	know about a test for the presence of carbon dioxide using limewater	*Year 8: Chemical reactions – More on combustion*
21.4	know how air pollution may be caused by the combustion of sulfur and the complete/incomplete combustion of carbon in fossil fuels	for example, formation of soot, carbon monoxide, carbon dioxide and sulfur dioxide *Year 8: Chemical reactions – More on combustion*
21.5	know the environmental problems caused by air pollution and ways of reducing them	carbon dioxide is a greenhouse gas and increasing amounts in the atmosphere may contribute to climate change sulfur dioxide is an acidic gas that dissolves in moisture in the air to form acid rain that can harm vegetation, aquatic life and buildings *Year 8: Chemical reactions – More on combustion*

Topic 22: Chemical reactions – Energy changes in reactions

Students should:		Guidance *iLowerSecondary Curriculum reference*
22.1	know about exothermic and endothermic chemical reactions (qualitative)	*Year 9: Chemical reactions – Energy changes in reactions*

Topic 23: Chemical reactions – Formulae and equations

Students should:		Guidance *iLowerSecondary Curriculum reference*
23.1	understand how to represent simple chemical reactions using formulae and equations, including state symbols	reactions should include: • elements reacting with oxygen, for example magnesium, copper and carbon • metals reacting with dilute hydrochloric acid, for example magnesium and zinc • the thermal decomposition of metal carbonates, for example copper carbonate. understand the terms *reactants* and *products* (This builds on *Year 7: Chemical reactions – Chemical reactions introduction)* *Year 9: Chemical reactions – Formulae and equations*
23.2	understand the conservation of mass in chemical reactions	understand why some reactions appear to lose or gain mass, for example when a gas is produced *Year 9: Chemical reactions – Formulae and equations*

Topic 24: Chemical reactions – Acids, bases and alkalis

Students should:		Guidance *iLowerSecondary Curriculum reference*
24.1	know names and occurrence of some common acids and alkalis	including ethanoic acid (acetic) in vinegar, citric acid in lemons, ammonia and caustic soda (sodium hydroxide) in household cleaners, dilute sulfuric, nitric, hydrochloric acid in laboratories, dilute sodium hydroxide in laboratories *Year 7: Chemical reactions – Acids, bases and alkalis*
24.2	know how to detect acids and alkalis using indicators	including litmus, phenolphthalein and methyl orange and their colours in acid and alkali the use of universal indicator to measure the approximate pH value of an aqueous solution *Year 7: Chemical reactions – Acids, bases and alkalis*
24.3	know the pH scale as a scale from 0-14 of acidity and alkalinity	recall pH 7 is neutral, pH 7 to 0 increasing acidity, pH 7 to 14 increasing alkalinity *Year 7: Chemical reactions – Acids, bases and alkalis*
24.4	know the reaction between an acid and an alkali as neutralisation	including evaporation to obtain the salt from the neutral solution *Year 7: Chemical reactions – Acids, bases and alkalis*
24.5	know the general equation for reactions between acids and alkalis	*Year 7: Chemical reactions – Acids, bases and alkalis*
24.6	know how to name salts from the names of acids and alkalis and use these in word equations	limited to hydrochloric, nitric and sulfuric acids reacting with sodium hydroxide and potassium hydroxide *Year 7: Chemical reactions – Acids, bases and alkalis*

Topic 25: Chemical reactions – More reactions of acids

Students should:		Guidance *iLowerSecondary Curriculum reference*
25.1	know the reaction between an acid and a metal oxide as neutralisation	Acid + Metal Oxide -> Salt + Water be able to write word equations for metal oxides reacting with hydrochloric acid and sulfuric acid be able to write chemical equations for the reactions of copper oxide and zinc oxide with hydrochloric acid *Year 9: Chemical reactions – More reactions of acids*
25.2	know that the reaction between dilute acids and metal carbonates produces carbon dioxide	know the limewater test for carbon dioxide *Year 9: Chemical reactions – More reactions of acids*
25.3	know the general equation for the reaction between acids and metal carbonates	Acid + Metal Carbonate -> Salt + Water + Carbon Dioxide be able to write word equations for metal carbonates reacting with hydrochloric acid and sulphuric acid be able to write chemical equations for calcium carbonate and copper carbonate reacting with hydrochloric acid *Year 9: Chemical reactions – More reactions of acids*

Topic 26: Chemical reactions – Reactivity series

Students should:		Guidance *iLowerSecondary Curriculum reference*
26.1	know how metals can be placed in a reactivity series using reactions of metals with oxygen and with water	*Year 9: Chemical reactions – Reactivity series*
26.2	understand how metals can be placed in a reactivity series using reactions of metals with dilute hydrochloric and sulfuric acid	*Year 9: Chemical reactions – Reactivity series*
26.3	explain the use of carbon in obtaining metals from metal oxides	*Year 9: Chemical reactions – Reactivity series*
26.4	understand the position of carbon in the reactivity series	*Year 9: Chemical reactions – Reactivity series*
26.5	understand the term *reduction* as loss of oxygen	*Year 9: Chemical reactions – Reactivity series*
26.6	understand what is meant by a displacement reaction	*Year 9: Chemical reactions – Reactivity series*
26.7	know how metals can be arranged in a reactivity series based on their displacement reactions between metals and metal oxides	*Year 9: Chemical reactions – Reactivity series*
26.8	understand how metals can be arranged in a reactivity series based on their displacement reactions between metals and aqueous solutions of metal salts	*Year 9: Chemical reactions – Reactivity series*
26.9	understand that the method of extraction of a metal from its ore depends on the position of that metal in the reactivity series	limited to knowing that carbon can be used to extract copper and iron but not aluminium (where electricity is used) no details of industrial processes are required *Year 9: Chemical reactions – Reactivity series*

Topic 27: Chemical reactions – Rate of reaction

Students should:		Guidance *iLowerSecondary Curriculum reference*
27.1	know the effect of changing the temperature on the rate of reaction	*Year 9: Chemical reactions – Rate of reaction*
27.2	know the effect of changing the size of the solid particles on the rate of reaction	for example, hydrochloric acid reacting with marble chips *Year 9: Chemical reactions – Rate of reaction*

Physics

Topic 28: Energy – Energy stores and energy transfer

Students should:		Guidance *iLowerSecondary Curriculum reference*
28.1	know joules (J) and kilojoules (kJ) as units of energy	*Year 7: Energy – Energy from food and fuels*
28.2	understand that energy is stored in different ways: • thermal energy • chemical energy • kinetic energy • gravitational potential energy • elastic potential energy (strain energy) • nuclear energy.	*Year 7: Energy – Energy from food and fuels*
28.3	understand that energy can be transferred between energy stores but no energy is created or lost	introduce law of conservation of energy *Year 7: Energy – Energy transfer*
28.4	know ways in which energy is transferred such as by: • light waves • heating • sound waves • electricity • forces.	introduce the idea that energy can be wasted and a simple discussion of efficiency *Year 7: Energy – Energy transfer*
28.5	know examples of energy stored as gravitational potential energy being transferred to other energy stores	*Year 9: Energy – More on energy stores and transfers*
28.6	know examples of energy stored as elastic potential energy (strain energy) being transferred to other energy stores	*Year 9: Energy – More on energy stores and transfers*

Topic 29: Energy – Conservation of energy

Students should:		Guidance *iLowerSecondary Curriculum reference*
29.1	understand the law of conservation of energy	*Year 8: Energy – Conservation of energy*
29.2	Understand the use of Sankey diagrams to show energy transfers	*Year 8: Energy – Conservation of energy*

Topic 30: Electricity – Electric current

Students should:		Guidance *iLowerSecondary Curriculum reference*
30.1	know electric current as a flow of negative charges or flow of electrons, which are negatively charged particles	*Year 7: Electricity – Electric current*
30.2	know that current is measured in amperes (A) using an ammeter connected in series	know symbol for ammeter *Year 7: Electricity – Electric current*

Topic 31: Electricity – Circuits

Students should:		Guidance *iLowerSecondary Curriculum reference*
31.1	understand that in a series circuit the current can only take one route and is the same everywhere	*Year 7: Electricity – Circuits*
31.2	understand that in a parallel circuit there are junctions where the current splits and takes different routes/branches	*Year 7: Electricity – Circuits*
31.3	understand that in a parallel circuit currents combine when routes/branches meet and the total current entering a junction is the same as the total amount leaving	*Year 7: Electricity – Circuits*

Topic 32: Electricity – Voltage and potential difference

Students should:		Guidance *iLowerSecondary Curriculum reference*
32.1	understand that a potential difference is needed to cause a flow of electrons (current) in a circuit	*Year 7: Electricity – Potential difference*
32.2	understand that a potential difference is provided by a cell/battery/power pack and that it is related to the energy provided by the cell/battery/power pack	*Year 7: Electricity – Potential difference*
32.3	know that voltage and potential difference is measured in volts (V) using a voltmeter connected in parallel to a component (across the component)	know symbol for voltmeter *Year 7: Electricity – Potential difference*
32.4	know that the potential difference across two components connected in parallel is the same	be able to carry out simple calculations to find unknown potential differences when some potential differences in a circuit are given *Year 7: Electricity – Potential difference*

Topic 33: Electricity – Magnetism and electromagnetism

Students should:		Guidance *iLowerSecondary Curriculum reference*
33.1	know that a bar magnet has a north(-seeking) pole and a south(-seeking) pole	*Year 8: Forces – Magnetism*
33.2	know that a compass is a magnet that points north	*Year 8: Forces – Magnetism*
33.3	know that like poles repel each other and opposite poles attract each other	*Year 8: Forces – Magnetism*
33.4	know that the magnetic field is the space around a magnet in which the magnetic force has an effect	*Year 8: Forces – Magnetism*
33.5	know how to find the shape of the magnetic field around a magnet	*Year 8: Forces – Magnetism*
33.6	know about the Earth's magnetic field and how compasses are affected by it	*Year 8: Forces – Magnetism*
33.7	know that a wire with an electric current flowing through it creates a magnetic field around it	*Year 9: Electricity – Electromagnets*
33.8	know that when the wire is wrapped into a coil the magnetic field produced is similar to that of a bar magnet	*Year 9: Electricity – Electromagnets*
33.9	know how the strength of the magnetic field of an electromagnet can be changed	limited to the number of turns of the coil, insertion of soft iron core and the size of the current *Year 9: Electricity – Electromagnets*

Topic 34: Electricity – Static electricity

Students should:		Guidance *iLowerSecondary Curriculum reference*
34.1	know that a charge of static electricity can build up when different materials rub together	static electricity can cause small electric shocks *Year 9: Electricity – Static electricity*
34.2	know that when a charged object comes near to another object they will either attract or repel each other	if the charges are the same they repel; if the charges are opposite they attract *Year 9: Electricity – Static electricity*

Topic 35: Electricity – Resistance, current and voltage

Students should:		Guidance *iLowerSecondary Curriculum reference*
35.1	know what is meant by electrical resistance and that it is measured in ohms (Ω)	understand that components such as bulbs and resistors make it more difficult for a current to flow through have a high resistance; components such as copper wire that are easy for a current to flow through have a low resistance (electrical) resistance of a component indicates how hard it is for current to flow through a component understand that the higher the total resistance of the components in a circuit, the smaller the current that flows (*This builds on Year 7: Electricity – Resistance*) *Year 9: Electricity – More on resistance, current and voltage*
35.2	know the relationship: voltage (V) = current (I) x resistance (R) and perform calculations using it	*Year 9: Electricity – More on resistance, current and voltage*

Topic 36: Waves – Introduction to sound waves

Students should:		Guidance *iLowerSecondary Curriculum reference*
36.1	understand what causes sound in terms of vibrations of objects	sound travels as a type of wave – details of them being longitudinal is **NOT** required describe how moving vibrations form a wave – use of a loudspeaker to illustrate this idea *Year 7: Waves – Introduction to sound*
36.2	understand the terms *volume*, *pitch*, *frequency* (measured in hertz (Hz)) and *amplitude* and the links between them	sound can be represented by wave trace diagrams interpret volume, pitch, frequency and amplitude in relation to wave trace diagrams for example, the greater the amplitude the greater the volume; the higher the frequency the higher the pitch *Year 7: Waves – Introduction to sound*
36.3	know how sound travels through a medium	compare speed of sound in air/water/solids *Year 7: Waves – Sound waves*

Topic 37: Waves – Sound detection

Students should:		Guidance *iLowerSecondary Curriculum reference*
37.1	know how animals use ears to detect sound	know that the outer ear collects and directs sound waves on to the ear drum causing the ear drum to vibrate; the inner ear converts vibrations into electrical signals (details of the inner ear **NOT** required); the brain interprets the electrical signals as sound know that some animals have muscles that enable them to point their outer ear in different directions (better predator detection) *Year 7: Waves – Sound detection*
37.2	know that sound waves transfer energy	know ways in which sound is used, for example communication, ultrasound, and sonar *Year 7: Waves – Sound detection*

Topic 38: Waves – Reflection and refraction of light

Students should:		Guidance *iLowerSecondary Curriculum reference*
38.1	understand the use of ray diagrams and the terms *incident ray*, *reflected ray*, *normal*, *angle of incidence* and *angle of reflection*	use the term *reflection* correctly know the angle of incidence equals the angle of reflection; including applications, for example a simple periscope and the use of a mirror to see around a corner *Year 8: Waves – Reflection of light*
38.2	know how an image is formed in a plane mirror	use of ray diagrams to show how an image is formed in a plane mirror *Year 8: Waves – Reflection of light*
38.3	know that refraction is the change of direction of light that happens when light passes from one transparent material to another	limited to air to glass and air to water (and vice versa); considering simple examples such as looking at objects at the bottom of a pool of water/cup of water *Year 8: Waves – Refraction of light*

Topic 39: Forces – Different types of forces

Students should:		Guidance *iLowerSecondary Curriculum reference*
39.1	understand that forces are pushes or pulls that can change the speed of an object or the direction it is moving in, or can change the shape of something	*Year 7: Forces – Different types of forces*
39.2	understand the difference between contact forces, such as friction, upthrust, air and water resistance, and non-contact forces, such as gravity, magnetism and forces due to static electricity	use examples where the forces occur such as gravity (a non-contact force), which causes parachutists to fall to the ground and air resistance (a contact force) stemming from the parachute, which slows the parachutist down *Year 7: Forces – Different types of forces*
39.3	know that the unit of force is the newton (N)	*Year 7: Forces – Different types of forces*
39.4	understand the use of different-sized arrows to indicate the size and direction of action of a force	*Year 7: Forces – Different types of forces*
39.5	know the difference between mass and weight	appreciate that an object on Earth has weight because of gravity *Year 7: Forces – Different types of forces*
39.6	understand the causes of friction, air resistance (drag), water resistance (drag) and upthrust	appreciate forces of friction, air resistance and water resistance can be helpful and unhelpful, and how they can be changed understand the term *streamlining* and how it can be used beneficially to reduce air resistance and water resistance *Year 7: Forces – Different types of forces*

Topic 40: Forces – More on gravity

Students should:		Guidance *iLowerSecondary Curriculum reference*
40.1	know that the greater the mass of an object, the stronger the gravitational force it exerts	know that the Earth's gravitational force attracts any mass towards its centre know that the force of gravity on a given object is less on the Moon than on the Earth appreciate that a given object will weigh less on the Moon than on Earth *Year 8: Forces – More on gravity*
40.2	know that the approximate value of the gravitational field strength (g) on the surface of Earth = 10 N/kg	know that gravitational field strength (g) is smaller on the Moon's surface than on the Earth's surface (*This builds on Year 7: Forces – Different types of forces*) *Year 8: Forces – More on gravity*
40.3	know how to use the formula: weight = mass (m) x gravitational field strength (g)	*Year 8: Forces – More on gravity*
40.4	know that the gravitational force of Earth acting on an object decreases as the object moves further away from the centre of the Earth	*Year 8: Forces – More on gravity*
40.5	know that gravitational force causes moons to orbit planets and causes the planets to orbit the Sun	*Year 8: Forces – More on gravity*
40.6	know that gravitational force causes artificial satellites to orbit the Earth and causes comets to orbit the Sun	know the terms *natural satellite* and *artificial satellite* know that satellites can be used to orbit the Earth and other planets to take photographs and provide scientific data, for example temperatures know some uses of artificial satellites for example: • polar orbiting satellites for observation, weather forecasting and reconnaissance • geostationary satellites for communications. *Year 8: Forces – More on gravity*

Topic 41: Forces – Forces and motion

Students should:		Guidance *iLowerSecondary Curriculum reference*
41.1	understand the relationship between forces (balanced and unbalanced) on an object and its motion	understand the use of different-sized arrows to indicate the size and direction of action of a force explain why some objects float using forces of weight and upthrust explain the effects of balanced and unbalanced forces (This builds on *Year 7: Forces – Different types of forces* and *Year 8: Forces – More on types of forces*) *Year 9: Forces – Forces and motion*
41.2	understand the concept of a resultant force	*Year 9: Forces – Forces and motion*
41.3	understand how to perform simple calculations of resultant forces	*Year 9: Forces – Forces and motion*
41.4	understand the concept of terminal velocity of a falling object	for example, parachutist *Year 9: Forces – Forces and motion*
41.5	know that there are various units for speed and understand how to interconvert between them	for example, convert km/h into m/s *Year 9: Forces – Forces and motion*
41.6	understand how to use the formula: average speed = distance travelled ÷ time taken	understand the concepts of speed and average speed *Year 9: Forces – Forces and motion*
41.7	understand how to construct and interpret distance-time graphs, describing patterns or relationships	including evaluating gradient to calculate speed *Year 9: Forces – Forces and motion*

Topic 42: Forces – Turning forces

Students should:		Guidance *iLowerSecondary Curriculum reference*
42.1	know how a simple lever operates	know the term *pivot* (*fulcrum*) know about the application of levers to simple situations *Year 9: Forces – Turning forces*
42.2	understand how to calculate the moment of a force	know that a moment is the turning effect of a force and the unit is Nm use of moment (Nm) = force (N) × distance from pivot (m) understand the terms *clockwise moment* and *anticlockwise moment* *Year 9: Forces – Turning forces*
42.3	understand how to use moments to find out if something will balance or not	*Year 9: Forces – Turning forces*
42.4	understand how to calculate the amount of work done	force measured in newtons (N) and distance in metres (m) know that work done, like energy, is measured in joules (J) know that work done is the amount of energy transferred when something is moved (from one place to another) using a force use the formula: work done = force × distance moved (in the direction of the force) *Year 9: Forces – Turning forces*

Topic 43: Forces – Stretching forces

Students should:		Guidance *iLowerSecondary Curriculum reference*
43.1	know that adding a mass to a spring affects its extension	Hooke's Law *Year 9: Forces – Stretching forces*

Scientific Enquiry

Topic 44a: Scientific ideas

Students should:		Guidance *iLowerSecondary Curriculum reference*
44.1	understand the importance of asking scientific questions	*Year 7 to 9: Scientific Enquiry – Scientific ideas*
44.2	understand the term *prediction*	*Year 7 to 9: Scientific Enquiry – Scientific ideas*
44.3	be able to make predictions using scientific knowledge and understanding	*Year 7 to 9: Scientific Enquiry – Scientific ideas*
44.4	be able to suggest ideas that could be tested	*Year 7 to 9: Scientific Enquiry – Scientific ideas*
44.5	be able to distinguish between questions that can be tested scientifically and those that cannot using simple reasoning	*Year 7 to 9: Scientific Enquiry – Scientific ideas*

Topic 44b: Investigating

Students should:		Guidance *iLowerSecondary Curriculum reference*
44.6	be able to plan ways in which evidence can be obtained to answer scientific questions	including the selection of appropriate equipment *Year 7 to 9: Scientific Enquiry – Investigating*
44.7	be able to distinguish between independent and dependent variables in an investigation	*Year 7 to 9: Scientific Enquiry – Investigating*
44.8	be able to consider variables that should be controlled in order to obtain valid evidence	*Year 7 to 9: Scientific Enquiry – Investigating*
44.9	be able to evaluate the quality of given data, making judgements on whether further repeats are required	including identifying anomalous results *Year 7 to 9: Scientific Enquiry – Investigating*
44.10	be able to evaluate risks associated with an investigation and suggest simple control measures	recognise hazard symbols for toxic, corrosive, irritant/harmful, flammable and danger to the environment be able to suggest appropriate safety measures, for example precautions when using a Bunsen burner for heating/evaporating; the use of goggles, fume cupboards *Year 7 to 9: Scientific Enquiry – Investigating*

Topic 44c: Obtaining and presenting evidence

Students should:		Guidance *iLowerSecondary Curriculum reference*
44.11	understand the importance of obtaining evidence in order to answer scientific questions	*Year 7 to 9: Scientific Enquiry – Obtaining and presenting evidence*
44.12	understand simple scientific conventions used when presenting data	for example, units in column headings of tables, labels for graph axes *Year 7 to 9: Scientific Enquiry – Obtaining and presenting evidence*
44.13	understand how to record data using appropriate methods, including labelled scientific diagrams, tables, bar graphs, scatter graphs and line graphs	*Year 7 to 9: Scientific Enquiry – Obtaining and presenting evidence*
44.14	be able to draw and use lines of best fit where appropriate	*Year 7 to 9: Scientific Enquiry – Obtaining and presenting evidence*

Topic 44d: Conclusions

Students should:		Guidance *iLowerSecondary Curriculum reference*
44.15	understand the term *conclusion*	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.16	be able to apply mathematical skills to calculate results	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.17	be able to interpret observations and data, including identifying patterns and trends	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.18	be able to use comparative statements to describe patterns and trends shown in data	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.19	be able to relate evidence gathered to prediction(s) made	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.20	be able to use observations, measurements and data to draw conclusions consistent with the evidence	*Year 7 to 9: Scientific Enquiry – Conclusions*
44.21	be able to explain patterns and trends in data using scientific knowledge and terminology	*Year 7 to 9: Scientific Enquiry – Conclusions*

Topic 44e: Evaluating

Students should:		Guidance *iLowerSecondary Curriculum reference*
44.22	understand the term *evaluate*	*Year 7 to 9: Scientific Enquiry – Evaluating*
44.23	be able to consider the extent to which the evidence obtained from an investigation answers the question asked	*Year 7 to 9: Scientific Enquiry – Evaluating*
44.24	be able to evaluate ways in which an investigation could be improved, in order to improve reliability and/or to answer further questions	*Year 7 to 9: Scientific Enquiry – Evaluating*
44.25	be able to consider simple sources of error (random and systematic)	students are **NOT** required to distinguish between random and systematic errors *Year 7 to 9: Scientific Enquiry – Evaluating*
44.26	be able to identify further questions that can be tested scientifically	*Year 7 to 9: Scientific Enquiry – Evaluating*

Assessment information

The Pearson Edexcel International Award in Lower Secondary Science consists of one externally-examined achievement test.

- The test is 1 hour 20 minutes and is out of 80 marks.
- Section A consists of 60 marks, it covers the content from Biology, Chemistry and Physics.
- Section B consists of 20 marks, it covers the skills in Scientific Enquiry.
- Students must answer all questions.
- The test consists of multiple-choice and closed-response questions, some use of direct questions, graphical and short-open response questions; there may be some basic calculations.
- Calculators may be used in the test. Please see *Appendix 4: Calculators*.

Please see the *Qualification at a glance* section for more information.

Sample assessment materials

A sample achievement test and mark scheme for this assessment can be found in the Pearson Edexcel International Award in Lower Secondary Science Sample Assessment Materials (SAMs) document.

A full list of command words that will be used in the assessment can be found in *Appendix 2: Command word taxonomy*.

Assessment Objectives

Students must:		% in qualification
AO1	demonstrate knowledge of scientific ideas, scientific techniques and procedures	24–26
AO2	demonstrate understanding of scientific ideas, scientific techniques and procedures	36–38
AO3	apply knowledge and understanding of scientific ideas, scientific enquiry, techniques and procedures	24–26
AO4	analyse and interpret information, including scientific data	5–8
AO5	evaluate, make judgements and draw conclusions.	5–8
	Total	**100%**

3 Administration and general information

Entries

Details of how to enter students for the examinations for this qualification can be found in our *International Information Manual*. A copy is made available to all examinations officers and is also available on our website: qualifications.pearson.com.

Access arrangements, reasonable adjustments, special consideration and malpractice

Equality and fairness are central to our work. Our equality policy requires all students to have equal opportunity to access our qualifications and assessments, and our qualifications to be awarded in a way that is fair to every student.

We are committed to making sure that:

- students with a protected characteristic (as defined by the UK Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to students who do not share that characteristic
- all students achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Language of assessment

Assessment of this qualification will be available in English only. All student work must be in English.

Access arrangements

Access arrangements are agreed before an assessment. They allow students with special educational needs, disabilities or temporary injuries to:

- access the assessment
- show what they know and can do without changing the demands of the assessment.

The intention behind an access arrangement is to meet the particular needs of an individual student with a disability without affecting the integrity of the assessment. Access arrangements are the principal way in which awarding bodies comply with the duty under the Equality Act 2010 to make 'reasonable adjustments'.

Access arrangements should always be processed at the start of the course. Students will then know what is available and have the access arrangement(s) in place for assessment.

Reasonable adjustments

The Equality Act 2010 requires an awarding organisation to make reasonable adjustments where a student with a disability would be at a substantial disadvantage in undertaking an assessment. The awarding organisation is required to take reasonable steps to overcome that disadvantage.

A reasonable adjustment for a particular student may be unique to that individual and therefore might not be in the list of available access arrangements.

Whether an adjustment will be considered reasonable will depend on a number of factors, including:

- the needs of the student with the disability
- the effectiveness of the adjustment
- the cost of the adjustment; and
- the likely impact of the adjustment on the student with the disability and other students.

An adjustment will not be approved if it involves unreasonable costs to the awarding organisation, timeframes or affects the security or integrity of the assessment. This is because the adjustment is not 'reasonable'.

Special consideration

Special consideration is a post-examination adjustment to a student's mark or grade to reflect temporary injury, illness or other indisposition at the time of the examination/ assessment, which has had, or is reasonably likely to have had, a material effect on a candidate's ability to take an assessment or demonstrate their level of attainment in an assessment.

Further information

Please see our website for further information about how to apply for access arrangements and special consideration.

For further information about access arrangements, reasonable adjustments and special consideration please refer to the JCQ website: www.jcq.org.uk.

Candidate malpractice

Candidate malpractice refers to any act by a candidate that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

Candidate malpractice in examinations **must** be reported to Pearson using a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice). The form can be emailed to pqsmalpractice@pearson.com or posted to: Investigations Team, Pearson, 190 High Holborn, London, WC1V 7BH. Please provide as much information and supporting documentation as possible. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Staff/centre malpractice

Staff and centre malpractice includes both deliberate malpractice and maladministration of our qualifications. As with candidate malpractice, staff and centre malpractice is any act that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

All cases of suspected staff malpractice and maladministration **must** be reported immediately, before any investigation is undertaken by the centre, to Pearson on a *JCQ Form M2(a)* (available at www.jcq.org.uk/exams-office/malpractice).

The form, supporting documentation and as much information as possible can be emailed to pqsmalpractice@pearson.com or posted to: Investigations Team, Pearson, 190 High Holborn, London, WC1V 7BH. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice itself constitutes malpractice.

More-detailed guidance on malpractice can be found in the latest version of the document *JCQ General and vocational qualifications Suspected Malpractice in Examinations and Assessments,* available at www.jcq.org.uk/exams-office/malpractice.

Awarding and reporting

The Pearson Edexcel International Award in Lower Secondary Science will be graded on a four-level scale from S1 to S4.

The first certification opportunity for the Pearson Edexcel International Award in Lower Secondary Science will be in August 2019. A pass in the Pearson Edexcel International Award in Lower Secondary Science is indicated by one of the four levels S1, S2, S3 and S4, of which level S4 is the highest and level S1 the lowest. Students whose level of achievement is below the minimum judged by Pearson to be of sufficient standard to be recorded on a certificate will receive an unclassified U result.

Student recruitment and progression

Pearson follows the JCQ policy concerning recruitment to our qualifications in that:

- they must be available to anyone who is capable of reaching the required standard
- they must be free from barriers that restrict access and progression
- equal opportunities exist for all students.

Prior learning and other requirements

There are no prior learning or other requirements for this qualification.

Progression

Students can progress from this qualification to the Pearson Edexcel International GCSE in Science.

Appendices

Appendix 1: Mathematical skills

The table below identifies the mathematical skills that will be developed and assessed throughout this qualification. These are not referenced explicitly in the content.

1	**Arithmetic and numerical computation**
A	Recognise and use numbers in decimal form
B	Use ratios, fractions, percentages
C	Make estimates of the results of simple calculations, without using a calculator
2	**Handling data**
A	Understand and find the arithmetic mean (average)
B	Construct and interpret bar charts
C	Construct and interpret frequency tables, diagrams and histograms
D	Use a scatter diagram to identify a pattern or trend between two variables
3	**Algebra**
A	Change the subject of an equation
B	Substitute numerical values into algebraic equations using appropriate units for physical quantities
C	Solve simple algebraic equations
4	**Graphs**
A	Translate information between graphical and numerical form
B	Plot two variables (discrete and continuous) from experimental or other data
C	Determine the slope of a linear graph
5	**Geometry and trigonometry**
A	Use angular measures in degrees
B	Visualise and represent 2D and 3D objects, including two-dimensional representation of 3D objects
C	Calculate areas of rectangles, surface areas and volumes of cubes

Appendix 2: Command word taxonomy

The following table lists the command words used in the external assessment.

Command word	Definition
Add/label	Requires the addition of or labelling to a stimulus material given in the question, for example labelling a diagram or adding units to a table.
Circle	Used for indicating a point on a graph or diagram where the answer is shown by a circle.
Complete	Requires the completion of a table, graph or diagram.
Draw	Produce/complete a diagram using a ruler or freehand.
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.
Explain	An explanation requires an identification of a point linked with justification/reasoning.
Give/State/Name	These command words are really synonyms. They generally require recall of one or more pieces of information. They are used only when there is more than one possible answer and the words 'What' or 'Which' cannot be used.
Plot	Mark points accurately on a grid from data that is provided and then draw a line of best fit through these points. A suitable scale for axes must be used if these are not provided in the question.
Predict	Give an expected result.
Tick	Used for completion of a table where the answer is given by a tick in the table.

Appendix 3: Units

Units that may be used in the external assessment:

- millimetre (mm)
- centimetre (cm)
- metre (m)
- kilometre (km)
- square centimetre (cm^2)
- square metre (m^2)
- cubic centimetre (cm^3)
- cubic decimetre (dm^3)
- litre (l)
- millilitre (ml)
- gram (g)
- kilogram (kg)
- newton (N)
- gravitational field strength (N/kg)
- moment (Nm)
- second (s)
- minute (min)
- hour (h)
- metre per second (m/s)
- kilometre per hour (km/h)
- degree Celsius (°C)
- hertz (Hz)
- ampere (A)
- voltage (V)
- ohm (Ω)
- joule (J)
- kilojoule (kJ).

Appendix 4: Calculators

Students may use a calculator in examination for this qualification. Centres are responsible for making sure that calculators used by their students meet the requirements highlighted in the table below.

Students must be told of these regulations and be familiar with them before they begin their examination for this qualification.

<table>
<tr>
<td>Calculators must be:
of a size suitable for use on a desk
either battery- or solar powered
free of lids, cases and covers that have printed instructions or formulae.</td>
<td rowspan="2">Calculators must not:
be designed or adapted to offer any of these facilities
language translators
symbolic algebraic manipulation
symbolic differentiation or integration
communication with other machines or the internet
be borrowed from another candidate during an examination for any reason*
have retrievable information stored in them, including
databanks
dictionaries
mathematical formulae
text.</td>
</tr>
<tr>
<td>The candidate is responsible for:
the calculator’s power supply
the calculator’s working condition
clearing anything stored in the calculator.</td>
</tr>
</table>

*An invigilator may give a student a replacement calculator if needed.

DB041124 9781446956632_ILS_SCIENCE_ISS2.DOCX.1-60/0

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

Pearson Education Limited. Registered in England and Wales No. 872828
Registered Office: 80 Strand, London WC2R 0RL

VAT Reg No GB 278 537121

Getty Images: Alex Belmonlinsky