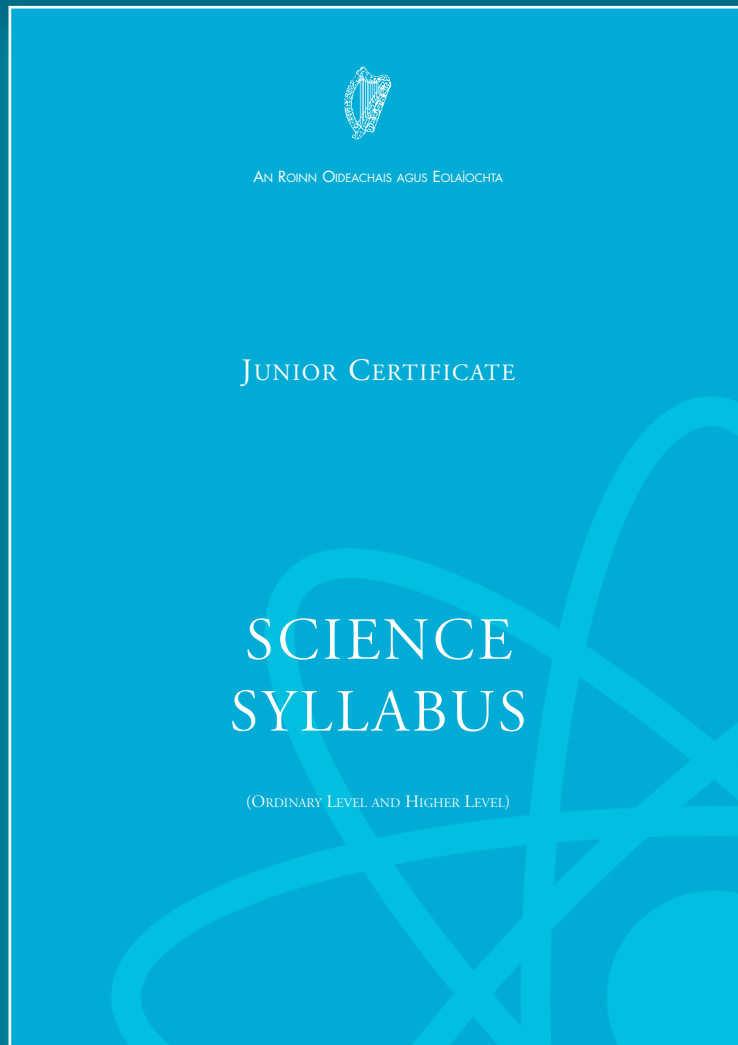


Notes on the revised syllabus



May 2003

Junior Certificate Science Revised Syllabus

A revised syllabus for Junior Certificate Science has been prepared by the NCCA and has been approved by the Department of Education and Science. While most of the content of the syllabus will be familiar to science teachers, this syllabus differs from that introduced in 1989 in a number of respects.

- The most significant change is an increased emphasis on scientific investigation and on the application of science process skills in student activities.
- The overall length of the syllabus has been significantly reduced to allow for student engagement in learning activities that will enable them to gain a better understanding of the science concepts involved and to develop their science process skills.
- The structure of the syllabus has been simplified. Topics are presented under three main headings—biology, chemistry and physics—each of which is sub-divided into three sections.
- Within each syllabus section, topics and sub-topics are described, together with associated learning outcomes. The learning outcomes embody the investigative approach emphasised in the revised syllabus and form the basis of the assessment arrangements.

In the following pages, an overview is presented of the structure of the revised syllabus; the structure of the 1989 syllabus is included to facilitate comparison. Details are also given of the changes in syllabus content; topics that are new and syllabus content that has been deleted are listed in separate tables. An exemplar is provided to illustrate the changed approach in the teaching and learning of science that is emphasised by the revised syllabus. Finally, an outline is given of the assessment components that apply to the revised syllabus.

Junior Certificate Science – revised syllabus

1. Biology	1A Human Biology – food, digestion and associated body systems
	1B Human Biology – the skeletal/muscular system, the senses and human reproduction
	1C Animals, plants and micro-organisms
2. Chemistry	2A Classification of substances
	2B Air, oxygen, carbon dioxide and water
	2C Atomic structure, reactions and compounds
3. Physics	3A Force and energy
	3B Heat, light and sound
	3C Magnetism, electricity and electronics

Junior Certificate Science – 1989 syllabus

<p><i>All students must study the core</i></p>	<p>1. Core Introduction to science The human body The non-living environment The living environment Energy</p>
<p><i>There are five extensions. At Ordinary level, students will select any three extensions. At Higher level, students will take the Physics, Chemistry and Biology extensions and will select either the Applied Science or the Local Studies extension.</i></p>	
<p>Physics</p>	<p>2. Forces and motion</p>
	<p>3. Heat</p>
	<p>4. Electricity and magnetism</p>
	<p>5. Light and sound</p>
<p>Chemistry</p>	<p>6. Matter, the atom and elements</p>
	<p>7. Acids, bases and water</p>
	<p>8. Metals and electrochemistry</p>
<p>Biology</p>	<p>9. Animal biology</p>
	<p>10. Plant biology</p>
	<p>11. Ecology</p>
<p>Applied Science <i>Students taking this extension will select any two of the six units</i></p>	<p>12. Earth science</p>
	<p>13. Horticulture</p>
	<p>14. Materials science</p>
	<p>15. Food</p>
	<p>16. Electronics</p>
	<p>17. Energy conversions</p>
<p>Local Studies</p>	

Changes in content

The following tables give a summary of the changes in content in the revised syllabus.

The reference codes used in the table of new content relate to the learning outcomes in the revised syllabus. The reference codes used in the table of deleted content relate to the numbered sections and sub-sections used in the 1989 syllabus.

The applied science extensions in the 1989 syllabus have not been retained, but some topics from these extensions have been included in the broad areas of biology, chemistry and physics, in the revised syllabus.

For many topics there has been a change in emphasis and approach. An example of this is given on page 6.

In addition to the changes outlined in this document, there have been some changes to the level – Higher or Ordinary – at which certain topics will be assessed. Details of syllabus content appropriate to each level can be found in the syllabus document – Higher level material is underlined. More detailed treatment of the changes will be provided in the Guidelines for Teachers.

New content

Section	Topic	Ref.
Biology	major bones in human body	OB25
	growth and puberty	OB33
	chromosomes are made of DNA and protein	OB37
	simple key to identify plants and animals including vertebrates and invertebrates	OB38
	function and main parts of a microscope	OB42
	seed structure	OB56
Chemistry	paper chromatography	OC2
	solubility of a variety of substances in water; effect of temperature on solubility	OC15
	qualitative test for dissolved solids	OC30
	isotopes	OC39
Physics	relationship between the extension and applied force for a spring	OP6
	cooling curve	OP29
	luminous and non-luminous objects	OP35
	sound detection in the ear	OP42

Content retained from extensions

Section	Topic	Ref.
Biology	food tests	OB3
	two uses of biotechnology in industry and in medicine	OB66
Chemistry	natural gas	OC57
	plastics: applications, raw materials, contribution to pollution	OC58/59/60
Physics	diodes	OP57/60
	electronic circuits using switches, buzzers, LEDs and resistors	OP58
	light-dependent resistor (LDR)	OP59/60

Deleted content

Section	Topic	Ref.
Biology	tooth decay	9.3
	alternative systems of gaseous exchange	9.6
	endocrine system	9.10
	inheritance of a simple character	9.12
	three examples each of common local woody and non-woody plants	10.2
	cambium	10.6
	mineral nutrition in plants	10.7
	factors affecting transpiration	10.8
	trophic levels	11.7
	soil study (except for investigation of soil micro-organisms)	11.8
Chemistry	separation of immiscible liquids	6.5
	different types of fire extinguisher	6.6
	surface tension, capillarity	6.6
	crystal structure	6.12
	oxidation and reduction	6.13
	heat changes in chemical reactions	6.14
	reactions of sulfuric acid	7.3
	distinction between temporary hardness and permanent hardness	7.7
	relative corrodibility of metals	8.3
	electrochemistry (except for electrolysis of water)	8.4/6/7
	acidic and basic oxides	8.5
Physics	action-reaction	2.8
	momentum	2.8
	definition of moment of force	2.11
	barometers - mercury and aneroid	2.16
	thermometers - mercury and alcohol	3.6
	sublimation	3.7
	effect of pressure on melting point	3.7
	rates of conduction of heat in metals	3.8
	tog values	3.8
	domestic ring circuits and spurs	4.9
	calculations on resistances in series	4.9
	waves	5.3
	electromagnetic spectrum	5.4
	eclipses, lenses, mixing of colours	5.5
location of the earth within the solar system	12.1	

Example of change of treatment

1989 syllabus – Ref. 8.5	Revised syllabus – OC52
Activity series: List of metals in order of reactivity K, Na, Ca, Mg, Zn, Fe, Cu, Ag	Investigate the relative reactivities of Ca, Mg, Zn and Cu based on their reactions with water and acid

In changing the emphasis from knowledge of a learned list to discovery through investigation, many of the objectives of the revised syllabus (cf. pages 4 and 5) are achieved.

The scientific method and the concept of a valid experiment

Students will need to plan how they intend to observe the reactions of the metals with water and acid. In considering the concept of a fair test, students might take into account factors such as particle size, temperature, and concentration of acid to ensure that conditions are the same for each metal.

Observation, measurement and the accurate recording of data

Students need to observe the reactions carefully and record their observations accurately. They may devise some form of coding for these observations, for example, quantity of gas produced or amount of fizzing, and record these in graphic or tabular form.

Logical thinking, inductive and deductive reasoning

Students might try the reaction with water first and record their observations. They could then reason that the metals that did not react with water should be tried with acid.

Formation of opinions and judgements based on evidence and experiment

Based on prior learning (OC51: reaction between Zn and HCl) and experimental evidence students will deduce the order of reactivity.

Assessment of Junior Certificate Science

The revised syllabus for Junior Certificate Science will be assessed, at both Ordinary level and Higher level, by means of a terminal examination paper and coursework. The examination paper will be allocated 65% of the total examination marks. There will be two components in the coursework assessment: Coursework A, accounting for 10% and Coursework B, accounting for 25%.

The **examination paper** will consist of three sections – biology, chemistry and physics – reflecting the structure of the revised syllabus. Candidates will be required to answer questions in all three sections. There will be separate papers for Higher level and Ordinary level.

Coursework A comprises the carrying out and recording of the thirty mandatory student activities identified in the syllabus. These activities are printed in bold type in the syllabus document. It is envisaged that, on completion of the course, students will be required to provide evidence of this coursework, which will be retained in the school for the duration of the assessment exercise. The State Examinations Commission will specify the requirements for the allocation of the marks (10%) to this component.

Coursework B involves the students in carrying out investigative work based on the syllabus topics and learning outcomes. Candidates will be required to submit a report of this work in a pro forma booklet. This investigative work may take the form of two separate investigations selected from three to be nominated each year by the State Examinations Commission (one each in biology, chemistry and physics), or a single science investigation of the student's own choosing, which meets specified criteria.

NCCA and syllabus development

Under the terms of the Education Act (1998), the National Council for Curriculum and Assessment (NCCA) advises the Minister for Education and Science on matters relating to

- (a) the curriculum for early childhood education, primary and post-primary schools, and
- (b) the assessment procedures employed in schools and examinations on subjects which are part of the curriculum.

Subject syllabuses are prepared by NCCA course committees and are submitted to the Council of the NCCA for approval. The NCCA, having considered the recommendations of the course committee, advises the Minister accordingly.

The revised Junior Certificate Science syllabus was prepared by a course committee comprising representatives from:

- Association of Secondary Teachers, Ireland
- Teachers' Union of Ireland
- Joint Managerial Body
- Association of Community and Comprehensive Schools
- Irish Vocational Education Association
- Irish Science Teachers' Association
- Department of Education and Science (Inspectorate)

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