Ireland

Department of Education
National Council for Curriculum and Assessment

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Introduction

Overview of Education System

Ireland's education system is predominantly centralized and encompasses early childhood, primary, postprimary, third-level, and further education.[a] Overall responsibility for primary and postprimary education lies with the Minister for Education, while the Department of Education (DE), along with a number of bodies under its aegis, is responsible for running the Irish education system. The Department of Further and Higher Education, Research, Innovation and Science funds and creates policy for the higher and further education and research sectors. Early learning and care (ELC) is funded by the Department of Children, Equality, Disability, Integration and Youth (DCEDIY) to deliver a universal free Early Childhood Care and Education Programme (ECCE). Since 2018, children between the ages of 2 years 8 months and 5 years 6 months or their entry to primary school have been eligible for an optional 2 years of state-funded provision through this program.[1] ELC settings are obliged, under the terms of their grant agreement, to follow the provisions of the national quality and curriculum frameworks[2,3] and to facilitate inspection by the DE's Inspectorate.

Almost all primary and postprimary schools receive state funding, although most are not state owned. State-funded schools are required to operate under the Education Act, 1998[4] and the curriculum, assessment, and evaluation framework established by the DE and based on advice from the National Council for Curriculum and Assessment (NCCA). The NCCA is a statutory body with responsibility for advising the Minister for Education on curriculum and assessment for early childhood education and for primary and postprimary schools. The DE's Inspectorate division evaluates and reports on education provision in all schools and centers of education supported by the DE, as well as in other education settings[b] not directly funded by the DE. Most schools at the primary level are owned by private patron bodies, most commonly religious denominations. This is different at the postprimary level, where there are more state schools. The patron body typically appoints a Board of Management, which manages each school locally in line with national policies and legislation.

a There are a small number of schools that offer curricula other than the Irish curriculum, including the International Baccalaureate.

b These include detention centers, special care units, Youthreach centers, prisons, etc.

Primary education covers an 8-year program, starting with the early grades of Junior and Senior Infants, followed by Grades 1 to 6 (First Class to Sixth Class). Children may start primary school at no younger than 4 years of age and must start by the time they turn 6.[5] The Primary School Curriculum[6] must be implemented in all state-funded primary schools, although some aspects may take into consideration the ethos of the school (see Education Act, 1998). Each school designates either Irish or English as its Language 1 (i.e., the language mainly used for communication and instruction in the school), with the other language as Language 2. Irish is Language 1 in about 8% of primary schools, with English as Language 1 in the remainder.

Postprimary education consists of a compulsory 3-year Junior Cycle program. This is followed by Senior Cycle, which consists of an optional 1-year Transition Year program before students choose one of three 2-year programs: Leaving Certificate, Leaving Certificate Vocational Program, or Leaving Certificate Applied, each leading to a terminal state examination. In academic year 2022–2023, nearly 8 in 10 students opted to extend the Senior Cycle to 3 years by completing Transition Year,[7] designed to foster development through a broad range of educational and vocational experiences, after the Junior Cycle.[8] The structure and content of Senior Cycle are currently under review.[9]

Most postprimary schools in receipt of state funding are privately owned "voluntary" schools (a minority of which charge a fee). The postprimary sector also includes education and training board community colleges/schools and community and comprehensive schools. Although the curriculum is substantially similar across school types, not all schools offer all pathways; for example, not all schools offer Transition Year or alternatives to the traditional Leaving Certificate.

At the lower secondary level (Junior Cycle), mathematics is compulsory and is offered at two levels (higher or ordinary),[c] while at the upper secondary level (Senior Cycle), three syllabus levels are offered (higher, ordinary, or foundation). Science is not compulsory for students. It is taught at a common level for Junior Cycle, while for Senior Cycle, students enroll in individual science subjects[d] at either higher or ordinary level. Levels differ mainly in terms of depth of curriculum content, and all sciences have practical elements built into their syllabi.

Use and Impact of TIMSS

Ireland has participated in four previous TIMSS assessments: 2011 (at the primary level only) and 1995, 2015, and 2019 (at both levels). Between 2011 and 2020, the National Strategy: Literacy and Numeracy for Learning and Life was a significant driver of policy in Ireland.[10,11] The Strategy, which was already in preparation while TIMSS 2011 was taking place, specifically references TIMSS as one benchmark against which to compare the performance of Irish students within a broader strategy to enhance literacy and numeracy. A successor strategy for

c Level 1 and Level 2 Learning Programmes in numeracy are available for students who are unable to engage with Junior Cycle mathematics (at either level). These are generally engaged with by students with moderate to profound and severe learning disabilities.

d Science subjects offered at Senior Cycle are organized into two groups: Science group (applied mathematics, biology, chemistry, mathematics, physics, physics and chemistry) and Applied Science group (agricultural science, construction studies, engineering, home economics, physics and chemistry, design and communication graphics, technology, computer science, physical education).

literacy, numeracy, and digital literacy was published in May 2024.[12] Findings from previous TIMSS cycles, including insights from context questionnaire data, helped inform this strategy.

The influence of the frameworks and methodologies used in developing TIMSS and PIRLS is also evident in the design and administration of the regular National Assessments of Mathematics and English Reading (NAMER) in Ireland, as well as in the recent redevelopments of curriculum at both the primary and postprimary levels.

The Mathematics Curriculum in Primary and Lower Secondary Grades

Fourth-Grade Mathematics Curriculum

The Primary School Curriculum: Mathematics[13] is for all children from Junior Infant classes (preprimary) to Grade 6. The objective of the mathematics curriculum is to help all children to

- develop a positive attitude toward mathematics and to appreciate its practical applications in life,
- develop problem-solving skills and the ability to use mathematics in everyday life,
- use mathematical language effectively and accurately,
- understand mathematical concepts and processes at a level commensurate to their development and ability, and
- become proficient in fundamental mathematical skills and in recalling basic number facts.

In Grade 4, the curriculum covers five areas, known as strands: Number, Algebra, Shape and Space, Measures, and Data. The strands are interrelated, such that student understanding in one strand is dependent on and supportive of ideas and concepts in other strands. The strands are divided into strand units in which student learning is described using content objectives. Unlike the rest of the Primary School Curriculum—in which subject learning content is categorized at four levels, each comprising a 2-year grade band—the content in the mathematics curriculum is specified in single year grades.

Exhibit 1 shows the curriculum strands and strand units for Grade 4 and provides the types of skills students are able to develop through their mathematical work. These include applying and problem-solving, understanding and recalling, communicating and expressing, integrating and connecting, and reasoning and implementing.

Exhibit 1: Summary of Mathematics Curriculum for Grade 4

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Numbers	Place Value	• explore and identify place value in whole numbers 0–9,999 • read, write, and order four-digit numbers and solve problems • round whole numbers to the nearest 1,000 • explore and identify place value in decimal numbers to two places of decimal
	Operations	• add and subtract, without and with renaming, within 9,999 • know and recall addition and subtraction facts • solve word problems involving addition and subtraction • develop an understanding of multiplication as repeated addition and vice versa • explore, understand, and apply the zero, commutative, distributive, and associative properties of multiplication • develop and recall multiplication facts within 100 • multiply a two-digit or three-digit number by a one- or two-digit number • use a calculator to check estimates • solve and complete practical tasks and problems involving multiplication of whole numbers • develop an understanding of division as sharing and as repeated subtraction without and with remainders • develop and/or recall division facts within 100 • divide a three-digit number by a one-digit number without and with remainders • use a calculator to check estimates • solve and complete practical tasks and problems involving division of whole numbers
	Fractions	• identify fractions and equivalent forms of fractions with denominators 2, 3, 4, 5, 6, 8, 9, 10, and 12 • compare and order fractions with appropriate denominators and position on a number line • calculate a fraction of a set using concrete materials • calculate a number given a multiple fraction of the number • express one number as a fraction of another number • solve and complete practical tasks and problems involving fractions

Exhibit 1: Summary of Mathematics Curriculum for Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Numbers	Decimals	• express tenths and hundredths as fractions and decimals • identify place value of whole numbers and decimals to two places and write in expanded form • order decimals on a number line • add and subtract whole numbers and decimals up to two places • multiply and divide a decimal number up to two places by a single-digit whole number • solve problems involving decimals
Algebra	Number Patterns and Sequences	• explore, recognize, and record patterns in numbers 0–9,999 • explore, extend, and describe sequences • use patterns as an aid in the memorization of number facts
	Number Sentences	• translate an addition, subtraction, multiplication, or division number sentence with a frame into a word problem • translate a one-step word problem into a number sentence • solve one-step number sentences
Shape and Space	2D Shapes	• identify, describe, and classify 2D shapes: equilateral, isosceles, and scalene triangles; parallelogram, rhombus, pentagon, octagon • explore, describe, and compare the properties of 2D shapes • construct and draw 2D shapes • combine, tessellate, and make patterns with 2D shapes • identify the use of 2D shapes in the environment • solve and complete practical tasks and problems using 2D shapes
	3D Shapes	• identify, describe, and classify 3D shapes, including cube, cuboid, cylinder, cone, sphere, triangular prism, and pyramid • establish and appreciate that when prisms are sliced through (in the same direction), each face is equal in shape and size • explore and describe the relationship of 3D shapes with constituent 2D shapes • construct 3D shapes • solve and complete practical tasks and problems involving 2D and 3D shapes

Exhibit 1: Summary of Mathematics Curriculum for Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Shape and Space	Symmetry	• identify line symmetry in the environment • identify lines of symmetry as horizontal, vertical, or diagonal • use understanding of line symmetry to complete the missing half of a shape, picture, or pattern
	Lines and Angles	• identify, describe, and classify oblique and perpendicular lines • draw, discuss, and describe intersecting lines and their angles • classify angles as greater than, less than, or equal to a right angle • solve problems involving lines and angles
Measures	Length	• estimate, compare, measure, and record lengths of a wide variety of objects using appropriate metric units and by selecting suitable instruments of measurement • rename units of length using decimal or fraction form • understand, estimate, and measure the perimeter of regular 2D shapes • solve and complete practical tasks and problems involving the addition, subtraction, multiplication, and simple division of units of length
	Area	• estimate, compare, and measure the area of regular and irregular shapes
	Weight	• estimate, compare, measure, and record the weight of a wide variety of objects using appropriate metric units and by selecting suitable instruments of measurement • rename units of weight in kg and g • rename units of weight using decimal or fraction form • solve and complete practical tasks and problems involving the addition, subtraction, multiplication, and simple division of units of weight
	Capacity	• estimate, compare, measure, and record capacity using appropriate metric units and by selecting suitable instruments of measurement • rename units of capacity in l and ml • rename units of capacity using decimal or fraction form • solve and complete practical tasks and problems involving the addition, subtraction, multiplication, and simple division of units of capacity

Exhibit 1: Summary of Mathematics Curriculum for Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Measures	Time	• consolidate and develop further a sense of time passing • read time in 1-minute intervals on an analog and a digital clock • express digital time as analog time and vice versa • read and interpret simple timetables • rename minutes as hours and hours as minutes • read dates from calendars and express weeks as days and vice versa • solve and complete practical tasks and problems involving times and dates and the addition and subtraction of hours and minutes
	Money	• rename amounts of money as euro or cents and record using € symbol and decimal point • solve and complete practical one-step and two-step problems and tasks involving the addition, subtraction, multiplication, and division of money
Data	Representing and Interpreting Data	• collect, organize, and represent data using pictograms, block graphs, bar charts, and bar-line graphs incorporating the scales 1:2, 1:5, 1:10, and 1:100 • read and interpret bar-line graphs and simple pie charts involving the use of 1/2, 1/3, and 1/4 • use data sets to solve and complete practical tasks and problems
	Chance	• use vocabulary of uncertainty and chance: chance, likely, unlikely, never, definitely • order events in terms of likelihood of occurrence • identify and record outcomes of simple random processes

In September 2023, a new Primary Mathematics Curriculum for all primary and special schools was launched.[e] This will be introduced on a phased basis from September 2023 with implementation commencing in September 2024.

Eighth-Grade Mathematics Curriculum

A Framework for Junior Cycle was initially introduced in 2012[14] with a follow-up publication in 2015[15] providing a road map for the introduction of Junior Cycle, a 3-year program (from Grade 7 to Grade 9) to replace the previous Junior Certificate. The revised specifications were introduced on a phased basis. The Junior Cycle mathematics specification was introduced

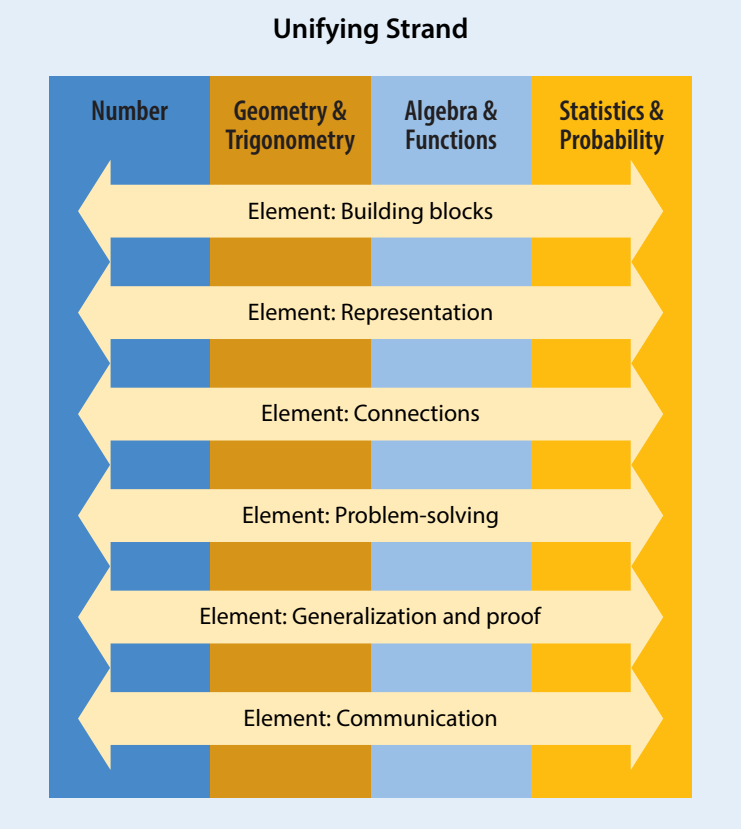
e Special schools support students with more severe and/or complex special education needs in cases where it is judged that a full-time mainstream placement would not be in the student's best interest (see https://ncse.ie/special-schools for more information).

as part of Phase Four in September 2018. The aim of Junior Cycle mathematics is to provide opportunities for all students to develop mathematical proficiency necessary for their future. Mathematical proficiency is more than just procedural fluency and is characterized in the syllabus as

- conceptual understanding—comprehension of mathematical concepts, operations, and relations;
- procedural fluency—skill in carrying out procedures flexibly, accurately, efficiently, and appropriately;
- strategic competence—ability to formulate, represent, and solve mathematical problems in both familiar and unfamiliar contexts;
- adaptive reasoning—capacity for logical thought, reflection, explanation, justification, and communication; and
- productive disposition—habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence, perseverance, and one's own efficacy.

The specification for Junior Cycle mathematics[16] focuses on developing students' ability to think logically, strategically, critically, and creatively through the Unifying strand and the four contextual strands: Number; Geometry and Trigonometry; Algebra and Functions; and Statistics and Probability, as shown in Exhibit 2.

Exhibit 2: Overview of the Specification for Junior Cycle Mathematics



The Science Curriculum in Primary and Lower Secondary Grades

Fourth-Grade Science Curriculum

Science is part of social, environmental, and scientific education (SESE) in the Primary School Curriculum, which also includes history and geography.[17] The current science curriculum was introduced as part of the Primary School Curriculum (1999) and officially implemented in schools in 2003. The science curriculum aims to help children develop basic scientific ideas and understanding about the biological and physical aspects of the world, and the processes through which they develop this knowledge and understanding. The curriculum also aims to foster positive attitudes toward science and to encourage children to examine and appreciate how science and technology affect their lives and the environment.

At the primary level, the teaching of science includes the development of two types of understanding: procedural understanding and conceptual understanding. Procedural understanding relates to the knowledge of the scientific process that relates to the "working scientifically" skill of the curriculum. Conceptual understanding involves the development of scientific knowledge and includes four content strands:

- Living Things
- Materials
- Energy and Forces
- Environmental Awareness and Care

The Primary School Curriculum: Science is presented at four levels, each of which covers two grade levels. Level 3 covers Grade 3 and Grade 4 students. The curriculum emphasizes the importance of starting with children's own ideas and learning through interactions with objects and materials, and their classmates. Children "create" new knowledge and learn about scientific concepts. It contains two sections, including a skills section and a content section. The skills section comprises working scientifically and designing and making. Working scientifically involves

- observing and constructing hypotheses;
- predicting;
- planning and carrying out investigations, with an emphasis on fair testing;
- recording and analyzing results;
- sharing and discussing findings; and
- extending thinking to accommodate new findings.

Designing and making involves looking for practical solutions to problems by exploring and assessing everyday objects in terms of their functionality, their component materials, and their design, and then using this information to plan, design, make, and evaluate artifacts or models. These activities are intended to harness and nurture children's creative and imaginative capacities.

The content section is composed of four strands: Living Things, Energy and Forces, Materials, and Environmental Awareness and Care. These strands, which are subdivided into strand units, outline the concepts and ideas to be explored by children as they work scientifically and are involved in designing and making. Children are expected to experience all Level 3 strand units over the course of Grades 3 and 4. Exhibit 3 shows the strands and strand units for Level 3 and provides what children are expected to learn within each strand unit.

Exhibit 3: Summary of Science Curriculum for Grade 3 and Grade 4

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Living Things	Human Life	• be aware of names and structures of some internal and external body organs and the importance of food for energy and growth • develop an awareness of the importance of food for energy and growth • understand physical changes in males and females to adulthood • become aware of and investigate breathing • explore and investigate how people move
	Plant and Animal Life	• observe, identify, and investigate the animals and plants that live in local environments • develop an awareness of plants and animals from wider environments • observe and explore some ways in which plant and animal behavior is influenced by, or adapted to, environmental conditions • sort and group living things into sets according to observable features • use simple keys to identify common species of plants and animals • understand that plants use light energy from the Sun • come to appreciate that animals depend on plants and indirectly on the Sun for food • discuss simple food chains • become aware of some of the basic life processes in animals • investigate the factors that affect plant growth

Exhibit 3: Summary of Science Curriculum for Grade 3 and Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Energy and Forces	Light	• learn that light is a form of energy • recognize that light comes from different natural and artificial sources • investigate that light can be broken up into many different colors • investigate the relationships between light and materials • investigate how mirrors and other shiny surfaces are good reflectors of light • recognize that the Sun gives us heat and light, without which people and animals could not survive • be aware of dangers of looking directly at the Sun
	Sound	• learn that sound is a form of energy • recognize and identify a variety of sounds in the environment • understand and explore how different sounds may be made by making a variety of materials vibrate • design and make a range of simple string instruments using an increasing variety of tools and materials • explore the fact that sound travels through materials
	Heat	• learn that heat can be transferred • recognize that temperature is a measurement of how hot something is • measure changes in temperature using a thermometer • measure and compare temperatures in different places in the classroom, school, and environment and explore reasons for variations • understand that the Sun is Earth's most important heat source • identify ways in which homes, buildings, and materials are heated

Exhibit 3: Summary of Science Curriculum for Grade 3 and Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Energy and Forces	Magnetism and Electricity	• learn that magnets can push or pull magnetic materials • explore how magnets have poles and investigate how these poles attract and repel each other • explore the relationship between magnets and compasses • examine and classify objects and materials as magnetic and nonmagnetic • investigate that magnets attract certain materials through other materials • explore the effects of static electricity • observe the effects of static electricity on everyday things in the environment • learn about electrical energy • investigate current electricity by constructing simple circuits • examine and group materials as conductors and insulators • become aware of the dangers of electricity
	Forces	• explore how objects may be moved • explore how moving objects may be slowed down • explore the effect of friction on movement through experimenting with toys and objects on various surfaces • investigate falling objects • explore how levers may be used to help lift different objects • investigate the pushing force of water
Materials	Properties and Characteristics	• identify and investigate a range of common materials in the immediate environment • recognize that materials can be solid, liquid, or gaseous • describe and compare materials, noting the differences in color, shape, and texture • distinguish between raw and manufactured materials • group materials according to their properties • investigate the use of materials in construction

Exhibit 3: Summary of Science Curriculum for Grade 3 and Grade 4 (Continued)

Strand	Strand Unit	Mathematics Learning Objectives The child should be enabled to:
Materials	Materials and Change	• explore the effects of heating and cooling on solids, liquids, and gases • investigate the suitability of different kinds of clothes for variations in temperature • experiment to establish which materials are conductors of heat or insulators • investigate how materials may be changed by mixing • investigate the characteristics of different materials when wet and dry • examine the changes that take place in materials when physical forces are applied • explore some simple ways in which materials may be separated
Environmental Awareness and Care	Environmental Awareness	• identify positive aspects of natural and built environments • identify the interrelationship of living and nonliving elements of local and other environments • become aware of the importance of Earth's renewable and nonrenewable resources • recognize how people's actions affect their environment • come to appreciate the need to conserve resources
	Science and the Environment	• begin to explore and appreciate the application of science and technology in familiar contexts • identify some ways in which science and technology contribute positively to society • recognize and investigate human activities that have positive and negative effects on local and wider environments
	Caring for the Environment	• examine a number of ways in which the local environment could be improved or enhanced • identify and discuss a local, national, or global environmental issue • realize that there is a personal and community responsibility for taking care of the environment

Eighth-Grade Science Curriculum

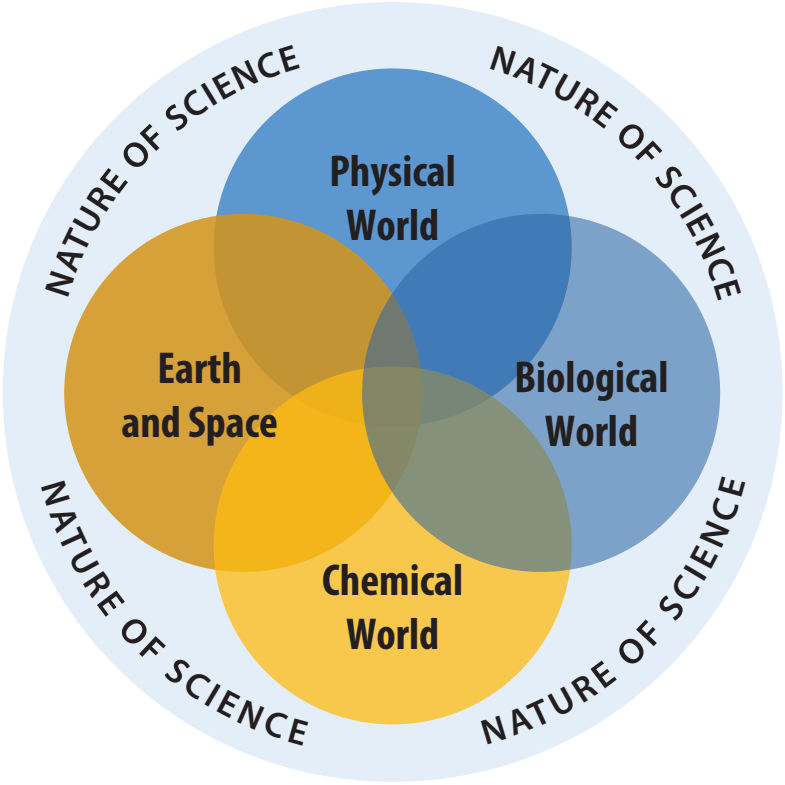
As noted above, a revised Junior Cycle was introduced over a number of years from 2014 onward. Junior Cycle science was introduced as part of Phase Two in September 2016. The course is a practical, investigative one, emphasizing hands-on student involvement in learning. Students are enabled to build on their learning in primary school and to further develop their knowledge of and about science. They enhance their scientific literacy by developing their

ability to explain phenomena scientifically, their understanding of scientific inquiry, and their ability to interpret and analyze scientific evidence and data to draw appropriate conclusions.

The specification for Junior Cycle science[18] focuses on the development of students' knowledge of and about science through the unifying strand Nature of Science. Within that, there are four contextual strands: Physical World, Chemical World, Biological World, and Earth and Space, as shown in Exhibit 4.

Although not compulsory, approximately 93% of lower secondary students take science as a subject.[19] The curriculum provides suitable preparation, but is not a requirement for, the study of one or more science subjects at the upper secondary level.

Exhibit 4: Overview of the Specification for Junior Cycle Science



In lower secondary science, students learn to

- carry out investigations,
- communicate in science, and
- develop an appreciation of the role and contribution of science and scientists to society.

The learning outcomes are pursued through the contextual strands as students develop their content knowledge of science through scientific inquiry. In doing so, students construct a coherent body of facts, learn how and where to access knowledge, and develop scientific habits of mind and reasoning skills to build a foundation for understanding the events and phenomena

they encounter in everyday life. This makes the science classroom a dynamic and interactive space, in which students are active participants in their development. They can engage not only in experimental activities and discussion within the classroom, but also in researching and evaluating information to look beyond claims and opinions to analyze the evidence that supports them.

Teacher Professional Development Requirements and Programs

Professional Development Requirements

Teachers have no formal requirements to participate in professional development, but they are encouraged to do so. After completing their initial teacher education, newly qualified teachers (NQTs), at both the primary and postprimary levels, are required to complete the *Droichead* process, a national induction program.[20] This includes two key strands. The first strand is a school-based induction supported by experienced colleagues that involves observations of experienced teachers and observations by experienced teachers of the NQTs' practice. The second strand is made up of additional professional learning activities, including attendance at NQT cluster meetings in local education centers. This also has a particular emphasis on numeracy and literacy.

Ongoing Professional Development Programs

Professional development at both the primary and postprimary levels is supported by Oide, a newly formed support service for teachers and school leaders;[f] the National Council for Special Education (NCSE); and 30 education support centers spread throughout the country. The National Strategy: Literacy and Numeracy for Learning and Life (2011–2020) highlighted the need for high-quality professional development opportunities for teachers. The implementation of the Strategy has increased the number of opportunities for professional development. School self-evaluation was introduced in 2012, with schools encouraged to develop improvements for teaching and learning with particular focus on numeracy (and literacy). This was supported by Looking at Our School (LAOS) 2016[21,22] and LAOS 2022,[23,24] a quality framework that supports a shared understanding of what effective and highly effective learning, teaching, leadership, and management practices look like in the Irish school system.

At the primary level, teachers are entitled to extra personal vacation days if they attend approved professional development courses during the summer holidays.[25] There is a requirement for all online summer courses to include numeracy, as well as literacy and digital skills, in their programs.[26] Teachers in designated disadvantaged schools are also provided with additional professional development opportunities, including training in the Mathematics Recovery program (see the Special Initiatives in Mathematics and Science Education section for more information about this program).

f On September 1, 2023, a new support service for teachers and school leaders called Oide was launched. It is funded by the DE and was formed from the integration of four existing support services, including the Centre for School Leadership (CSL), Junior Cycle for Teachers (JCT), the National Induction Program for Teachers (NIPT), and the Professional Development Service for Teachers (PDST). These services are referenced individually in this chapter in contexts where their work predated the amalgamation.

At the postprimary level, the Junior Cycle for Teachers (JCT, now part of Oide) has provided continuing professional development support for schools to implement the Framework for Junior Cycle (for teachers of Grades 7 to 9). This includes cluster days where teachers attend subject-specific workshops on the implementation of the Junior Cycle curriculum. The National Centre for STEM (science, technology, engineering, and mathematics) Education provides a part-time postgraduate program for postprimary teachers to attain a Professional Diploma in Mathematics for Teaching. This program is funded by the DE to enhance the skills of mathematics teachers.

Centers such as those at the University of Limerick, University College Cork, and Dublin City University, among others, are examples of third-level institutions that work closely with teachers and students to research good practice in science education and provide professional development. The RDS (Royal Dublin Society) STEM Learning Programme offers a professional development program for developing teachers' conceptual and pedagogical knowledge of mathematics and science.

Monitoring Student Progress in Mathematics and Science

Section 22 of the Education Act specifies that schools are required to regularly evaluate students and periodically report the results of the evaluation to their parents or guardians. The National Strategy: Literacy and Numeracy for Learning and Life (2011–2020) outlined a requirement that all schools report to parents or guardians about their child's progress in both written school reports and parent-teacher meetings.

At the primary level, the Strategy introduced a formal requirement to administer standardized tests of English reading, mathematics, and, in Irish-medium schools, Irish, at Grades 2, 4, and 6. However, in practice, annual administration of standardized tests of mathematics from Grades 1 to 6 is almost universal.[g] Conversely, standardized tests of science are not commonly administered in Ireland.[h] Schools choose from a small number of standardized tests normed for an Irish population and aligned to the Primary School Curriculum. Schools must report the aggregated results of these tests, at the school level, to the DE. These data are not published publicly or in any way that could lead to the creation of school comparison league tables. Individual results are reported to parents or guardians. At the postprimary level, standardized tests of mathematics for students at the end of Grade 8 have been developed and made available for online administration since 2017 but are not mandated by the DE and have received limited uptake in schools to date.

In 2007, the NCCA published guidelines that outlined a wide range of assessment approaches, including child-led methods (e.g., self-assessment) and teacher-led methods (e.g., teacher-designed tasks, tests).[27] The guidelines also specify that primary schools should report

g While it is expected that all children will engage with standardized tests, there are exceptions in the case of children who, in the view of the school principal, have a learning or physical disability that would prevent them from attempting the tests or, in the case of migrant students, where the level of English required in the test would make attempting the test inappropriate.

h An example of such a test is the Irish Primary Science Achievement Tests (IPSA-T), which is designed to assess students' scientific knowledge and skill across the strands and strand units of the Primary School Curriculum.

students' progress at least twice a year, providing a range of report card templates that schools can use when reporting to parents or guardians. Since 2014, there has been a requirement for primary schools to report on students' progress, including standardized test results, using the NCCA-developed Education Passport when transitioning from primary to postprimary school (after sixth grade).[i]

Junior Cycle places a strong emphasis on assessment as part of the learning process. The Framework for Junior Cycle 2015[28] reduces the focus on externally assessed examinations and increases the prominence of classroom-based assessment (CBA) and formative assessment. Both Junior Cycle mathematics and science include three assessment moments, which include two CBAs,[j] one assessment task, and one final examination. The CBAs are designed by the NCCA and take place during Grade 8 and Grade 9, with teachers awarding a descriptor based on Features of Quality. The assessment task is administered in class by the teacher and is based on the learning outcomes assessed in the second CBA. It is marked by the State Examinations Commission (SEC) and accounts for 10% of the final mark. The final examination is a 2-hour exam that takes place at the end of Grade 9, again marked by the SEC, and accounts for 90% of the final mark. The results of these assessments are reported in a Junior Cycle Profile of Achievement (JCPA) as two CBA descriptors and one final exam grade. In conjunction with the JCPA, students take teacher-made assessments at the end of most terms. It is normal for report cards, with grades and teacher comments, to be issued after such assessments.

Although Ireland does not operate a national mandatory system of assessment for primary schools, it monitors standards through the regular assessment of reading and mathematics performance in a representative sample of schools. The Educational Research Centre regularly conducts national assessments of reading and mathematics on behalf of the DE with the most recent cycle conducted in 2021.[29] The main functions of the national assessments are to monitor and assess national standards, identify factors related to test performance, and inform policy developments.

Special Initiatives in Mathematics and Science Education

Mathematics and science initiatives in Ireland are both publicly and privately funded and are supported by a range of stakeholders, including professional organizations, foundations, social enterprises, and government agencies.

Across both the primary and postprimary levels, there are various school-led initiatives, including Maths Week, which is supported by Maths Week Ireland, a not-for-profit organization; and Science Week, which is supported by Science Foundation Ireland (SFI), a national foundation for the investment in scientific and engineering research. The SFI also runs a Discover Program that aims to increase interest and engagement in STEM subjects. The

i See https://ncca.ie/en/primary/reporting-and-transfer/ for more information.

j Due to COVID, Junior Cycle assessment requirements were adjusted for the years 2020–2023. Students completed one CBA in both mathematics and science. In addition, there was no requirement for the assessment tasks during this period.

Primary Science Fair and the BT Young Scientist and Technology Exhibition provide public fora for primary and postprimary schools, respectively, to showcase STEM projects, receive feedback from experts in the field, and learn from viewing other projects at a major exhibition. Other initiatives include the Engineers Ireland STEPS Programme that encourages primary and postprimary students to explore the world of STEM while promoting engineering as a career choice. At the postprimary level only, SciFest is a STEM fair program in Ireland hosted locally in schools and regionally in third-level institutions. The John Hooper Medal for Statistics competition is an annual competition that is open to all postprimary schools and is awarded by the Central Statistics Office for outstanding projects in statistics. Maths Circles Ireland is an initiative designed for postprimary students to encourage problem-solving, investigation, and discovery, and Maths Eyes is an initiative designed for both primary and postprimary students to encourage them to see mathematics in the world around them. This is not an exhaustive list of the mathematics and science initiatives on offer.

The Delivering Equality of Opportunity in Schools (DEIS) program administered by the DE provides additional support and initiatives to address educational disadvantage. One initiative within the program is Mathematics Recovery. It focuses on the lowest achievers at Grade 1 and provides a program of intensive individualized, group, or class-based teaching. An interim review of the National Strategy: Literacy and Numeracy for Learning and Life (2011–2020)[30] included specific numeracy targets for schools identified as most disadvantaged at the primary and postprimary levels.

Suggested Reading

A wide range of documents are available for download from the websites of the Department of Education and Skills (www.education.ie), the National Council for Curriculum and Assessment (www.ncca.ie), and the Educational Research Centre (www.erc.ie).

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