

Norway

Ole Kristian Bergem

Jelena Radišić

Department of Teacher Education and School Research, University of Oslo

Introduction

Overview of the Education System

Norway has a centralized curriculum comprising all subjects for Grades 1 to 13. Parliament approves the curriculum through a process initiated by the Ministry of Education and Research. Several interest and expert groups are involved in developing and revising the curriculum. A new curriculum for all subjects in primary and lower secondary schools will be implemented in 2020. Within the frameworks set by the curriculum, local schools and teachers have considerable freedom to make their own decisions regarding organization and instructional methods.

Kindergarten or preprimary school is neither compulsory nor free in Norway, though every child has a right to attend. Following preprimary school, every child has the legal right to 13 years of education, of which the first 10 grades (Grades 1 to 10) are compulsory and free. The next three years of education (Grades 11 to 13) are not compulsory but are still free. Children enter first grade in August of the year they reach age 6. Most students are enrolled in public school; private schools play a minor role in the education system.¹

School in Norway is divided into three main stages: Grades 1 to 7, Grades 8 to 10, and Grades 11 to 13. Together, the first two stages (Grades 1 to 10) constitute compulsory education, referred to as basic school. In basic school, there are few alternative programs and no streaming; almost all students are taught together in inclusive classrooms. This system is based on a broad political agreement to minimize differences among students.

The final three grades, Grades 11 to 13, constitute (upper) secondary school. Although education at this level is not compulsory, the vast majority of the youth cohort in Norway attends it. Although certain basic subjects are common to all students, students choose from a variety of general study programs that prepare them for tertiary studies and vocational programs.

In 2006, the National Curriculum for Knowledge Promotion was introduced. This curriculum retains the basic education vision of previous curricula while providing for the first time a comprehensive curriculum for the entire school system. Fully implemented by 2008, the curriculum includes goals defined as competencies to be attained and introduces five basic areas of skill (literacies) that permeate the curriculum across all subjects.^{2,3}

Mathematics is a prominent subject in the Norwegian school curriculum. Together with Norwegian and English, it is one of the core subjects covered on national examinations in

Grade 10. Much less instructional time is allocated for science during compulsory education, and there is no national examination for science in Grade 10. However, the 2006 curriculum reform increased the amount of time allocated for both mathematics and science in the lower grades.

Use and Impact of TIMSS

Norway participated in TIMSS 1995, TIMSS 2003, TIMSS 2007, TIMSS 2011, TIMSS 2015, and TIMSS 2019, as well as in TIMSS Advanced in 1995, 2008, and 2015. Norway also takes part in the Programme for International Student Assessment (PISA), Progress in International Reading Literacy Study (PIRLS), and Teaching and Learning International Study (TALIS). Outcomes from these studies have received publicity; attracted professional, political, and public interest; and generated public debate, prompting the Ministry of Education and Research to appoint a commission to review the education situation in Norway. This review resulted in significant curriculum reform for the entire school system in 2006. At present, international surveys play an important role in the national evaluation of education quality.⁴

Generally, TIMSS, TIMSS Advanced, and PISA have been influential in setting the agenda for discussions on education in Norway, as well as for action taken to improve student achievement in mathematics and science.⁵

An important curricular goal in Norway is for all students to receive instruction in accordance with their potential for learning. A recent example of how TIMSS results have influenced education policy in Norway is the increased awareness of the importance of supporting high achieving students. For a long time, partly due to previous TIMSS results, low achieving students received significant attention and resources; presently, however, there is a growing understanding that high achieving students also need attention and support to fully realize their potential and develop their talents. From a national perspective, this realization is important to the ongoing discussion regarding student recruitment to science, technology, engineering, and mathematics (STEM) education programs and professions (see section “Special Initiatives in Mathematics and Science Education,” below).

The Mathematics Curriculum in Primary and Lower Secondary Grades

The Norwegian curriculum is organized by grade ranges, and curriculum goals specify competencies to be attained by the end of Grades 2, 4, 7, 10, 11, 12, and 13. Thus, for Grades 5 and 9, there are no grade-specific curricular goals. In addition, the order in which subjects are presented to students within these grade ranges (i.e., 5 to 7, 8 to 10), may vary across schools and textbooks. These factors make it difficult to assess the degree to which students in target grades have been exposed to the mathematics necessary for solving items in TIMSS 2019. Hence, curriculum statements for Grades 5 and 9 give only a rough indication of what is covered.

For each school subject, the curriculum includes an introduction outlining the general objectives and structure of the subject, specifications for basic skills in that subject, a list of

competency goals, and statements regarding assessment. A brief overview of the mathematics curriculum for Grades 1 to 10 follows.

The first sentence of the curriculum states, “Mathematics is part of our global cultural heritage.”⁶ After presenting mathematics as a possible source of joy, the curriculum emphasizes the broad range of mathematics applications and utilities. It goes on to introduce certain concrete and practical as well as abstract and theoretical aspects of mathematics that have an essential place in the teaching and learning of the subject.

The mathematics curriculum is organized under subject domains. The domains for Grades 1 to 4 are Numbers, Geometry, Measuring, and Statistics. The domains for Grades 5 to 7 are Numbers and Algebra, Geometry, Measuring, and Statistics and Probability. The domains for Grades 8 to 10 are Numbers and Algebra; Geometry; Measuring; Statistics, Probability, and Combinatorics; and Functions.

The curriculum defines five basic areas of skill across all subjects and at all grade levels. For mathematics, these skill areas include the following:

- Oral skills—Creating meaning by listening, asking, speaking, reasoning, and discussing mathematics; developing communication skills, progressing from simple, informal language toward precise terminology and unambiguous conceptual language
- Writing skills—Expressing discoveries, ideas, lines of thought, and solutions; making suitable sketches, drawings, tables, graphs, and diagrams; and developing the ability to use formal, symbolic language and to formulate comprehensive arguments about complex relationships
- Reading skills—Understanding texts containing mathematical expressions, graphs, diagrams, tables, symbols, formulas, and logical reasoning; and understanding complex texts with advanced symbolic language and concepts
- Numeracy—Applying symbolic language, mathematical concepts, and a variety of strategies in problem solving and investigations in practical, everyday situations and in pure mathematical contexts; recognizing mathematical aspects of situations and problems, analyzing them, and evaluating the validity of solutions; progressing from a basic understanding of numbers toward analyzing and solving complex problems using a variety of strategies and methods; and learning to use various tools more in calculations, modeling, and communication
- Digital skills—Applying digital tools to calculation, investigation, visualization, simulation, modeling, and presentation; and critically evaluating sources, analyses, results, and utilities

Exhibit 1 presents a summary of the competencies that students are expected to attain in mathematics in Grades 1 to 4, Grades 5 to 7, and Grades 8 to 10, respectively. Generally, it might be expected that the one-third of the goals for Grades 5 to 7 should be attained in Grade 5, and that two-thirds of the goals for Grades 8 to 10 should be attained in Grade 9.

Exhibit 1: Expected Competencies in Mathematics, Grades 1–10 (Abbreviated)⁷

Grade Range	Subject Domain	Expected Competencies
Grades 1–4	Numbers	Use the number line, describe and use the place-value system for integers, and use positive and negative integers, simple fractions, and decimal numbers in practical contexts; estimate both mentally and on paper; develop and use different methods for addition, subtraction, multiplication, and division mentally and on paper, and apply them in practical contexts; find information in texts or practical situations, choose an arithmetic operation and provide a rationale for the choice, exploit relations between arithmetic operations, assess results, and present solutions; recognize, experiment with, describe, and develop simple number patterns; use mathematical symbols and expressions in problem-solving
	Geometry	Recognize, sort, and describe characteristics of geometric figures; recognize and use mirror symmetry and translation in practical situations; make, explore, and describe geometric patterns, with and without digital tools; read, place, and describe positions in grids, on maps, and in coordinate systems with and without digital tools
	Measuring	Estimate and measure length, area, volume, mass, temperature, time, and angles, and assess whether the results are reasonable; compare magnitudes and convert units; solve practical tasks that involve buying and selling
	Statistics	Collect, sort, record, illustrate, and comment on data using tallies, tables, and bar charts with or without digital tools, and discuss the results
Grades 5–7	Numbers and Algebra	Calculate with positive and negative integers, decimal numbers, fractions, and percentages; find common denominators; use a spreadsheet for simple calculations and presentations; justify solution methods; explore and describe structures and changes in numerical and geometrical patterns using figures, words, and formulas; formulate and solve simple equations; and simplify expressions with parentheses, addition, subtraction, and multiplication of numbers
	Geometry	Analyze characteristics of two- and three-dimensional figures, build three-dimensional models, and draw simple three-dimensional figures in perspective; describe and perform reflection, rotation, and translation; describe position and movement in a coordinate system; and calculate distances parallel to the coordinate axes
	Measuring	Select suitable measurement tools, choose suitable units, and convert between units; explain the structure of measurements of length, area, and volume and calculate circumference, area, surface area, and volume of simple two- and three-dimensional figures; use a scale to calculate distances from a map and to make a scale drawing; use ratios in practical situations; calculate velocity; and convert currencies
	Statistics and Probability	Collect data from observations, questionnaires, and experiments; represent data in tables and graphs digitally and manually; read, interpret, and assess data; find median, mode, and average for simple data sets, and assess them in relation to each other; assess and discuss probability in everyday contexts, games, and experiments; calculate probability in simple situations

Grade Range	Subject Domain	Expected Competencies
Grades 8–10	Numbers and Algebra	Compare and convert between integers, decimal numbers, fractions, percentages, and numbers in standard form, and assess the suitability of different representations in various situations; divide and reduce fractions; use factors, powers, square roots, and prime numbers in calculations; factor and simplify algebraic expressions, and relate such expressions to practical situations; manipulate formulas, parentheses, and simple rational expressions; solve linear equations and inequalities and simple systems of equations with two unknowns, and apply this skill to solve practical and theoretical problems; perform calculations about consumption, use of credit cards, income, loans, and savings, and set up budgets and accounts using a spreadsheet; analyze complex problems, identify fixed and variable quantities, perform calculations, and present results; use numbers and variables in investigation, experimentation, practical and theoretical problem solving, and technology and design projects
	Geometry	Investigate and describe characteristics of two- and three-dimensional figures, and use them for constructions and calculations; perform, describe, and explain constructions with a compass and a ruler, and with a dynamic geometry program; use and explain the use of congruence and the Pythagorean theorem to calculate unknown lengths and angles; make and interpret scale drawings and perspective drawings; use coordinates to represent and investigate geometric figures; formulate logical reasoning about geometrical ideas
	Measuring	Discuss precision and uncertainty of measurements; account for the number π , and use it in calculations of circumference, area, and volume
	Statistics, Probability, and Combinatorics	Carry out investigations and use databases to search for and analyze statistical data and demonstrate critical assessment of data sources; order and group data; find and discuss median, mode, average, and range; present data with and without digital tools, and discuss different ways of presenting data; find and discuss probabilities through experimentation, simulations, and calculations in everyday contexts and in games; describe sample spaces and represent probabilities as fractions, percentages, and decimal numbers; discuss and solve simple combinatorial problems
	Functions	Construct functions that describe numerical relationships and practical situations, with and without digital tools, describe and interpret the functions, and convert between various representations of functions, such as graphs, tables, formulas, and text; identify and apply properties of proportional, inversely proportional, linear, and quadratic functions, and provide examples of practical situations that may be described by these functions

The Science Curriculum in Primary and Lower Secondary Grades

A brief overview of the science curriculum for Grades 1 to 10 follows.

Knowledge and understanding of the natural sciences constitute a basis for participation in the democratic process and enable people to contribute to sustainable development. Learning science must be closely related to practical experience in laboratories and nature. The first sentence in the curriculum states, “Natural science is the result of human curiosity and our need to find answers

to questions about our existence, life and life forms, and our place in nature and the universe, and, in this way, it becomes part of our culture.”⁸ The curriculum emphasizes the holistic nature of the subject even though natural science is divided into the disciplines of physics, chemistry, biology, and the geosciences. The curriculum also states that scientific laws and theories are models of a complex reality and that these models are developed through observations, experiments, and ideas. In short, the science curriculum emphasizes the importance of understanding both the content and the nature of science.

The natural science curriculum for Grades 1 to 10 is organized into five main areas: the Budding Researcher, Diversity in Nature, Body and Health, Phenomena and Substances, and Technology and Design. The curriculum defines five basic areas of skill across all subjects and at all grade levels. For natural science, these areas of skill include the following:

- Oral skills—Listening and speaking to communicate knowledge and formulate questions, arguments, and explanations in natural science; adapting to different forms of expression, concepts, and examples to suit different objectives and recipients; progressing from simple experiences and observations to the ability to discuss progressively more complex themes, involving an increasing use of scientific concepts to express understanding, form opinions, and participate in academic discussions
- Writing skills—Writing plans and formulating questions, hypotheses, and explanations; comparing and reflecting on information, using sources in a purposeful manner, and formulating arguments; using scientific concepts, diagrams, and symbols that are suited to the objective and the recipient; developing in writing proficiency, from using simple forms of expression to composing more complex texts with precise scientific concepts, symbols, graphic presentations, and argumentation
- Reading skills—Understanding concepts, symbols, diagrams, and arguments in texts related to natural science in books, newspapers, operating manuals, brochures, and digital sources; critically assessing how information is presented and used in arguments; distinguishing between data, assumptions, assertions, hypotheses, and conclusions; developing in reading proficiency, from finding and using information in simple texts to understanding texts with increasingly complex terminology, symbols, diagrams, tables, and implicit information; developing the ability to read critically, identify relevant information, and evaluate the credibility and relevance of sources of information
- Numeracy—Collecting, processing, and presenting numerical data, using concepts, measuring instruments, units, formulas, and graphics; comparing, evaluating, and arguing for the validity of calculations, results, and presentations; progressing from using simple methods for counting and classification to being able to evaluate the choice of methods, concepts, formulas, and measuring instruments; gradually becoming able to make more advanced presentations, assessments, and arguments
- Digital skills—Using digital tools to explore, record, process, visualize, document, and publish data from studies, experiments, and fieldwork, involving the use of research tools and strategies; evaluating sources critically and selecting relevant information on topics in

natural science; progressing from the simple application of digital tools to the selection and implementation of digital sources, tools, media, and information with increasing independence

Exhibit 2 presents the competencies that students are expected to attain in natural science in Grades 1 to 4, Grades 5 to 7, and Grades 8 to 10. As a general indication, it is expected that the about one-third of the goals for Grades 5 to 7 should be attained in Grade 5, and two-thirds of the goals for Grades 8 to 10 should be attained in Grade 9.

Exhibit 2: Expected Competencies in Natural Science, Grades 1 to 10 (Abbreviated)⁹

Grade Range	Subject Domain	Expected Competencies
Grades 1–4	The Budding Researcher	Explore the local neighborhood, ask questions, and talk about experiences in nature and man’s place in nature; describe observations and suggest and discuss possible explanations; use simple measuring instruments, collect and organize data, present results, and write reports; collect and process information regarding natural science from different sources
	Diversity in Nature	Recognize, sort, and describe certain plant and animal species in the local environment, and compare their life cycles; observe and describe characteristics of the four seasons; observe and describe changes that occur in a tree or another perennial plant over time; describe an extinct animal species; discuss animal welfare and distinguish between fact and opinion; investigate biological decomposition and describe a life cycle in nature; practice recycling and discuss its importance; argue for appropriate behavior toward the natural environment
	Body and Health	Describe general traits of the human body; discuss respect for one’s own body and the bodies of others; describe the form and function of the digestive system, skeleton, and muscles; explain why we vaccinate against certain diseases; describe a common illness and how it can be prevented; observe and describe how the human body reacts in different situations; discuss different emotional reactions and the relationship between physical and mental health
	Phenomena and Substances	Describe and illustrate how Earth, the Moon, and the Sun move in relation to each other, discussing the seasons, day and night, and lunar phases; research and write about planets in our solar system; recognize certain stellar constellations; tell and discuss legends and myths related to the starry sky and Northern Lights; describe and sort substances, and carry out experiments showing that substances and mixtures may change characteristics in certain environments; experiment with water, light, and sound, describe the observations, and suggest explanations; record and describe observations of weather, measure temperature and precipitation, and present the results graphically

Grade Range	Subject Domain	Expected Competencies
	Technology and Design	Make objects that can be propelled by water or air and objects that use reflection of light, and discuss how they work; plan, build, and test simple models of building constructions and document the process with text and illustrations; describe building structures and discuss why some are more stable than others; recognize and describe load-bearing structures in buildings in the local neighborhood
Grades 5–7	The Budding Researcher	Formulate questions, suggest explanations, make a plan, and conduct an investigation; discuss the importance of making and testing hypotheses through systematic experiments and observations; use digital tools to record, process, and publish data from experiments and fieldwork; extract natural science information from different media and make a presentation
	Diversity in Nature	Plan and conduct explorations in nature, and record the observations; examine and describe flowering plants and explain the functions of different parts of plants; examine and discuss factors that influence the germination and growth of plants; describe the characteristics of certain plants, mushrooms, and animals and order them systematically; discuss traditional uses of certain plants, mushrooms, and animals
	Body and Health	Describe the development of the human body from conception to adulthood; explain what happens during puberty and discuss gender identity and sexual orientation; describe the main features of the heart and lung system and its function in the human body; explain how the body protects itself against illness and how we may prevent and treat infectious diseases; collect information and statistics, and discuss damage to health caused by drug abuse
	Phenomena and Substances	Use animations and models to describe the motions of the planets and the Moon, and explain reasons for the seasons and the lunar phases; describe how certain minerals and rocks have been formed; account for the use of certain sources of energy in the past and the present, and describe consequences of this use for the global and local environment; explain the concept of climate, identify certain causes of climate change, and investigate the consequences of extreme weather; investigate phenomena related to sound, hearing, and noise, discuss observations, and explain how sound may damage hearing; conduct experiments with magnetism and electricity and explain and present results; describe the main characteristics of gases, liquids, solids, and phase transitions by using the particle model; use the concepts of atoms and molecules to explain the structure of substances and how substances may be transformed; carry out experiments with chemical reactions and describe what characterizes them
	Technology and Design	Plan, build, and test mechanical toys, and explain the principles of mechanical transfer; plan, make and test simple products that use electricity; describe the life cycle of a product and discuss to what extent it is compatible with sustainable development
Grades 8–10	The Budding Researcher	Formulate testable hypotheses, plan and conduct experiments, and discuss observations and results in a report; collect and process natural science data, and present results graphically; write explanations and arguments; explain the importance of looking for relationships between cause and effect, and explain why arguments, disagreement, and publication are important; identify scientific arguments, facts, and assertions in media, and assess the content critically; comply with safety measures

Grade Range	Subject Domain	Expected Competencies
	Diversity in Nature	Explain the main features of the theory of evolution and give an account of observations that support this theory; describe the structure of animal and plant cells and explain the main features of photosynthesis and cellular respiration; describe cell division, genetic variation, and inheritance; explain the main features of theories about how Earth is changing and has changed over the eons, and the underpinning of these theories; investigate biotic and abiotic factors in a local ecosystem and explain the relationship between the factors; observe and provide examples of how human activities have affected a nature area, investigate views of different interest groups on these effects, and propose measures that may preserve nature for future generations
	Body and Health	Describe the nervous system and the endocrine system, and explain how these systems control bodily processes; describe the development of a fetus and the process of birth; discuss issues related to sexuality, sexual orientation, gender identity, sexual limits and respect, sexually transmitted diseases, contraception, and abortion; explain how lifestyle may affect health, including slimming and eating disorders, and how they may be prevented; provide examples of and discuss the difference between alternative and academic medicine
	Phenomena and Substances	Describe the universe and different theories of how it has developed; investigate a topic on the exploration of outer space; assess properties of elements and compounds by using the periodic table; examine properties of certain common everyday substances, and perform simple calculations related to the dilution of solutions; examine and classify pure substances and mixtures based on solubility in water, combustibility, acidity, and basicity; separate substances in a mixture, and analyze an unknown substance; examine hydrocarbons, alcohols, carboxylic acids, and carbohydrates; explain the origin of crude oil and natural gas; use the concepts of current, voltage, resistance, power, and induction to explain results from experiments with electric circuits; explain how we can produce electric energy from renewable and nonrenewable sources, and discuss environmental effects; explain the concepts of velocity and acceleration, measure their magnitude with simple tools, and provide examples of how force is connected to acceleration; carry out experiments and simple calculations with work, energy, and power; explain how traffic safety equipment prevents and reduces injury in accidents; carry out experiments with light, vision, and colors, and describe and explain the results
	Technology and Design	Develop products, and assess product functionality and user-friendliness; test and describe properties of materials used in a production process, and assess their use from an environmental perspective; describe an electronic communication system, explain how it transfers information from sender to recipient, and discuss positive and negative consequences

Professional Development Requirements and Programs

Teacher professional development is the responsibility of school administrators (i.e., municipalities or counties), often supported by government funding.

In 2014, teacher employment regulations were expanded. In addition to general employment requirements, teachers in primary school are now required to hold a minimum of 30 credits in a subject to teach it. In lower secondary school, teachers are required to hold 60 credits in mathematics and 30 credits in science to teach those subjects. Since these new regulations came into effect, all teachers who do not fulfil the new requirements and wish to continue teaching are required to undertake further education by the end of 2025.¹⁰ Professional development courses for teachers most often are offered by universities and university colleges.

In 2005, the Norwegian Ministry of Education and Research launched an initiative to strengthen professional development programs for teachers in primary, lower secondary, and higher secondary schools. This initiative is being implemented in several stages through the elaboration of strategies for certain periods from 2005 to 2025.^{11,12,13,14} These improved professional development programs give teachers an opportunity to earn European Credit Transfer and Accumulation System (ECTS) points to extend their formal qualifications. In addition, the Ministry of Education funded smaller scale professional development programs not linked to ECTS points. Several organizations representing various stakeholders—including school owners, teacher organizations, and national advisory committees for teacher education—were invited to participate in developing the main principles for these programs. The motivation for this comprehensive cooperation was to ensure that all relevant interest groups were represented. A major goal of this strategy is improved learning outcomes for all students through improved teaching quality. The collaboration yielded the following three aims for professional development programs:

- To contribute to improved pedagogical and subject-related competence for teachers
- To ensure that all teachers fulfil the requirements for teaching the relevant subjects
- To contribute to the development of learning communities in all schools

Particularly, professional development courses should aim to improve the specific teaching competencies necessary to teach a subject, and such courses should be prioritized to a larger degree than they were previously. Colleges and universities, in cooperation with school owners and teacher organizations, have been given the responsibility to maintain and further develop such courses. School owners have been asked to develop plans to ensure that their teachers have an opportunity to participate in relevant professional development courses to fulfil the new teaching requirements. The Norwegian government is responsible for funding these courses by granting 75 percent of the total costs for professional development courses in science and mathematics and 60 percent of the total cost of professional development courses in other subjects. The allocation of expenses indicates the importance assigned to the quality of teaching in science and mathematics. All groups involved have been encouraged to cooperate closely to ensure the success of this endeavor.

Monitoring Student Progress in Mathematics and Science

At the end of their compulsory schooling (Grade 10), students receive one overall achievement grade in each subject, determined by their teachers. In addition, students are selected to sit for one written examination. Approximately one-third of students are selected to sit for an examination in mathematics, one-third for an examination in Norwegian, and one-third for an examination in English. These written examinations are prepared and graded at the national level. Students also may be selected for an oral examination that is prepared and graded locally, for which science and mathematics are among certain eligible subjects.

Norway administers national tests in numeracy, reading, and English early in Grades 5, 8, and 9. These tests are constructed and organized at the national level. The students' subject teachers score the national tests locally. Since 2014, the design of the national tests has allowed for trend analysis.

Even though grades are not given until lower secondary school, teachers write local tests to monitor student progress in earlier grades, as well. Lower secondary school teachers might use suggested tests found in commercial textbooks.

Teachers at all grade levels (1 to 10) regularly write individual progress reports for their students, and students together with their parents are summoned for meetings in school at least twice each school year.

Special Initiatives in Mathematics and Science Education

Since the turn of the millennium, several initiatives encouraging students to pursue careers in STEM have been launched,¹⁵ one of which led to the establishment of The National Centre for Science Recruitment.¹⁶ This center is an administrative agency of the Ministry of Education and Research, and its mandate is to design and implement initiatives that will increase the number of students, females in particular, choosing STEM education and careers. The center collaborates closely with tertiary educational institutions and employers to strengthen the position of STEM in society. Other initiatives include the establishment of two national centers for mathematics and science in education and nine local science centers that all contribute to enhancing knowledge about the STEM subjects and increasing motivation toward STEM.^{17,18,19} In addition, the political strategy aims to provide professional development for STEM teachers so that all these teachers will fulfil the expanded employment requirements by 2025 (see the section “Professional Development Requirements and Programs,” above).

Norwegian municipalities may allow high achieving students in Grades 8 to 10 to join upper secondary school classes in certain subjects, mathematics being the most common. These cases are considered on an individual basis, and decisions are subject to the consent of students or their parents.²⁰ Certain universities arrange for high achieving students in Grades 11 to 13 to join mathematics courses at the university.

Recently, the Ministry of Education and Research commissioned The Virtual School of Mathematics, which is available to both high and low achieving students.²¹ The virtual school is accessed via the internet and enables high achievers in Grades 8 to 10 (primarily in Grade 10) to attend Grade 11 mathematics classes and low achievers (primarily in Grade 9) to access a multitude of digital learning resources designed to help them understand, succeed in, and develop motivation in mathematics. For low achievers, the virtual school is a supplement to their regular in-school classes. For both groups, the virtual school is built on the principles of “flipped classrooms.”²² The project has now been renamed and expanded to include mathematics and science courses presented in foreign languages.

The Ministry of Education and Research has implemented a new course aiming to improve the mathematical competence of low achieving students in mathematics in lower secondary school. Students who take this course still are required to take the standard mathematics course that is compulsory for all students.

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