

Portugal

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Introduction

Overview of Education System

The Portuguese education system is organized according to three sequential education levels: preprimary education (ages 3 to 5), compulsory education (ages 6 to 17), and higher education (from age 18). In Portugal, education is compulsory for 12 years of schooling, or up to age 18 (this extension was introduced for every student enrolled in Grade 7 or below as of 2009–2010).¹

Education policy is defined centrally by the Ministry of Education, which is responsible for the definition and enforcement of the core curricula and learning goals for each level of education and subject. The Ministry of Education also defines teaching method guidelines that are adapted by teachers in each school in close relation with the school education project.

The Portuguese education network is composed of state-funded (public) schools, as well as private for-profit and nonprofit schools. The public network is organized in school clusters that are composed of schools that offer all education levels, from preschool education to secondary education, under the leadership of a school principal. School clusters aim to facilitate transitions across education levels, as well as to overcome geographic isolation and social exclusion.

Preprimary education is not compulsory. However, it is universal for children ages 4 and 5.² The main objectives of preschool education are to promote children's personal and social development and well-being; their expression, communication, curiosity, and critical-thinking abilities; and the involvement of families in their children's education.

Compulsory education starts at age 6 and is divided into basic education (9 years of school) and secondary education (3 years of school). Basic education aims to ensure a common general education for all children, providing the fundamental knowledge and skills required for pursuing (upper) secondary education. It is divided into three sequential cycles: first cycle (Grades 1 to 4), second cycle (Grades 5 and 6), and third cycle (Grades 7 to 9). The first and second cycles correspond to primary education (International Standard Classification of Education [ISCED] 1), and the third cycle corresponds to lower secondary education (ISCED 2).

In the first cycle of basic education, teaching is the responsibility of a generalist teacher who may be assisted by other teachers in specialized areas, namely music, foreign language, and physical education. The core curriculum focuses on Portuguese, mathematics, and sciences.

The second and third cycles of basic education are organized into multidisciplinary areas of study taught by specialist teachers. Compulsory learning of a foreign language begins in Grade 3 of the first cycle, with English as a mandatory foreign language for all students until the end of basic education in order to give students command of the language in a structured and sequential way. In the third cycle of basic education, a second foreign language is introduced and is compulsory.

Basic education can also be concluded and certified through different paths adapted to the profile and specific characteristics of students, such as the following:

- education and training courses
- alternative curricular pathways
- an integrated education and training program

Upper secondary education (Grades 10 to 12, ISCED 3) is organized into different education or training paths, providing access to higher education or for entering active life. The scientific-humanistic path prepares students to enter higher education in the sciences, technology, and humanities. Specialized arts courses prepare students to enter active life or to follow higher education studies in music and performing arts, audiovisual arts, and dance. Vocational and professional paths prepare students to enter active life but also allow for the pursuit of higher education studies.³

Use and Impact of TIMSS

In 2019, Portugal participated in TIMSS in Grade 4 for the fourth time, having participated previously in TIMSS 1995, 2011, and 2015. In 2019, Portugal participated in Grade 8 for the second time, having previously participated in TIMSS 1995. There is no explicit mention of TIMSS results or TIMSS frameworks in the national curricula development for Grade 4 or 8 or other official policies aimed at basic education goals and orientations. However, the new upper secondary mathematics curriculum, introduced in academic year 2015–2016, mentions TIMSS Advanced (TIMSS assessment of students in the final year of secondary school who are enrolled in special advanced mathematics and physics programs; Portugal participated in TIMSS Advanced 2015 in mathematics) and reducing the gap between the national mathematics curriculum and the TIMSS Advanced framework.⁴

The Mathematics Curriculum in Primary and Lower Secondary Grades

The curriculum for mathematics includes general education targets, planning for instruction and teaching methods, and mathematics subject matter and competencies, as well as general assessment guidelines for all of basic education (Grades 1 to 9). By the end of basic education, the curriculum should contribute to the acquisition of knowledge of facts and procedures; the construction and development of mathematical reasoning, communicating (oral and written) mathematics, and problem-solving in different contexts; and a holistic and coherent view of mathematics.⁵

The general goals of the mathematics curriculum and its development during the three cycles of education are to

- promote the knowledge of basic mathematical facts and procedures;
- develop mathematical comprehension and reasoning;
- read and interpret different mathematical representations;
- develop, organize, and communicate mathematical ideas and reasoning;
- solve problems using mathematical knowledge and critically discuss the solutions reached;
- establish connections between different mathematical concepts and relationships, as well as relationships in nonmathematical contexts;
- develop autonomous mathematical work strategies; and
- appreciate mathematics and its importance to other school subjects and daily life.

The curriculum emphasizes three major skills required of all mathematical learning: mathematical reasoning, resolution of mathematical problems, and communication of mathematical results and conclusions. Exhibit 1 presents mathematics topics and content in the three cycles of education.

Exhibit 1: Mathematics Topics and Content⁶

Cycle of Education	Topic	Content
First (Grades 1 to 4)	numbers and operations	<ul style="list-style-type: none"> • natural numbers, decimal numbering system, arithmetic operations (addition, subtraction, multiplication, and division), number sequences, identifying and representing fractions, arithmetic operations with fractions and decimal numbers • decimal representation of non-negative rational numbers
	geometry and measurement	<ul style="list-style-type: none"> • location and orientation in space, geometric figures, angles, geometric properties, measure, distance and length, area, volume and capacity, mass, time, money, problem-solving
	organization of data and data processing	<ul style="list-style-type: none"> • representation of sets, data representation, data processing
Second (Grades 5 and 6)	numbers and operations	<ul style="list-style-type: none"> • natural numbers, rational numbers (positive and negative rational numbers, addition and subtraction)
	geometry	<ul style="list-style-type: none"> • geometric properties (angles, parallelism, and perpendicularity), triangles and quadrilaterals, measure (area, angle width, volume), plane isometries, flat geometric figures, geometric solids and properties, problem-solving

Exhibit 1: Mathematics Topics and Content (Continued)

Cycle of Education	Topic	Content
Second (Grades 5 and 6)	algebra	<ul style="list-style-type: none"> algebraic expressions and properties of operations, natural exponent powers, sequences and regularities, direct proportionality
	organization of data and data processing	<ul style="list-style-type: none"> Cartesian charts, representation, and data processing
Third (Grades 7 to 9)	numbers and operations	<ul style="list-style-type: none"> rational numbers, periodic finite and infinite tithes, nonperiodic infinite tithes and real numbers, order relationship in \mathbb{R} (order relationship properties, intervals, approximate values of results of operations)
	geometry and measurement	<ul style="list-style-type: none"> Greek alphabet, geometric figures (polygonal lines and polygons, quadrilaterals), parallelism, congruence and similarity, measurement (changes in unit length and incommensurability, quadrilateral areas, perimeters and areas of similar figures, distances to a point plane, parallel lines and parallel planes, volumes and areas of solid surfaces), Pythagorean theorem, vectors, translations and isometries, axiomatization of mathematical theories (vocabulary of axiomatic method, axiomatization of geometry), parallelism and perpendicularity of lines and planes (Euclidean geometry and the axiom of parallels, parallelism of lines and planes in Euclidean space, perpendicularity of lines and planes in Euclidean space, problems), trigonometry, geometric places involving notable points of triangles, properties of angles, strings and arcs defined in a circle
	functions, sequences, and successions	<ul style="list-style-type: none"> functions (function definition, operations with numeric functions, sequences and successions), graphs of related functions, algebraic functions
	algebra	<ul style="list-style-type: none"> algebraic expressions, square and cube roots, algebraic equations, full exponent powers, monomials and polynomials, incomplete second-degree equations, literal equations, systems of two first-degree equations with two unknowns, inequalities, second-degree equations, inverse proportionality
	organization of data and data processing	<ul style="list-style-type: none"> location measures, diagrams of extremes and quartiles, histograms, probability

The Science Curriculum in Primary and Lower Secondary Grades

The science curriculum in the first cycle of basic education (Grades 1 to 4) in Portugal is a core subject of a study domain designated Environment Studies.⁷ This study domain aims to promote students' understanding of the natural and social environment in which they live. In the first cycle, this study domain evokes knowledge from several scientific areas, namely geography, history, biology, physics, and chemistry.

The curriculum is developed around the following six thematic blocks:

- discovering myself
- discovering others and institutions
- discovering the natural environment
- discovering interrelations between places
- discovering materials and objects
- discovering relations between nature and society

In the second cycle of basic education (Grades 5 and 6), science is offered as an independent subject named Natural Sciences.⁸ The curriculum for this subject focuses on themes that are fundamental for students' comprehension of the functions of the Sun-Earth-life system. It addresses the following domains:

- diversity of living beings and their interactions with the environment
- diversity of living beings (animals and plants)
- water, air, rocks, and soil
- vital processes common to living beings
- aggressions of the environment and integrity of the organism

In the third cycle of basic education (Grades 7 to 9), science is taught as Natural Sciences⁹ with the addition of Physics and Chemistry Sciences.¹⁰

The Natural Sciences curriculum in this cycle of education is developed around major domains such as Earth in Space, Earth in Transformation, Earth Sustainability, and Living Better on Earth. Through this curriculum, students are introduced to external and internal Earth dynamics; consequences of internal Earth dynamics; Earth's geological history; the sustainability of life on Earth; Earth's systems, from cells to ecosystems; sustainable management of Earth's resources; and better living on the planet.

The Physics and Chemistry Sciences curriculum is developed around major domains such as Space, Materials, Energy, Chemical Reactions, Sound, Light, Movements and Forces, Electricity, and Materials' Classification (see Exhibit 2).

Exhibit 2: Physics and Chemistry Sciences Domains and Subdomains¹¹

Grade	Domain	Subdomain
7	Space	<ul style="list-style-type: none"> universe, solar system, distances in the universe, Earth, the Moon, gravitational forces
	Materials	<ul style="list-style-type: none"> constitution of the material world, substances and mixtures, physical and chemical transformations, physical and chemical properties of materials, separation of substances from a mixture
	Energy	<ul style="list-style-type: none"> energy sources and energy transfers
8	Chemical Reactions	<ul style="list-style-type: none"> explanation and representation of chemical reactions, types of chemical reactions, speed of chemical reactions
	Sound	<ul style="list-style-type: none"> sound production and propagation, sound and waves, sound attributes and their detection by humans, acoustic phenomena
	Light	<ul style="list-style-type: none"> light waves and their propagation, optical phenomena
9	Movements and Forces	<ul style="list-style-type: none"> Earth's movements, forces, movements and energy, forces and fluids
	Electricity	<ul style="list-style-type: none"> electric current and electrical circuits, effects of electrical current and electrical energy
	Materials' Classification	<ul style="list-style-type: none"> atomic structure, material properties and periodic table, chemical bond

Teacher Professional Development Requirements and Programs

The professional development of teachers in Portugal is understood as a structural element in improving the quality, effectiveness, and efficiency of the education system. The Ministry of Education promotes several programs for teachers' professional development in partnership with different higher education institutes and universities.

In parallel, the Ministry of Education, through various agencies, promotes several training courses for teachers that aim to contribute, among other aspects, to improving the quality of teaching and students' school results and the professional development of teachers and other education agents, in their continuous improvement throughout life.

The programs of in-service training are part of a broader strategy of developing professional practice among teachers in order to equip them to meet the challenges of wider structural and organizational reforms in the education system.

Monitoring Student Progress in Mathematics and Science

Assessment is an integral part of education practice, enabling the systematic collection of information essential for making appropriate decisions to improve the quality of student learning. According to Decree-Law No. 55/2018, student assessment includes formative and summative assessment.¹²

Schools have pedagogical autonomy to define the assessment and monitoring criteria for each grade and study cycle in accordance with the orientation and goals of the national curricula. Teachers are responsible for students' assessment, as well as for the awarding of marks. Students are internally assessed at the end of each term and each school year.

Until academic year 2023–2024, at a national level, students' learning was monitored through low-stakes testing (standardized tests) provided by the National Education Assessment Institute (IAVE) in Grades 2, 5, and 8 in Portuguese, mathematics, sciences, English, history, geography, artistic education, and physical education.¹³ As a result, detailed information about student performance in each domain of each subject has been provided to schools. As of academic year 2024–2025, a new model of assessment for basic education will be implemented with the aim of improving the monitoring of the quality of learning, therefore contributing to school strategies for improving learning, as well as guiding public policies.¹⁴ This new assessment model will be compulsory and universal and should also be an instrument at the service of schools and teachers to strengthen the timely diagnosis of areas for improvement. The new assessment model includes the following:

- learning monitoring tests (ModA) in Grades 4 and 6 for Portuguese, mathematics, and a rotating subject (English, history, geography, artistic education, or physical education) every 3 years
- comparison of results in basic education, which will make it possible to monitor the evolution of learning over time
- valorization of the digital format in assessment processes with guarantees of fairness

National exams take place at Grade 9 (end of basic education) for Portuguese and mathematics, and at Grades 11 and 12 (end of compulsory education) for different subjects, including mathematics and science, depending on the group of subjects the student attends to. Results on national exams affect students' assessment and certification.

Suggested Reading

Decreto-lei No. 55/2018 - Currículo nacional: Autonomia e Flexibilidade Curricular [Decree-Law No. 55/2018 – National curriculum: Curricular autonomy and flexibility]. (2018). https://www.dge.mec.pt/sites/default/files/Curriculo/AFC/dl_55_2018_afc.pdf

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