Czech Republic

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Introduction

Overview of Education System

Responsibility for schools in the Czech Republic is distributed among the Ministry of Education, Youth and Sports; regional education authorities; and municipalities. The Ministry sets education policies and assesses the development of the education system.

From 2001 to 2003, regional education authorities were established to fundamentally decentralize the education system. The Ministry of Education, Youth and Sports retained its policymaking responsibilities but transferred administrative responsibilities to the regions and municipalities.

In general, the Ministry's responsibilities are as follows:

- defining, establishing, and developing the education system
- allocating financial resources from the state budget
- setting the qualification requirements and working conditions of teachers
- determining the general content of education from preprimary to upper secondary
- approving educational programs of tertiary professional schools

The responsibilities of the regional education authorities are as follows:

- establishing upper secondary schools (International Standard Classification of Education [ISCED] 3)
- establishing *conservatoires* (ISCED 2, ISCED 3, ISCED 5)
- establishing tertiary professional schools (ISCED 6)

The responsibilities of the municipalities are as follows:

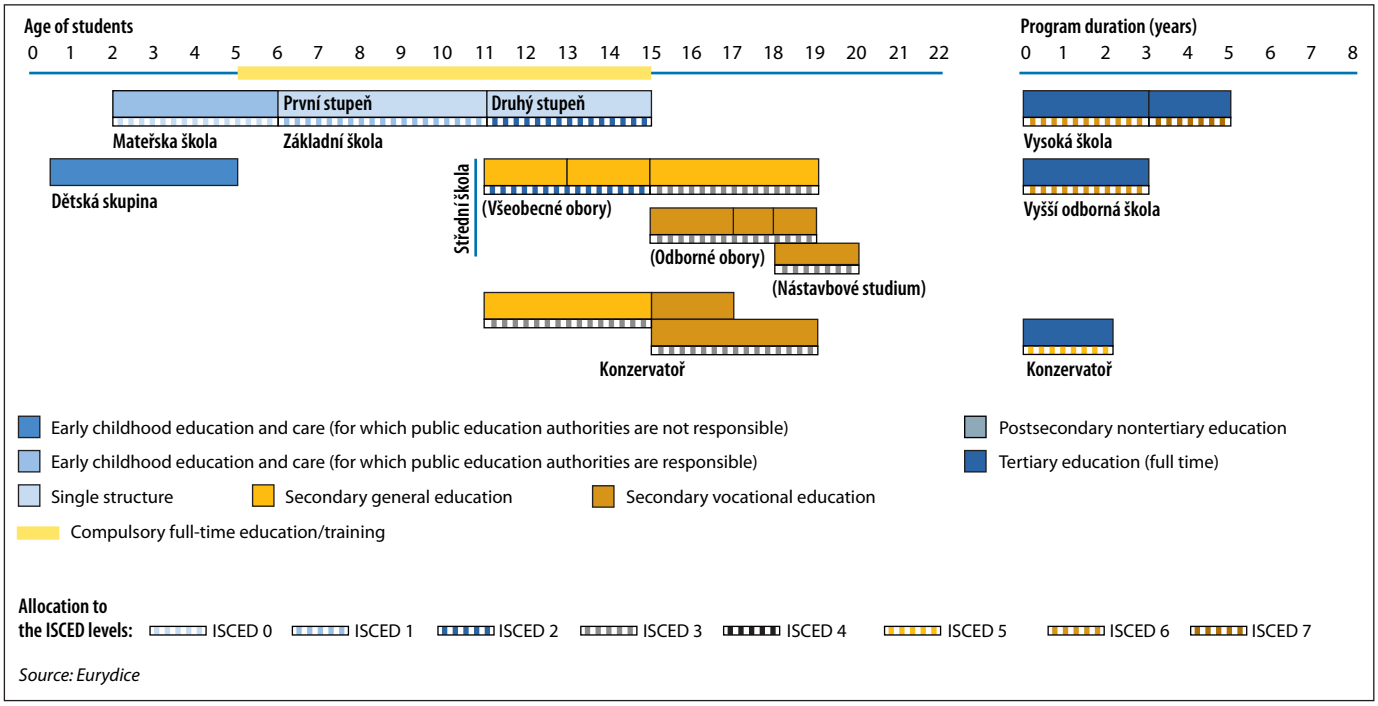
- establishing nursery schools (ISCED 0)
- establishing basic schools (ISCED 1, ISCED 2)
- ensuring compulsory education at preprimary and other levels of education

More specifically, the Ministry of Education, Youth and Sports defines compulsory education components; is partially responsible for funding public schools; and oversees the school register, a tool that ensures all students have access to appropriate educational opportunities.

The Ministry also oversees institutions that provide professional development for teachers and retains direct control of several institutions that offer institutional or preventive care, such as orphanages, detention centers for juveniles, and schools for students with physical needs or disabilities. The Czech School Inspectorate (CSI) serves as the main state authority responsible for monitoring school quality at the preprimary, primary, secondary, and postsecondary levels.

On October 19, 2020, the government approved the Strategy for the Education Policy of the Czech Republic up to 2030+.[1] The aim is to modernize the Czech education system in the fields of regional education, leisure activities and nonformal education, and lifelong learning. The implementation of the strategy will take place over three periods: 2020–2023, 2023–2027, and 2027–2031.

Exhibit 1: Structure of the Education System in the Czech Republic[2]



Source: Eurydice

Exhibit 1 describes the structure of the education system in the Czech Republic. Nursery schools (*mateřská škola*) usually provide education for children ages 3 to 6 as part of preprimary education. As of 2017, attendance is compulsory for children who are 5 years old (last year of preprimary education). The percentage of 5-year-olds attending nursery school is 93.8%. Some children start primary school (*první stupeň*) a year later (at age 7) because they are not yet ready to start at age 6 based on an educational and psychological assessment. The percentage of 6-year-olds attending nursery school is 18.5%. This final year of preprimary education is free of charge. Although the availability of care for children younger than age 3 is limited, some schools accept these children under certain conditions. The percentage of 2-year-olds attending nursery school is 28.4%.[3] Since 2014, the Ministry of Labour and Social Affairs has established a special service called children's groups (*dětská skupina*) for children

from the age of 6 months until the start of compulsory education. The service does not ensure children's preprimary education. Children's groups allow attendance of at least 6 hours during the operating day. Care is provided outside the child's home and is aimed at developing the child's education; skills; and cultural, hygienic, and social habits. There is a fee for this service.

Together with preprimary education, school attendance is compulsory for all children ages 5 to 15. Basic schools (*základní škola*) provide 9 years of education at the primary and lower secondary levels (*druhý stupeň*): 5 years at the primary level for students ages 6 to 11, and 4 years at the lower secondary level for students ages 11 to 15. At the end of the primary level (fifth grade), students may leave primary school to start either an 8-year track of general secondary school (8-year gymnasium) or *conservatoire* (*konzervatoř*), in which they may complete compulsory education within the first 4 years of study by age 15. Similarly, at the end of the seventh grade of basic school, students may start a 6-year gymnasium after passing an entrance examination set by the school. Approximately 9% of students study in a multiyear gymnasium or *conservatoire*. All public basic schools are free of charge.

Primary education teachers usually teach all subjects, whereas lower secondary education teachers are specialists, generally in two subjects. The Framework Educational Programme for Basic Education (FEP BE)[a] sets objectives and the basic curricula content on which schools base their educational programs.

Three kinds of schools provide upper secondary education (*střední škola*): (1) gymnasium schools, which provide general academic programs (*všeobecné obory*) and which 24% of students ages 15 to 19 attend, culminating with a school-leaving examination; (2) secondary technical and vocational schools, which 52% of students ages 15 to 19 attend, also culminating with a school-leaving examination; and (3) secondary vocational schools (*odborné obory*), which 24% of students ages 15 to 17 or 18 attend and which offer an apprenticeship certificate without a school-leaving examination.[4] Prerequisites for acceptance into upper secondary schools include completing compulsory education and meeting entrance requirements set by schools. Students must pass an upper secondary school-leaving examination to apply for postsecondary education. Students completing vocational school with an apprenticeship certificate may apply for postsecondary education (*nástavbové studium*) after completing 2 years of follow-up courses and passing a school-leaving examination.

Private primary and secondary schools were established in 1990, while private universities were established in 1999. These schools are mostly secular and typically are established by for-profit or nonprofit grant-aided organizations. Nongovernmental basic schools (private and denominational schools) represent only 8% of basic schools and educate 3.3% of primary school students. In contrast, nongovernmental secondary schools comprise 26% of all secondary schools and educate 16% of secondary school students. Private schools receive a state contribution toward their operating costs. This funding is formula based, and the method

a See https://www.edu.cz/wp-content/uploads/2023/07/RVP_ZV_2023_cista_verze.pdf for more information.

of calculation is still under development. School fees and other private sources cover capital expenditures and rent.[5]

Use and Impact of TIMSS

Assessments like TIMSS, PIRLS, and the Programme for International Student Assessment (PISA) provide important information regarding student achievement in the Czech Republic to experts (e.g., researchers, teachers, nongovernmental organizations, the CSI) and policymakers. The CSI organizes regular national testing in various subjects and grades. The results from national and international surveys provide a comprehensive picture of the Czech education system. Experts tend to use TIMSS survey results as a starting point when discussing the quality of mathematics and science education in the Czech Republic, especially when the results indicate a stable or even decreasing level of student achievement. Policymakers generally consider these survey results when developing and implementing reforms in mathematics and science education.

In 2020, after the last set of TIMSS results was released, a national report was published,[6] and a set of seminars for teachers and experts was held throughout the country to familiarize them with the framework and results.

In 2021, a publication with released mathematical and scientific items was prepared that also contained a coding guide and comments for better understanding the purpose of questions.[7] The publication also included inspirational projects (with printable materials) that teachers could use in their classrooms. The projects focused on practicing skills that appeared to be challenging for Czech students based on TIMSS survey results.

Both publications were distributed to schools free of charge, and an electronic version is available on the CSI's website. Since 2017, the CSI has organized hundreds of educational seminars and has invited teachers from all schools to participate.

To summarize, TIMSS tasks act as a methodological support for teachers and headmasters to improve the teaching of mathematics and science.

The Mathematics Curriculum in Primary and Lower Secondary Grades

Mathematics at the primary level follows the FEP BE and is divided into four thematic areas and their applications: Numbers and Arithmetic Operations, Data and Relationships, Plane and Spatial Geometry, and Problem-Solving. Exhibit 2 shows what students should be able to do in each thematic area by the end of fifth grade. The Standards for Mathematics and Its Applications, which took effect September 1, 2012, were introduced to the FEP BE and specify more detailed content standards and achievement outcomes in mathematics for students in Grade 5.[b]

b See https://digifolio.rvp.cz/artefact/file/download.php?file=67490&view=9832 for more information.

Exhibit 2: Mathematics Thematic Areas and Capabilities by the End of Grade 5

Thematic Area	Capabilities
Numbers and Arithmetic Operations	• read, record, and compare natural numbers and read and compose statements of equality and inequality • use natural numbers to model real-life situations, count objects in a given set, and create sets with a given number of elements • use linear arrangement and represent numbers on a number line • perform oral and written arithmetic operations on natural numbers • round natural numbers, perform estimates, and verify the results of arithmetic operations on natural numbers • use commutability and associativity of addition and multiplication when performing both oral and written calculations • create and solve problems that require the application of arithmetic operations on natural numbers • model and determine fractions as parts of a whole, and represent fractions using numbers • compare simple fractions, and add and subtract fractions with the same denominator • read decimals and show them on a number line • understand the symbol – in negative numbers, and show negative numbers on a number line
Data and Relationships	• understand the concept of time and perform simple time-unit conversions • describe simple relationships between real-world variables • gather, display, and classify data • complete tables, charts, diagrams, and sequences of numbers
Plane and Spatial Geometry	• draw basic plane figures (square, rectangle, triangle, and circle) and perform simple constructions • measure and estimate the length of line segments, add and subtract graphic line segments, and determine the length of a broken line or the perimeter of a polygon • construct parallel and perpendicular lines • determine the area of a geometric figure by means of a quadratic grid and use basic units of area • identify and draw simple axisymmetric figures on a quadratic grid and determine the axis of symmetry by folding paper
Problem-Solving	• solve simple practical word problems as well as nonroutine problems

Mathematics at the lower secondary level is also divided into four thematic areas: Numbers and Variables, Data and Relationships, Plane and Spatial Geometry, and Problem-Solving. Exhibit 3 shows what students should be able to do in each thematic area by the end of ninth grade.

Exhibit 3: Mathematics Thematic Areas and Capabilities by the End of Grade 9

Thematic Area	Capabilities
Numbers and Variables	• perform arithmetic operations on whole, natural, and rational numbers • calculate square numbers and square roots • round numbers, make estimates to a specified level of precision, and use calculators effectively • express whole-part relationships using natural numbers, ratios, fractions, decimals, and percentages • solve problems involving ratios and work with the graphic scales of maps and plans • solve problems involving percentages (including percentages greater than 100) • represent simple real-life situations using variables, expressions, and equations, including simultaneous equations • add, multiply, and factor polynomials
Data and Relationships	• gather, evaluate, and process data, and compare datasets • determine direct or inverse proportionality • express functional relations with tables, equations, and graphs • describe simple real-life situations with relations
Plane and Spatial Geometry	• characterize and classify basic plane and spatial figures, and identify their properties • determine the size of an angle by measurement or calculation • estimate and calculate the area and perimeter of basic plane figures and the volume and surface area of three-dimensional figures • perform constructions of figures in a plane • apply theorems of congruent and similar triangles in proofs and calculations • construct and characterize centrally symmetric and axisymmetric figures • solve application problems with geometry
Problem-Solving	• apply combinatory logic when solving problems, and use spatial reasoning to solve problems

The Science Curriculum in Primary and Lower Secondary Grades

The national curricula include cross-curricular subjects. These subjects represent a mandatory part of basic education and must be included in Stage 1 (Grades 1 to 5) and Stage 2 (Grades 6 to 9). Cross-curricular subjects may be used as an integrated part of the educational content of a subject of instruction in the form of individual subjects, projects, seminars, courses, etc. One cross-curricular subject is environmental education. Environmental education introduces four thematic areas—Ecosystems, Fundamental Conditions of Life, Human Activities and Environmental Problems, and Humankind's Relationship to the Environment—and connects

these areas with current issues. The primary goal in introducing environmental education is not to expand the educational content of the curriculum, but to introduce a formative element by providing students the opportunity for individual engagement and teamwork that will foster their personal development and shape their attitudes and values.

The science curriculum in the primary grades (Grades 1 to 5) follows the FEP BE and is divided into five thematic areas relating to Man and His World: Place Where We Live, People Around Us, Man and Time, Diversity of Nature, and Man and His Health. Traditionally, instruction in Grades 1 to 3 integrates subject matter from the five individual thematic areas into one subject. In Grades 4 and 5, instruction is divided into two subject areas: One subject draws on the thematic areas Place Where We Live, People Around Us, and Man and Time as a foundation for geography and history, and the other draws on the thematic areas Diversity of Nature and Man and His Health as a foundation for the natural sciences. Exhibit 4 describes the thematic area topics traditionally taught as a foundation for the natural sciences, which students will have covered by the end of fifth grade.

Exhibit 4: Natural Sciences Thematic Areas and Capabilities by the End of Grade 5

Thematic Area	Main Topic	Subtopics
Diversity of Nature	substances and their properties	• classification, properties, comparisons, and changes of substances • changes of state in matter • measuring quantities • working with units of measurement
	water and air	• distribution, properties, importance for life, and forms of water • the water cycle • characteristics, composition, and importance of air • air circulation
	minerals, rocks, and soil	• economically important rocks and minerals, weathering, and the origin and importance of soil
	Earth and the universe	• the solar system, day and night, and the seasons
	plants, fungi, and animals	• what living things need to survive and characteristics that help them survive in particular environments • life cycles, nutrition, and the body structure and importance of familiar species
	living conditions	• diversity of the conditions for life on Earth • importance of the atmosphere, water, soil, fauna, and flora • climate and weather • extreme events and handling extreme events

Exhibit 4: Natural Sciences Thematic Areas and Capabilities by the End of Grade 5 (Continued)

Thematic Area	Main Topic	Subtopics
Diversity of Nature	the balance of nature	• relationships among organisms, and ecosystems
	conservation and protection	• human responsibility toward the environment, conservation, and protection of the environment • waste disposal • natural and ecological disasters
	skills/capabilities	• carry out simple experiment using a group of familiar substances and identify their common and different qualities • measure basic quantities using simple measuring instruments • set up a simple experiment, plan and justify the procedure, evaluate and explain the outputs of an experiment
Man and His Health	the human body	• what humans need to survive and characteristics that help them survive in particular environments • basic structures and functions in humans • reproductive differences between males and females, the basics of human reproduction, and human development
	health	• exercise, nutrition, substance abuse, illness, minor injuries and wounds, first aid, injury prevention, personal and intimate hygiene, mental health, and stress and its risks

The Man and Nature science curriculum in the lower secondary grades (Grades 6 to 9) follows the FEP BE and includes four education fields: physics, chemistry, natural sciences (biology), and geography. The science topics covered in Grades 6 to 9 are presented in Exhibit 5. As in the primary grades (Grades 1 to 5), the cross-curricular subject environmental education has been added to the science curriculum, covering the same topics. The function of environmental education consists of promoting individual understanding of the complex and intricate relationship between humans and the environment, fostering students' personal development (i.e., their acquisition of specific values and attitudes) and directing students' individual behavior toward sustainable development.

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9

Thematic Area	Main Topic	Subtopics
Physics	substances and their properties	• measured quantities (length, volume, mass, temperature, and time) • states of matter (the connection between state of matter and particulate structure, and diffusion)
	motions of bodies and forces	• uniform and nonuniform motion • rectilinear and curvilinear motion • gravity and gravitational fields • compression force and pressure • force of friction • addition and subtraction of force vectors • Newton's first, second, and third laws of motion • equilibrium state for levers and fixed pulleys
	mechanical properties of fluids	• Pascal's law, hydraulic equipment • hydrostatic and atmospheric pressure (the relationship between hydrostatic pressure, depth, and the density of a liquid; and the relationship between atmospheric pressure and weather) • Archimedes' principle (buoyant force, and immersion, suspension, and flotation of bodies in fluids at rest)
	energy	• forms of energy (kinetic and potential energy, internal energy, electrical energy and power, production and transfer of electrical energy, nuclear energy, nuclear fission, nuclear reactors, nuclear power plants, and protection against radiation) • state changes (melting and freezing, latent heat of melting, evaporation and condensation, factors influencing evaporation, and the boiling point for liquids) • renewable and nonrenewable sources of energy
	sound	• properties of sound (propagation media, speed, reflection, echo, absorption, and pitch)
	electricity and light	• electric circuits, voltage sources, electrical appliances, and switches • electricity and magnetism (electric and magnetic field, electric and magnetic force, electric charge, thermal effects of electric currents, resistance, direct current motors, transformers, and safety) • properties of light (sources, speed in a vacuum and in various media, shadows, and solar and lunar eclipses; reflection, and concave and convex mirrors; imaging by refraction through thin converging and diverging lenses; and dispersion of white light by a prism)

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Physics	the universe	• the solar system (main components and phases of the Moon) • composition of stars
	skills/capabilities	• use suitably chosen measuring instruments to make certain important physical measurements of substances and bodies • use a diagram to build an electrical circuit and analyze a diagram of an actual circuit
Chemistry	observation, experiment, and chemical safety	• properties of substances (density, solubility, thermal and electrical conductivity, and the effect of the atmosphere on properties and states of substances) • safety (in the school laboratory and in everyday life, risk and safety labels on chemicals and machinery, warning symbols, and industrial accidents)
	mixtures	• heterogeneous and homogeneous solutions • concentration and saturation of solutions • solubility and factors affecting solubility (temperature, stirring, and surface area of solute) • separation of components of mixtures (sedimentation, filtration, distillation, crystallization, and sublimation) • water (distilled, potable, and wastewater, drinking water production, and water purity) • composition and purity of air and the ozone layer
	the particulate composition of matter and elements	• atoms and molecules (atomic nucleus, protons, neutrons, electrons, and electron shells) • elements (names, symbols, properties and uses, the periodic table, groups, periods, and atomic number) • chemical bonds, nomenclature of simple inorganic and organic compounds
	chemical reactions	• the law of conservation of mass • chemical equations • molar mass • chemical reactions (combination, neutralization, exothermic, and endothermic) • factors influencing the rate of chemical reactions (temperature, surface area of reactants, and catalysts) • electrochemistry: chemical sources of electric current

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Chemistry	inorganic compounds	• oxides (nomenclature, properties, and applications) • acids and bases (pH, properties, formulas, and names and applications of acids and bases) • chemistry of oxygen and halide salts (nomenclature, properties, applications, and oxidation state)
	organic compounds	• hydrocarbons (alkanes, hydrocarbons with multiple bonds, and aromatic hydrocarbons) • fuels (petroleum, coal, natural gas, and synthetic fuels) • hydrocarbon derivatives (alcohols and carboxylic acids) • natural substances (sources, properties, and examples of the functions of proteins, fats, saccharides, and vitamins in the human body)
	chemistry and society	• the chemical industry (industrial fertilizers, heat-treated materials, plastics, synthetic fibers, detergents, pesticides, insecticides, combustible compounds, drugs, and addictive substances)
	skills/capabilities	• suggest and perform the steps for separating the known components of a mixture; give examples of the separation of components in practice
Natural Sciences/ Biology	general biology and genetics	• emergence, development, and diversity of life and its significance (nutrition, respiration, growth, reproduction, development, and reactions to stimuli; and views on the emergence of life) • fundamental structures of life (cells, tissues, organs, organ systems, and unicellular and multicellular organisms) • classification of organisms, heredity and mutability of organisms (transfer of hereditary information, genes, and crossbreeding) • viruses and bacteria (occurrence, significance, and practical application)
	fungal biology	• fungi without fruiting bodies (basic characteristics, and positive and negative impact on humans and living organisms) • fungi with fruiting bodies (structure, occurrence, importance, consumption, and first aid for mushroom poisoning) • lichens (structure, symbiosis, occurrence, and importance)

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Natural Sciences/ Biology	plant biology	• plant anatomy and morphology (structure and significance of parts of higher plants: root, stem, leaf, flower, seed, and fruit) • plant physiology (photosynthesis, respiration, growth, and reproduction) • plant categorization (classification of common species of algae, bryophytes, pteridophytes, gymnosperms, and angiosperms; their development; and the use of economically important plants) • the importance and protection of plants
	animal biology	• animal anatomy and morphology (animal cells, tissues, organs, organ systems, unicellular and multicellular organisms, and reproduction) • animal evolution, development, and classification (protozoans, invertebrates [cnidarians, platyhelminthes, nemathelminthes, mollusks, annelids, arthropods], chordates [chondrichthyes, osteichthyes, amphibians, reptiles, birds, and mammals]) • distribution, significance, and protection of animals (economically and epidemiologically important species, raising domesticated animals, and animal communities) • animal behavior
	human biology	• human reproduction • anatomy and physiology (structure and function of body parts, organs, and organ systems, including skeletal, muscular, circulatory, respiratory, digestive, excretory, reproductive, and nervous systems; higher nervous activity; and mental health) • illnesses and injuries, and their prevention (causes, symptoms, essential knowledge and methods for treating common illnesses; serious injuries and life-threatening conditions; epidemics) • impact of environmental factors and lifestyle on human health

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Natural Sciences/ Biology	geology and earth science	• Earth (origin and structure) • minerals and rocks (formation, properties, qualitative classification, practical importance, uses, and principles of crystallography) • endogenic and exogenic geological processes (causes and consequences) • soils (composition, properties, and importance of soil for plant nutrition, economic importance, dangers and examples of soil degradation, and options for and examples of recultivation) • Earth's crustal evolution and development of life on Earth (geological changes, emergence of life, occurrence of typical organisms and their adaptation to the environment) • geological development and structure of the territory of the Czech Republic (Bohemian Massif and the Carpathians) • climate and weather in relation to life (importance of water and clean air for life, use and protection of natural resources, impact of anthropogenic air pollution and climate change on ecosystems and human life) • extreme events (causes, important types of global extreme events, types of extreme events in the Czech Republic, e.g., floods, hurricanes, blizzards, avalanches, rimes, and handling extreme events)
	ecology	• organisms and their environment (relationships among and between organisms and their environment; populations, communities, and natural and artificial ecosystems; food chains; balance within an ecosystem) • environment protection (global environmental problems and protected natural areas)
	empirical exploration of nature	• empirical methods of exploring nature (observation with a magnifying glass, microscope, or telescope, simplified identification keys, atlases) • important biologists and their discoveries

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Geography	geographic information, data sources, cartography, and topography	• geographic and cartographic terminology (basic topographical formations, plans, maps, map terminology, statistical data, tables, and graphs) • geographic data sources and geographic cartography and topography (globes, globe scales, geographic grids, meridians and parallels, geographic coordinates, determining geographic position) • scale and content of plans and maps • orienting plans and maps with respect to the cardinal points • practical exercises and applications using cartographic products in printed and electronic form
	a natural image of Earth	• Earth as a celestial body (the shape, size, and motion of Earth, day and night, change of seasons, Universal Time, time zones, local time, the International Date Line, and conventional time) • landscape area (the natural sphere, social and economic spheres, and components and elements of the natural sphere) • the natural sphere on the planetary level (geographical belts, latitudinal zones, and altitudinal zones) • the system of the natural sphere at the regional level (natural regions)
	regions of the world	• continents, oceans, and world macroregions (criteria defining regions; natural and socioeconomic conditions, with an emphasis on their links and connections: natural zones, climate zones, settlement areas, language areas, religious areas, and cultural zones) • regions of the world: natural, social, political, industrial; and environmental problems
	the social and economic environment	• world population • globalization of social, political, and economic process • the global economy: economic structure (sectors, industries), territorial division of labor, indicators of economic development and standard of living • regional social, political, and economic units
	the environment	• landscape (natural and social environments, and types of landscape) • the relationship between nature and society (sustainable development, principles and fundamentals of environmental protection, protected natural areas, and global ecological and environmental problems)

Exhibit 5: Summary of the Man and Nature Curriculum, Grades 6 to 9 (Continued)

Thematic Area	Main Topic	Subtopics
Geography	the Czech Republic	• regions of the Czech Republic
	fieldwork	• field exercises in and observations of the local landscape, geographical excursions; personal safety in case of threats to life and health: natural disasters, disaster preparedness and measures

Teacher Professional Development Requirements and Programs

Professional Development Requirements

Qualification and continuing education of teachers at all education levels (apart from higher education) follow the Act on Pedagogical Staff.[c] Primary teachers (the first stage of basic schools, *základní školy*) and teachers of general and theoretical technical subjects at upper levels are required to have a master's degree (ISCED 746 or 747). The teacher obtains a university diploma, a diploma supplement, and the academic degree of *Magistr* (master).

The responsibility for the preparatory education of teachers for primary school rests solely with the faculties of education. It is at a master's level and usually lasts 5 years. Graduates are qualified to teach all the subjects that are taught in primary schools.

Accredited study programs at most faculties follow a two-stage structure (usually a 3-year bachelor's immediately followed by a 2-year master's study program). Lower secondary school teachers are normally qualified in two subjects.

The obligation for the pedagogical staff of public schools and schools established by the Ministry of Education, Youth and Sports to participate in in-service training for renewing, strengthening, and supplementing their qualifications is explicitly set by the Act on Pedagogical Staff.

Teacher preparation includes a training program (including in-school placement) that usually lasts from 6 to 12 weeks, depending on the university. The CSI has reported that 90.2% of teachers at basic schools (as of academic year 2022–2023) are fully qualified.

Ongoing Professional Development Programs

The Ministry of Education, Youth and Sports determines the types and conditions for in-service training of education staff and the ways in which it may be completed in a decree.[d] (The Ministry of the Interior and the Ministry of Defence determine the types and conditions for in-service training of education staff of the schools they are responsible for.)

In-service training of education staff can take place in the following ways:

c See https://www.zakonyprolidi.cz/cs/2004-563 for more information.

d See https://www.zakonyprolidi.cz/cs/2005-317 for more information.

- at higher education institutions (*vysoké školy*)
- at institutions for in-service training of education staff and at other facilities on the basis of accreditation granted by the Ministry of Education, Youth and Sports
- through self-study (education staff can be granted 12 paid days during a school year for this purpose)[8]

The decree lists the following three types of in-service training:

- courses aimed at gaining required qualifications
- courses aimed at meeting further qualification requirements
- courses aimed at perfecting professional qualifications[9]

Details on individual courses are listed in separate sections of the decree. The Ministry of Education, Youth and Sports has issued standards and methodological recommendations for some types of courses.

In-service training of education staff is also provided by a school facility (*zařízení pro další vzdělávání pedagogických pracovníků*) registered in the School Register (*školský rejstřík*). These facilities are established mainly by regions, but also by municipalities, ministries, and private and religious organizations. In 2019, there were 56 such facilities registered.

The majority of in-service training courses are offered by the National Pedagogical Institute of the Czech Republic (NPI).[e] Its mission is to enhance the continuing development of general, vocational, art, and linguistic education, and to support schools in the areas of pedagogical-psychological, educational, and career counseling, as well as in the methodology used in the continuing education of teachers. All of these services emphasize a general focus on lifelong education while maintaining close cooperation with the European Union (EU).

Monitoring Student Progress in Mathematics and Science

Individual schools determine guidelines for assessment. Students are assessed continuously in individual subjects, as well as at the end of every term, and are given a school report that includes assessment of the student's results in every subject, assessment of the student's behavior, and overall results. Teachers base assessment on oral and written work, as well as homework. Assessment of a student can be indicated by using a system of marks on the school report, verbally, or a combination of both.[10] Students with special education needs (SEN) who attend a special basic school (*základní škola speciální*) must receive a verbal assessment.

Since the 2011–2012 academic year, the CSI has conducted annual low-stakes online assessments through its InspIS SET platform for a sample of students in primary and secondary education. These assessments contribute to the CSI's evaluation and verification of learning outcomes in the Czech education system. The system enables sample as well as national testing across subjects and grades. The CSI conducts these assessments every year, and it is

e See https://www.npi.cz/ for more information.

mandatory for schools to participate. Most schools administer some type of commercial test as well.

Special Initiatives in Mathematics and Science Education

Long-term initiatives in mathematics and science education can be divided into the following two broad categories:

- State-managed initiatives include those implemented by organizations of the Ministry of Education, Youth and Sports (e.g., the NPI or the Centre for the Measurement of Educational Achievement [CERMAT]). These initiatives focus on preparing and implementing educational programs for pedagogical staff in all regions of the Czech Republic, developing didactic materials for use in schools, and analyzing future needs in education (including mathematics and science education).
- Expert-managed voluntary initiatives include those implemented by associations that unite experts (i.e., researchers, scholars, and teachers) in their respective fields of research (e.g., the Union of Czech Mathematicians and Physicists, the Czech Chemical Society, and the Czech Geographical Society). These initiatives aim to support and facilitate mathematical, biological, chemical, and geographical research; improve mathematics and science education; disseminate new knowledge from theory into practice; and popularize the various branches of mathematics and science. These initiatives comprise conferences, specific educational training programs for teachers from every type of school, activities for students to enhance their interest in mathematics and science, mathematics and science competitions for students, and didactic materials for every type of school.

Various nongovernmental or private organizations funded by the European Social Fund or regional funds offer further support to schools in the form of didactic materials and educational programs. Initiatives led by nongovernmental organizations and civic associations focusing on environmental and sustainable development education have made a long-term positive impact on science education in terms of developing students' values and attitudes. The most well-known examples of nongovernmental initiatives are Project Heuréka (Eureka) and the Hejny method.

The main aim of Project Heuréka is to improve physics education in order to get new ideas and further inspiration.[f] Since 2009, seminars have been held under the auspices of Charles University. Project Heuréka enables collaboration among enthusiastic teachers from different types of schools, future teachers, people from universities, and others who are interested in physics education to improve physics education at all levels.

f See http://kdf.mff.cuni.cz/heureka/en/index.php?page=about-heureka for more information.

The Hejny method is a new and developing way of teaching mathematics in a nontraditional way.[g] It has its own textbooks and teacher's books and has been adopted by more than 750 of the 4,100 Czech schools at the primary and, since 2018, lower secondary levels.

Universities frequently hold competitions across different subjects and areas at district, regional, and national levels.

Areas of competition include the following:

- biology, ecology, and environmental protection[h]
- physics and astronomy[i]
- chemistry[j]
- computer science[k]
- mathematics[l]
- technical competitions
- multidisciplinary and interdisciplinary competitions[m]

References

1 Fryč, J., Matušková, Z., Katzová, P., Kovář, K., Beran, J., Valachová, I., Seifert, L., Běťáková, M., Hrdlička, F., & the team of authors of the *Guidelines for the Education Policy of the Czech Republic up to 2030+*. (2020). *Strategy for the education policy of the Czech Republic up to 2030+* (A. Faberová & V. Kohoutová, Eds.). Ministry of Education, Youth and Sports. https://www.msmt.cz/uploads/brozura_S2030_en_fin_online.pdf

2 Eurydice. (2024). *Czechia: Overview*. Retrieved from https://eurydice.eacea.ec.europa.eu/national-education-systems/czechia/overview

3 Czech School Inspectorate. (2023). *Kvalita vzdělávání ve školním roce 2022/2023 – výroční zpráva* [Quality of education in the school year 2022/2023 – annual report]. Retrieved from https://www.csicr.cz/cz/Dokumenty/Vyrocni-zpravy/Kvalita-vzdelavani-ve-skolnim-roce-2022-2023-%E2%80%93-vyr

4 Ministry of Education, Youth and Sports. (n.d.). *Statistická ročenka školství—výkonové ukazatele 2022/2023, tabulka D1.1.1, D1.2.1 a D1.3.1* [Statistical yearbook—performance indicators 2022–2023, table D1.1.1, D1.2.1 and D1.3.1]. Retrieved from https://statis.msmt.cz/rocenka/rocenka.asp

5 Ministry of Education, Youth and Sports. (n.d.). *Statistická ročenka školství—výkonové ukazatele školního roku 2023/2024, tabulka C1.13.2 a D1.1.3* [Statistical yearbook—performance indicators 2023–2024, table C1.13.2 and D1.1.3]. Retrieved from https://statis.msmt.cz/rocenka/rocenka.asp

g See https://www.h-mat.cz/en/hejny-method for more information.

h See http://www.biologicka-olympiada.cz for more information.

i See http://fyzikalniolympiada.cz/ and https://olympiada.astro.cz/ for more information.

j See https://olympiada.vscht.cz/cs/ for more information.

k See https://www.bebras.org/ for more information.

l See https://www.matematickaolympiada.cz/, https://matematickyklokan.net/, and https://www.logickaolympiada.cz/ for more information.

m See http://amavet.fvtp.cz/ for more information.

6 Tomášek, V., Boudová, S., Klement, L., Basl, J., Zatloukal, T., Pražáková, D., & Janoušková, S. (2020). *Mezinárodní šetření TIMSS 2019: národní zpráva* [International survey TIMSS 2019: National report]. Czech School Inspectorate. https://www.csicr.cz/Csicr/media/Prilohy/PDF_el._publikace/Mezin%c3%a1rodn%c3%ad%20%c5%a1et%c5%99en%c3%ad/TIMSS_2020_e-verze.pdf

7 Tomášek, T., Klement, L., Janoušková, S., Frýzek, M., Houfková, J., Mandíková, D., Peclinovská, S., Pumpr, V., Musilová, D., Chmelířová, L., Toušková, I., Krausová, D., & Pumpová, B. (2021). *Inspirace pro rozvoj dovedností TIMSS: úlohy z matematiky a přírodovědy* [Inspiration for TIMSS skills development: Maths and science items]. Czech School Inspectorate. Retrieved from https://www.csicr.cz/cz/Dokumenty/Publikace-a-ostatni-vystupy/TIMSS-Inspirace-pro-rozvoj-dovednosti-%E2%80%93-ulohy-z-ma

8 *Zákon o pedagogických pracovnících č. 563/2004, aktuální znění k 1. 9. 2023* [Act No. 563/2004 on pedagogical staff, current version valid from September 1, 2023]. Retrieved from https://www.msmt.cz/dokumenty/zakon-o-pedagogickych-pracovnicich-ve-zneni-ucinnem-ode-dne

9 Eurydice. (2024). *Czechia: Teachers and education staff*. Retrieved from https://eurydice.eacea.ec.europa.eu/national-education-systems/czechia/continuing-professional-development-teachers-working-early#9_3_1_3_Courses_aimed_at_perfecting_professional_qualifications

10 EACEA/Eurydice. (2015). *Czech Republic: Assessment in single-structure education*. Retrieved from https://eurydice.eacea.ec.europa.eu/national-education-systems/czechia/assessment-single-structure-education