

# Chile

Agencia de Calidad de la Educación  
División de Estudios  
*Departamento de Estudios Internacionales*

## Introduction

### *Overview of Education System*

The Chilean education system is governed by the Quality Assurance System, which is mandated to guarantee good quality education for all students in the country. To achieve this objective, the Quality Assurance System implements programs of evaluation, inspection, and supervision, and provides guidance and continual support to schools. The Quality Assurance System is composed of the Ministry of Education, the Superintendence of Education, the National Council of Education, and the Educational Quality Agency.<sup>1</sup>

The Ministry of Education is the central institution of the Quality Assurance System. Its purpose is to implement education policy through granting official recognition to schools, defining regulations, providing funding, and creating and supporting education resources, standards of learning, and pedagogical training. The Superintendence of Education monitors the implementation of education regulations and imposes sanctions. The National Council of Education approves and informs the national curriculum, standards of learning, and national and international assessment plans, among other education frameworks. The Education Quality Agency evaluates and monitors student learning outcomes and indicators of personal and social development. It provides guidance to schools aiming to foster quality education for all, reduce learning gaps, and realize more inclusive education.<sup>2</sup>

As of 2018, there were 12,021 schools in Chile, serving 3.58 million students. These schools are divided into groups depending on their administrative status: public schools (43.9 percent of all schools, 35.9 percent of all students), private subsidized schools (48.9 percent of schools, 55.1 percent of students), and paid private schools (7.2 percent of schools, 9.1 percent of students). Public schools are managed by local governments (municipalities) or local education services<sup>a</sup> and funded by the state. Private subsidized schools are managed by private entities and funded by the state.<sup>b</sup> Private schools are managed by private entities and funded exclusively by families.

<sup>a</sup> Law 21.040, enacted in 2017, establishes the System of Public Education. This new regulation transfers schools from municipal administration to administration by local education services. It will be implemented gradually, and 70 local education services will be developed by 2025.

<sup>b</sup> Law 20.845, which will be implemented gradually, provides more public funding for private subsidized schools and eliminates funding from families in these schools. Before the law was enacted, private subsidized schools could be funded exclusively by state or by a combination of families and the state.

The Ministry of Education officially recognizes all these educational institutions as long as they meet established requirements, and parents can choose among them for their children's education.<sup>3,c</sup> Chile's current school system consists of eight years of basic education (*educación básica*), which combines primary and lower secondary education (Grades 1 to 8), and four years of high school (*educación media*), which corresponds to upper secondary education (Grades 9 to 12). Basic education starts when students are 6 years old.<sup>4</sup> In 2015, kindergarten became compulsory, making compulsory education a total of 13 years.

Schools may offer primary and lower secondary education (basic education), upper secondary education (high school), or both (complete schooling). Some schools offer education for Grades 7 to 12 only, and others, mainly very small rural schools, offer education for Grades 1 to 4 or Grades 1 to 6 only. Schools providing upper secondary education offer humanistic-scientific education, technical professional (vocational) education, or both (polyvalent). These tracks start in Grade 11, when curricula differentiate. Some small groups of schools offer specific artistic education. For students with temporary or permanent special needs, economic, human, and technical resources, as well as specific knowledge and assistance, are available.<sup>5</sup>

The Ministry of Education is responsible for developing the national curriculum, which determines the fundamental objectives and minimum content for each grade and subject in all schools. It also develops study plans and teaching guides. The National Council of Education, which is independent of the Ministry, must approve the national curriculum. However, schools are free to decide how to implement the curriculum and may include additional education objectives, content, and programs, with prior approval from the Ministry of Education. In primary and lower secondary education (basic education), there is one common curriculum for mathematics and science, because all students at this level follow the same track. In upper secondary education, there is one common curriculum for Grades 9 and 10, but different curricula for Grades 11 and 12, depending on whether students follow the humanistic-scientific or the technical professional track.<sup>6</sup>

### *Use and Impact of TIMSS*

Chile's participation in TIMSS in 1999, 2003, 2011, 2015, and 2019 has helped not only to assess the learning of Chilean students in mathematics and science, compared with international standards, but also to measure changes in student learning over time, monitoring the Chilean education system. TIMSS has had great impact in terms of the recognition of Chile's education system. TIMSS results over time have shown an improvement in mathematics at the eighth grade. Also, policymakers in Chile took note of the national average score for eighth grade science from 2003 to 2011. These results led to the evaluation of education policies in the country against suggested policy guidelines.<sup>7</sup>

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<sup>c</sup> Fewer public establishments (approximately 70) are managed under the Executive Management System (*Sistema de Administración Delegada*), which is administered by several corporations and nonprofit foundations.

TIMSS data has shown socioeconomic and gender gaps that affect the Chilean education system. Chile has presented a constant outcomes gap between boys and girls, such that boys achieve significantly better results than girls in mathematics. Another gap presents among different types of schools (i.e., public sector schools, populated mostly by students from lower socioeconomic groups, exhibit lower achievement than private paid schools). The same gap is present in the eighth grade science results in socioeconomic status and gender.<sup>8</sup>

Chile's participation in TIMSS also has provided a stimulus and a point of reference for making improvements to the national curriculum. It has provided information contributing to a better understanding of school organization, teacher education, and teaching practices in a comparative context. The curricular basis of the Chilean education system has undergone several updates since 2000, informed by the assessment frameworks of international studies such as TIMSS.

Despite the fact that important reforms were made to the national curriculum in 2000, TIMSS 2003 showed continuing gaps between the TIMSS framework and the Chilean curriculum, especially in algebra and geometry and in physics and environmental science. As a result, the Chilean curriculum was updated again in 2009, taking into account the curriculum framework provided by TIMSS 2003.<sup>9</sup> Subsequent content updates to Chile's mathematics and science curricula were informed by the frameworks of TIMSS 2011—in particular, fourth grade science (2012), eighth grade science (2013), and eighth grade mathematics (2013).<sup>10</sup>

Participation in TIMSS also has impacted Chile's national standardized testing system (*Simce*). In Chile, TIMSS is regarded as a benchmark for assessment methodologies, evaluation frameworks, designing and coding of open ended questions, and results reporting, among other components of assessment.<sup>11</sup>

## The Mathematics Curriculum in Primary and Lower Secondary Grades

The current mathematics curriculum for fourth grade was implemented in 2012,<sup>12</sup> and the curriculum for eighth grade was approved in 2013 and implemented in 2016.<sup>13</sup> TIMSS 2019 was administered in Chile in 2018. Exhibits 1 and 2 present the content areas and fundamental objectives of the mathematics curriculum for Grades 4 and 8.

### Exhibit 1: Mathematics Curriculum, Grade 4

Content Area	Fundamental Objectives
Numbers and Operations	<ul style="list-style-type: none"> <li>▪ Represent and describe numbers from 0 to 10,000</li> <li>▪ Describe and apply mental arithmetic strategies</li> <li>▪ Demonstrate understanding of addition and subtraction up to 1,000</li> <li>▪ Apply the properties of 0 and 1 for multiplication and the property of 1 for division</li> <li>▪ Demonstrate understanding of the multiplication of three-digit numbers by one-digit numbers</li> <li>▪ Demonstrate understanding of division with double-digit dividends and single-digit divisors</li> <li>▪ Solve routine and nonroutine problems in everyday contexts that involve money, selecting and using the proper operations</li> <li>▪ Demonstrate understanding of fractions with denominators 100, 12, 10, 8, 6, 5, 4, 3, and 2</li> <li>▪ Add and subtract fractions with the same denominator (100, 12, 10, 8, 6, 5, 4, 3, and 2) in concrete and pictorial ways in a problem solving context</li> <li>▪ Identify, describe, and represent proper fractions and mixed numbers up to 5 in concrete, pictorial, and symbolic ways, in a problem solving context</li> <li>▪ Describe and represent decimals (tenths and hundredths)</li> <li>▪ Add and subtract decimals (with place value to the hundredth) in a problem solving context</li> </ul>
Algebra and Patterns	<ul style="list-style-type: none"> <li>▪ Identify and describe number patterns in tables that involve an operation, manually and/or using educational software</li> <li>▪ Solve equations and inequalities for values from 0 to 100 in one step, using addition and subtraction, checking the results in a pictorial and symbolic manner, and applying the inverse operation (addition or subtraction)</li> </ul>
Geometry	<ul style="list-style-type: none"> <li>▪ Describe the absolute location of an object on a simple map with informal coordinates (e.g., with letters and numbers) and the relative location in relation to other objects</li> <li>▪ Determine the views of three-dimensional figures from the front, the side, and above</li> <li>▪ Demonstrate understanding of line of symmetry</li> <li>▪ Move, rotate, and mirror two-dimensional figures</li> <li>▪ Construct angles using a protractor and compare them</li> </ul>
Measuring	<ul style="list-style-type: none"> <li>▪ Read and record various time measurements on analog and digital clocks, using the concepts of a.m., p.m., and 24 hours</li> <li>▪ Convert among units of time in the context of problem solving (i.e., the number of seconds in a minute, the number of minutes in an hour, the number of days in a month, and the number of months in a year)</li> <li>▪ Measure length in standardized units (m, cm) and convert between units (e.g., from m to cm and vice versa) in the context of problem solving</li> <li>▪ Demonstrate understanding of the concept of area of rectangles and squares</li> <li>▪ Demonstrate understanding of the concept of volume</li> </ul>
Data and Probabilities	<ul style="list-style-type: none"> <li>▪ Conduct surveys, analyze the data, and compare with the results of random tests, using charts and graphs</li> <li>▪ Perform randomized experiments, tabulate the results, and represent them in graphs constructed manually and/or using educational software</li> <li>▪ Read and interpret pictographs and simple bar graphs with scale and report findings</li> </ul>

**Exhibit 2: Mathematics Curriculum, Grade 8**

Content Area	Fundamental Objectives
Numbers	<ul style="list-style-type: none"> <li>▪ Demonstrate understanding of multiplication and division of integers               <ul style="list-style-type: none"> <li>▫ Represent them in concrete, pictorial, and symbolic ways</li> <li>▫ Apply procedures used in multiplication and division of natural numbers</li> <li>▫ Apply the rule of order of operations</li> <li>▫ Solve routine and nonroutine problems</li> </ul> </li> <li>▪ Use multiplication and division of rational numbers in the context of problem solving               <ul style="list-style-type: none"> <li>▫ Represent them on the number line</li> <li>▫ Use different number sets (fractions, decimals, and integers)</li> </ul> </li> <li>▪ Explain multiplication, division, and the process of forming powers of numbers with natural number bases and exponents up to 3, in concrete, pictorial, and symbolic ways</li> <li>▪ Demonstrate understanding of the square roots of natural numbers               <ul style="list-style-type: none"> <li>▫ Estimate them intuitively</li> <li>▫ Represent them in concrete, pictorial, and symbolic ways</li> <li>▫ Apply them in geometrical situations and in daily life</li> </ul> </li> <li>▪ Solve problems involving percent changes in different contexts, using pictorial representations and recording the process symbolically (e.g., annual savings interest)</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Demonstrate understanding of operations and algebraic expressions               <ul style="list-style-type: none"> <li>▫ Represent them in pictorial and symbolic ways</li> <li>▫ Relate them to the area of squares and rectangles and the volume of parallelepipeds</li> <li>▫ Determine factored forms</li> </ul> </li> <li>▪ Demonstrate understanding of the concept of function in terms of linear change               <ul style="list-style-type: none"> <li>▫ Use tables</li> <li>▫ Use machine metaphors</li> <li>▫ Establish rules for <math>x</math> and <math>y</math></li> <li>▫ Graph them manually and/or by using educational software (e.g., Cartesian plane, Venn diagrams)</li> </ul> </li> <li>▪ Model situations in everyday life and in other academic subjects, using linear equations of the form <math>ax = b</math>; <math>\frac{x}{a} = b, a \neq 0</math>; <math>ax + b = c</math>; <math>\frac{x}{a} + b = c, a \neq 0</math>; <math>x = b + cx</math>; <math>a(x + b) = c</math>; <math>ax + b = cx + d (a, b, c, d, e)</math></li> <li>▪ Solve linear inequalities with rational coefficients in the context of problem solving, using graphic representations and symbolic representations, generated manually and/or by using educational software</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Demonstrate understanding of affine functions               <ul style="list-style-type: none"> <li>▫ Generalize as the sum of a constant with a linear function</li> <li>▫ Move linear functions in the Cartesian plane</li> <li>▫ Determine the constant change from one interval to another, graphically and symbolically, manually and/or by using educational software</li> <li>▫ Link them to simple interest</li> <li>▫ Use them to solve everyday life problems and in other academic subjects</li> </ul> </li> </ul>
Geometry	<ul style="list-style-type: none"> <li>▪ Develop formulas for finding the surface area and volume of prisms with different bases and cylinders               <ul style="list-style-type: none"> <li>▫ Estimate surface area and volume</li> <li>▫ Use nets to find the surface area of prisms</li> <li>▫ Apply the formula for volume of a cube (base <math>\times</math> height) to different prisms and cylinders</li> </ul> </li> </ul>

Content Area	Fundamental Objectives
	<ul style="list-style-type: none"> <li>▫ Apply these formulas to geometric problems and problem solving in daily life</li> <li>▪ Explain in concrete, pictorial, and symbolic ways the validity of the Pythagorean theorem, and apply the theorem to geometric problems and solving problems in daily life, manually and/or by using educational software</li> <li>▪ Describe the position and transformations (i.e., translations, rotations, and reflections) of two-dimensional figures in a coordinate plane, manually and/or by using educational software, involving:               <ul style="list-style-type: none"> <li>▫ Vectors used in translations</li> <li>▫ The axes of the Cartesian plane (e.g., lines of reflection)</li> <li>▫ Points in a plane of rotation</li> </ul> </li> <li>▪ Perform rotations, translations, and reflections in the Cartesian plane and in space, manually and/or by using educational software; apply these transformations to the lines of symmetry of polygons and polyhedra, and in geometric problems related to art</li> </ul>
Probability and Statistics	<ul style="list-style-type: none"> <li>▪ Demonstrate understanding of statistical measures of position (i.e., percentiles and quartiles)               <ul style="list-style-type: none"> <li>▫ Identify the population above or below the percentile</li> <li>▫ Represent them in diagrams, manually, and/or by using educational software</li> <li>▫ Use them to compare populations</li> </ul> </li> <li>▪ Evaluate the way data is presented               <ul style="list-style-type: none"> <li>▫ Compare information from the same data set displayed in different types of graphs to determine the strengths and weaknesses of each</li> <li>▫ Justify the choice of graph for a given situation and its corresponding data set</li> <li>▫ Detect manipulation of graphics to represent data</li> </ul> </li> <li>▪ Explain the multiplication principle of probability               <ul style="list-style-type: none"> <li>▫ In specific situations</li> <li>▫ Represent it in regular tables and trees, generated manually, and/or by using educational software</li> <li>▫ Use it to calculate the probability of compound events</li> </ul> </li> </ul>

## The Science Curriculum in Primary and Lower Secondary Grades

The science curriculum for fourth grade was updated in 2012,<sup>14</sup> and the science curriculum for eighth grade was approved in 2013 and implemented in 2016.<sup>15</sup> Both curricula group together the following scientific disciplines: biology, chemistry, physics, botany, geology, and astronomy. These disciplines address a wide variety of natural phenomena (e.g., living beings, matter, energy and its transformations, the solar system, and Earth).<sup>d</sup> Exhibits 3 and 4 present the content areas and fundamental objectives of the science curricula for Grades 4 and 8, respectively.

<sup>d</sup> In 2016, the science curriculum for eighth grade was restructured. The descriptions here correspond to the curriculum that was current for students in 2014.

**Exhibit 3: Science Curriculum, Grade 4**

Content Area	Fundamental Objectives
Life Science	<ul style="list-style-type: none"> <li>▪ Recognize, through exploration, that an ecosystem is composed of living elements (i.e., animals, plants, etc.) and nonliving elements (i.e., rocks, water, land, etc.) that interact with each other</li> <li>▪ Observe and compare adaptations of plants and animals for survival in ecosystems in relation to their structure and behavior (i.e. body cover, camouflage, type of leaves, hibernation, etc.)</li> <li>▪ Give examples of food chains, identifying the roles of producers, consumers, and decomposers in ecosystems in Chile</li> <li>▪ Analyze the effects of human activity on ecosystems in Chile, proposing measures to protect them (e.g., national parks and enclosures)</li> <li>▪ Human body and health:               <ul style="list-style-type: none"> <li>▫ Identify and describe, using models, structures of the skeletal system and some of its features, such as protection (ribs and skull), support (vertebrae and spinal cord), and movement (pelvis and femur)</li> <li>▫ Explain, with the help of models, body movements, considering the coordinated action of muscles, bones, tendons, and joints (e.g., arms and legs), and describe the benefits of physical activity for the musculoskeletal system</li> <li>▫ Identify structures of the nervous system and describe some of its features, such as transmitting information (spinal cord and nerves) and processing and control (brain)</li> <li>▫ Investigate various sources and communicate the effects of excessive alcohol consumption on human health (e.g., lack of coordination, confusion, and slowness)</li> </ul> </li> </ul>
Physics and Chemistry	<ul style="list-style-type: none"> <li>▪ Demonstrate, through experimental research, that matter has mass and occupies space, using materials from the environment</li> <li>▪ Compare the three states of matter (solid, liquid, and gas) in relation to properties such as the ability to flow and change shape and volume, for example</li> <li>▪ Measure the mass, volume, and temperature of materials (in solid, liquid, and gas states), using appropriate instruments and units of measurement</li> <li>▪ Demonstrate, through experimental research, the effects of the application of forces on objects, considering changes in shape, speed, and direction of movement, for example</li> <li>▪ Identify, through experimental research, different types of forces and their effects on specific situations—e.g., friction force (by dragging objects), weight (gravity), and magnetic force (in magnets)</li> <li>▪ Design and build technological objects that use force to solve everyday problems</li> </ul>
Earth Science and the Universe	<ul style="list-style-type: none"> <li>▪ Describe, using models, Earth’s layered structure (crust, mantle, and core) with distinctive characteristics in terms of composition, hardness, and temperature</li> <li>▪ Explain changes to the surface of Earth caused by the interaction of its layers and movement of tectonic plates (i.e., earthquakes, tsunamis, and volcanic eruptions)</li> <li>▪ Propose prevention and safety measures for natural hazards, in school, on the street, and at home, to develop a culture of prevention</li> </ul>

**Exhibit 4: Science Curriculum, Grade 8**

Content Area	Fundamental Objectives
Biology	<ul style="list-style-type: none"> <li>▪ Explain how cell models have evolved based on those made by scientists such as Hooke, van Leeuwenhoek, Virchow, Schleiden, and Schwann</li> <li>▪ Develop models to explain the relationship between the function of a cell and its parts, considering:               <ul style="list-style-type: none"> <li>▫ Structures (i.e., nucleus, cytoplasm, cell membrane, cell wall, vacuoles, mitochondria, chloroplasts, etc.)</li> <li>▫ Eukaryotic cells (animal and plant) and prokaryotic cells</li> <li>▫ Cell types (e.g., intestinal, muscular, nervous, pancreatic)</li> </ul> </li> <li>▪ Explain, through experimentation, exchange mechanisms between cells (animals and plants) and their environment by diffusion and osmosis</li> <li>▪ Create models to show that plants have specialized structures to respond to environmental stimuli, similar to the human body, considering substance transport processes and gas exchange</li> <li>▪ Explain, based on evidence, the interaction of human body systems, organized by specialized structures that contribute to its balance, considering:               <ul style="list-style-type: none"> <li>▫ The digestion of food through the action of digestive enzymes and its absorption into the blood stream</li> <li>▫ The role of the circulatory system in transporting nutrients, gases, metabolic waste, antibodies, and other substances</li> <li>▫ The process of pulmonary ventilation and gas exchange at the alveolar level</li> <li>▫ The role of the excretory system in the filtration of blood, regulating body water, and waste disposal</li> <li>▫ The prevention of diseases that are caused by the excessive consumption of substances such as tobacco, alcohol, fat, and sodium</li> </ul> </li> <li>▪ Investigate experimentally and explain the nutrients found in food (i.e., carbohydrates, proteins, fats, vitamins, minerals, and water) and their effects on human health</li> <li>▪ Analyze and evaluate, based on evidence, factors contributing to physical health, proposing a plan that considers:               <ul style="list-style-type: none"> <li>▫ A balanced diet</li> <li>▫ Regular physical exercise</li> <li>▫ Avoiding alcohol, tobacco, and drugs</li> </ul> </li> </ul>
Physics	<ul style="list-style-type: none"> <li>▪ Analyze electrical forces, considering:               <ul style="list-style-type: none"> <li>▫ Types of electricity</li> <li>▫ Methods of charging an object (i.e., friction, contact, and induction)</li> <li>▫ Planning, conducting, and evaluating experiments to demonstrate electrical interactions</li> <li>▫ Assessment of risks in everyday life and possible solutions</li> </ul> </li> <li>▪ Investigate, explain, and evaluate the technologies that enable the generation of electricity, as in batteries, photovoltaic panels, and generators (e.g., wind, hydroelectric, and nuclear)</li> <li>▪ Analyze a home electrical circuit and compare circuits in series and in parallel through experimentation, in relation to:               <ul style="list-style-type: none"> <li>▫ Electrical power</li> <li>▫ Potential difference</li> <li>▫ Amperage</li> <li>▫ Electrical resistance</li> <li>▫ Energy efficiency</li> </ul> </li> </ul>

Content Area	Fundamental Objectives
	<ul style="list-style-type: none"> <li>▪ Develop models and experimental research to show heat is a process of transfer of thermal energy between two or more bodies that are at different temperatures, or between a heat source and an object, considering:               <ul style="list-style-type: none"> <li>▫ Methods of heat transfer (conduction, convection, and radiation)</li> <li>▫ The effects of heat transfer (e.g., change in temperature, deformation, and change of state)</li> <li>▫ The amount of heat transferred and absorbed in a thermal process</li> <li>▫ Technological objects that protect high or low temperatures of living beings and objects</li> <li>▫ Temperature difference (at the level of particles)</li> </ul> </li> <li>▪ Temperature measurements using thermometers and various scales (e.g., Celsius, Kelvin, and Fahrenheit)</li> </ul>
Chemistry	<ul style="list-style-type: none"> <li>▪ Investigate and analyze how knowledge about the field of chemistry has evolved, considering the contributions and evidence of:               <ul style="list-style-type: none"> <li>▫ Dalton's atomic theory</li> <li>▫ Atomic models developed by Thomson, Rutherford, and Bohr, among others</li> </ul> </li> <li>▪ Develop models that show that matter consists of atoms combining into molecules and substances</li> <li>▪ Use the periodic table to investigate the properties of chemical elements based on patterns, considering:               <ul style="list-style-type: none"> <li>▫ Atomic number</li> <li>▫ Atomic mass</li> <li>▫ Electrical conductivity</li> <li>▫ Thermal conductivity</li> <li>▫ Brightness</li> <li>▫ Bonds that can be formed</li> </ul> </li> <li>▪ Investigate and argue, based on evidence, that there are chemical elements on Earth that are common in living organisms and support life (e.g., carbon, hydrogen, oxygen, and nitrogen)</li> </ul>

## Professional Development Requirements and Programs

The Center of Development, Experimentation, and Pedagogical Research (CPEIP),<sup>16</sup> within the Ministry of Education, is in charge of designing, implementing, and evaluating professional development policies for teachers in order to improve the quality of education in the country.

One of the CPEIP's professional development programs consists of B-learning Courses, which are online courses for teachers that are part of a series of professional development programs. These courses combine face-to-face and remote classes (via the internet) that cover one specific theme and are run by subject specialists, who provide tutorials and guides for teachers. The courses comprise approximately 80 to 140 hours, and target teachers and education assistants in subsidized schools. Another CPEIP program is the Continuing Education Programs, which grants disciplinary and pedagogical specialization to basic education teachers in public and private subsidized schools. This specialization program is developed by accredited Chilean universities, and the CPEIP acts as a technical advisor.<sup>17</sup>

Teachers in public schools are evaluated under a mandatory formative evaluation system (*Docente Más*), which is administrated by the CPEIP with the aim of strengthening the teaching profession and improving the quality of education in Chile. Evaluations consist of self, peer, and supervisor assessments and a portfolio assessment (including written and audiovisual material). Evaluation results are shared with teachers, school principals and management teams, and school administrators (municipalities). Teachers who obtain positive results on the evaluation also may take a written test of disciplinary and pedagogical knowledge specific to their subject and grade level. Teachers who obtain positive results on the written test receive an additional yearly allowance, called the variable allowance for individual performance (*Asignación Variable por Desempeño Individual*).<sup>18</sup>

The Ministry of Education offers the Teaching Excellence Allowance (*Asignación de Excelencia Pedagógica*), which aims to improve the quality of education by recognizing the professional excellence of teachers from public and private subsidized schools.<sup>19</sup> To apply, teachers take a voluntary assessment consisting of a portfolio and a pedagogical and disciplinary test. Depending on the assessment results, teachers may receive a bonus on their incomes for a certain amount of time. Teachers who obtain distinguished results on the Teaching Excellence Allowance assessment may apply to join the Expert Teachers Network (*Red Maestros de Maestros*). This network, also launched by the Ministry of Education, aims to leverage distinguished teachers' capabilities to benefit the professional development of teachers as a whole.<sup>20</sup>

Although these programs are delivered to the entire primary and secondary educational sector (for teachers of all grades and in all subsectors), they aim to develop the knowledge and skills of teachers in their respective areas of specialty, such as science and mathematics.

## Monitoring Student Progress in Mathematics and Science

The Ministry of Education and the Education Quality Agency are responsible for the continual and periodic assessment of the education system to improve the quality of education. The Education Quality Agency is responsible for assessing student learning outcomes and the performance of educational institutions based on national curriculum standards, on an annual basis.<sup>21</sup> The national assessment system (*Simce*) is administered in all schools in certain grades and certain subjects.<sup>e,22</sup> The *Simce* assessment includes a questionnaire for students, parents, teachers and principal designed to measure Personal and Social Development Indicators, a set of indexes that reflect the personal and social development of students and complement the results of the *Simce* standardized tests as well as international assessments.

<sup>e</sup> *Simce* is administered to students in Grades 4 and 10, every year. *Simce* assessment at other grades varies year to year, depending on the annual evaluation plan. Similarly, *Simce* is administered in mathematics and language arts every year, whereas the *Simce* assessment in the social and natural sciences varies year to year, depending on the annual evaluation plan. <https://www.agenciaeducacion.cl/evaluaciones/que-es-el-simce/>

Results are published at school, regional, and national levels, represented by scale scores and achievement levels, and indicate what students are able to do at different levels on the assessment scale. The individual results of students and teachers are protected.

At the school level, students are assessed individually in every grade and subject by their teachers, and grade promotion depends on their academic results. The Ministry of Education awards high school (upper secondary school) promotion certificates based on student qualifications provided by schools.<sup>23</sup>

## Special Initiatives in Mathematics and Science Education

In recent years, the Ministry of Education has developed educational programs that aim to provide instructional support and resource materials in every subject area, including science and mathematics. The most prominent program in recent years has been the Schools Up Plan, implemented in more than 400 schools across the country since 2019. The Schools Up Plan aims to support schools categorized as “insufficient” by a national comprehensive evaluation of student achievement. The aim of the program is to improve student learning through the leveling of learning, the prevention of school absenteeism, and the accompaniment of management teams. Leveling of learning strategies incorporate the provision of educational resources in mathematics and language, pedagogical support, and demonstration classes, as well as other actions.<sup>24</sup>

*Explora* is another national program, created in 1995 by the National Commission for Scientific and Technological Research (*CONICYT*) to provide nonformal education in science and technology. Its aim is to develop the use of science and technology in the community. The program focuses on children and school age young people, in particular, and fosters a scientific culture to improve the quality of life in the country. Program initiatives include the following: guidance of scholarly research; national contests, regional congresses, and national school conventions on science and technology; Explore Chile Go camps; and activity books.<sup>25</sup>

The Innovation Center of the Ministry of Education, initially created as the *Enlaces* program, is another national initiative that seeks to support the education system, promoting the adoption of educational innovations, contributing to the development of capacities and improving their conditions, and considering the needs of their people and communities. I Learn Through Projects is a program that seeks to promote the development of skills, preparing students for academic, personal, and professional success; helping them to face the challenges of the future; and fostering student-centric learning. Schools are invited to take part through different proposed subjects, including mathematics and science.<sup>26</sup>

## References

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