

# Georgia

Lika Zaalishvili

*National Assessment and Examinations Center*

## Introduction

### Overview of Education System

Education in Georgia is based on principles of each citizen's freedom of choice and collaboration, fair competition and equal opportunity, civil unity, and respect for cultural identity. Education that is offered in Georgia encourages people to acquire and develop the knowledge and skills necessary for social accomplishment and self-realization. The government of Georgia defines the broad goals of basic education, attainable results, strategies for action, and curricula. Education is regulated by the Law of Georgia on General Education (adopted in 2005).<sup>1</sup>

According to the Law of Georgia on General Education, the education system consists of three levels: primary education (Grades 1 to 6), basic education (Grades 7 to 9), and secondary education (Grades 10 to 12). After completing basic education, students can continue to a vocational education institution or pursue undergraduate education. To receive a bachelor's degree, a student must complete secondary education or vocational education programs in which secondary education learning outcomes are integrated.<sup>2</sup>

In 2023, Georgia had 2,296 schools (2,086 public and 210 private), educating 634,300 students at all levels; 567,800 students were enrolled in public schools and 66,500 students were enrolled in private schools.<sup>3</sup>

In 2018, the Ministry of Education, Science and Youth of Georgia launched the General Education Reform Support Program.<sup>4</sup> The program introduces constructive principles (active learning and teaching, knowledge building, learning to learn, interconnecting and organizing knowledge, and emphasizing comprehension over memorization), assessment oriented toward student development, and teamwork practices based on responsibility and collaboration. Within the reform program, the Ministry of Education, Science and Youth of Georgia approved the new third-generation national curriculum for 2018–2024.<sup>5</sup>

According to the constitution, the official language of Georgia is Georgian, and Abkhazian is the official language in the territory of Abkhazia (currently occupied by Russia). Most general education institutions provide instruction in Georgian. The Georgian language belongs to the Caucasian language group, which has its own unique alphabet. Considering the multiethnic population of the country, comprising Azeri, Armenian, Russian, Abkhazian, Ossetian, Greek, Jewish, Kurdish, and Ukrainian communities, the law stipulates those students have the right to receive general education in their native language.

## Use and Impact of TIMSS

Georgia participated in the 2007, 2011, 2015, and 2019 cycles of TIMSS. The National Assessment and Examinations Center prepared and disseminated national reports, which are available from the center's website.<sup>6</sup> Recommendations from the report *Trends in International Mathematics and Science Study (TIMSS) 2019 results, Georgia* were discussed among the Minister of Education, Science and Youth of Georgia; invited experts; nongovernment organizations; and a national curriculum group. The report was also reviewed by employers and other interested individuals who made suggestions about how TIMSS results could be used to improve the quality of education.

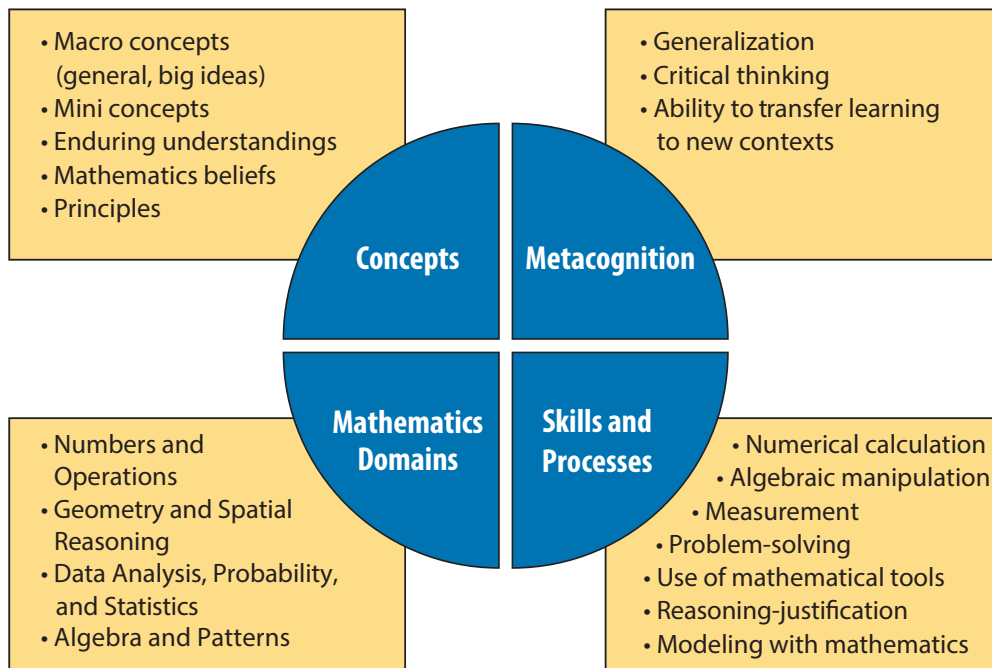
## The Mathematics Curriculum in Primary and Lower Secondary Grades

Mathematics is regarded as one of the most important subjects in Georgia, and it has received significant attention from policymakers and schools. This belief is reflected in various aspects of national policy (e.g., the development of Olympiads, which are competitions that encourage talented students to learn mathematics and science).

The introduction to the national curriculum states that its main purpose is to support every constituency involved in general education—including teachers, students, parents, textbook authors, and education managers—in planning and implementing the learning process effectively. The national curriculum describes requirements that students must fulfill for the successful completion of every grade and presents them in the form of outcomes and relevant indicators.

Since the adoption of the Law of Georgia on General Education in 2005, the curriculum has been changed several times, with the most recent revision in effect from 2011 to 2016. In 2018, the third-generation curriculum was introduced. The main difference between this new curriculum and the former curriculum is that the new curriculum is more focused on developing thinking and analytical skills, understanding ideas, and using concepts to help students think and understand materials deeply, with an ability to transfer learning to new contexts (see Exhibit 1).<sup>7</sup>

## Exhibit 1: Mathematics Framework



The new curriculum seeks to do the following:

- develop students' thinking abilities
- develop abilities to use deductive and inductive reasoning; support opinions with relevant arguments; and analyze phenomena, facts, and events
- master mathematics as a universal language of science and to describe the universe
- understand the role of mathematics as a significant component of human culture
- prepare students for professional careers
- acquire the mathematical knowledge to complete daily tasks and develop the skills needed for the practical application of this knowledge

Mathematical competence includes mastering mathematical concepts and procedures, as well as acquiring skills for applying them when solving problems, and developing communication abilities essential for obtaining and providing information through mathematical language and methods. As such, mathematics education aims to develop reasoning, communication, application and modeling, and problem-solving skills, as well as a positive attitude toward the subject. To reflect these objectives, the national curriculum in mathematics is divided into four domains:

- Numbers and Operations
- Geometry and Spatial Reasoning
- Data Analysis, Probability, and Statistics
- Algebra and Patterns

Although these domains are interrelated and cover knowledge and skills to be acquired at school, the division of mathematics into domains should not be confused with the division of mathematics courses. Domains merely help to outline the range of materials to be taught and highlight topics that should be given special consideration at different stages of the learning process.

The four domains encompass the following content:

- Numbers and Operations—numbers, their uses, and ways to present them; operations on numbers and numerical relationships; estimation and approximation of quantities; quantities, measurement units, and other uses of numbers
- Geometry and Spatial Reasoning—geometric objects, their properties, relationships, and constructions; measures and methods of measurement; transformations and symmetry of figures; coordinates and their uses in geometry
- Data Analysis, Probability, and Statistics—data sources and data collection methods; ways of organizing data and means of data representation; summarizing numerical characteristics of data; probabilistic models; sampling methods and numerical characteristics of samples
- Algebra and Patterns—sets, mappings, and functions and their uses; elements of discrete mathematics and their uses; algorithms and recursions; algebraic operations and their properties

Apart from more general aims, the curriculum defines specific objectives to be achieved within each domain at every level of general education—primary (Grades 1 to 6), basic (Grades 7 to 9), and secondary (Grades 10 to 12). Exhibit 2 outlines the objectives for each mathematics domain in Grades 4 and 8.

**Exhibit 2: Mathematics Domain Objectives, Grades 4 and 8**

| Grade | Domain                                     | Objectives  |
|-------|--|---|
| 4     | Numbers and Operations                     | represent whole numbers in decimal notation; add, subtract, multiply, divide, and compare numbers; recognize and compare simple fractions ( $\frac{1}{2}$ , $\frac{1}{3}$ , $\frac{1}{4}$ ); use and convert between measuring units; use arithmetic operations to solve practical problems |
|       | Geometry and Spatial Reasoning             | develop skills essential for describing and constructing geometrical figures; find components of geometric objects and their relationships; classify figures in terms of their attributes; recognize figures based on verbal descriptions and create graphical models                       |
|       | Data Analysis, Probability, and Statistics | become acquainted with elements of descriptive statistics, including ways of collecting, organizing, and interpreting qualitative and discrete quantitative data  |
|       | Algebra and Patterns                       | develop skills needed to recognize correspondence and relationships between quantities; learn to build and solve simple algebraic expressions   |

**Exhibit 2: Mathematics Domain Objectives, Grades 4 and 8 (Continued)**

| Grade | Domain                                     | Objectives  |
|-------|--|---|
| 8     | Numbers and Operations                     | represent rational numbers in decimal notation or using fractions; calculate using addition, subtraction, multiplication, and division; compare rational numbers; analyze various properties of numbers, including operations of square or cubic roots                    |
|       | Geometry and Spatial Reasoning             | use Cartesian coordinates to find unknown magnitudes of a given geometric shape; calculate area of planar shapes by subdividing into simple shapes or by completing to a simple shape; complete a missing step in a geometric proof                                       |
|       | Data Analysis, Probability, and Statistics | gather data and organize it in tables or charts; convert data represented in one way into another graphical form; build simple sample spaces; calculate simple probabilities  |
|       | Algebra and Patterns                       | recognize linear relationships between variables; solve systems of linear equations with two unknowns; solve linear inequalities and interpret the results geometrically using a number line; solve word problems by writing linear equations; model real-life situations |

## The Science Curriculum in Primary and Lower Secondary Grades

The subject group of science consists of the following subjects: natural science, which comprises the fundamentals of life science, physical science, and earth science for primary education; and biology, chemistry, physics, and geography for basic and secondary education (earth science is part of the social science subject group). Science is prioritized in Georgia's general education system. It equips a student with knowledge and skills that will ensure the student's advancement along with fast-moving human progress. These skills and knowledge enable a student to use modern science and become a valuable and active participant in society. This kind of student will be able to apply knowledge not only for career advancement but also for the well-being of society. Mastering natural science facilitates the comprehension of connected processes in the universe, as well as the importance of caring for the surrounding world and maintaining a healthy and safe lifestyle.

In the course of teaching natural science, it is essential to focus on the formation of attitudes and approaches, the development of research skills, and knowledge utilization. These activities are the requirements of modern pedagogy as well as classic Georgian didactics.

The purpose of teaching the subjects combined in the group of natural science is to stimulate a student's interest in studying the foundations of natural science and to develop research skills, which will give the student an opportunity to become acquainted with the surrounding world, learn more about it, and feel a responsibility toward society and the environment.

In accordance with education goals, the curriculum covers the following aspects of problem-solving:

- studying the living world and living processes happening in it
- studying physical and chemical phenomena happening in the world
- studying Earth and the universe
- studying the interrelationships between humans and the environment
- forming observation and descriptive skills
- developing classification skills
- forming skills in anticipating/formulating a hypothesis
- developing planning skills
- forming skills in experimenting/testing
- developing data recording skills
- developing analyzing skills
- forming inference and assessment skills
- developing modeling skills
- forming communication skills
- developing interest in natural science
- grasping the importance of natural science
- developing a positive attitude toward scientific research and novelties
- developing a desire for collaboration
- grasping the importance of maintaining a healthy and safe lifestyle
- forming a responsibility to care for the environment

As mentioned, natural science is an integrated subject (combining knowledge from the fields of life science, physical science, and earth science) and is taught at the primary level of general education (Grades 1 to 6). Natural science comprises the following four branches:

- **Scientific Research**—Within the scope of this branch, a student becomes acquainted with the foundations of scientific research. The student learns how to formulate a research question; make assumptions; plan and implement simple, practical activities; observe and describe phenomena; create and use models; organize and analyze results; draw a conclusion and compare it with an assumption; and present work to classmates. Initially, a student does all of these activities with the help of a teacher, but by the end of this level of education (i.e., by the end of sixth grade), the scope of independent work increases, and students plan and conduct research without the teacher's active involvement. Scientific Research is a comprehensive area that connects with the other three branches of natural science.
- **The Living World**—Within the scope of this branch, a student becomes acquainted with the diversity of the living world; the construction of organisms and characteristics of life; the basic requirements for life; and the attributes of major groups of organisms, their life cycles, and forms of adaptation with the environment. A student perceives the surrounding world via simple research activities, observes the living world



by means of sense organs or simple tools, collects and processes data, makes assumptions and checks his or her interest-provoking idea through practical activities, gathers information, and draws conclusions on the basis of observations and opinions.

- **Bodies and Phenomena**—Within the scope of this branch, a student tries to formulate assumptions regarding physical and chemical phenomena on the basis of observations and learns new terms based on simple practical activities. A student becomes acquainted with the basic concepts of physics, chemistry, and simple technology via real situations and examples of everyday life, which makes it easier for the student to learn comprehensively the same or other topics at the next level of education.
- **Earth and the Universe**—Within the scope of this branch, a student becomes acquainted with views regarding Earth, the solar system, and other cosmic objects and develops a perception concerning orientation in time and space. A student learns about ongoing cyclic processes in nature. The student becomes familiar with the resources essential for the existence of life on Earth and the ways and means of their utilization. The curriculum also incorporates practical activities for mastering these methods, including observation and learning trials, familiarization with simple tools and implementing measuring and computing activities, orientation in place, utilization of maps, modeling of objects and processes, and other activities.

In Grades 7 to 9, biology, physics, chemistry, and geography are taught as separate subjects. Each subject comprises three branches as follows:

- biology—Scientific Research, Science and Technology, The Living World
- physics—Scientific Research, Science and Technology, Physical Phenomena
- chemistry—Scientific Research, Science and Technology, Chemical Phenomena
- geography—Maps and Geographical Analysis, Natural and Social Systems, Sustainable Development and Safety

At this level of general education, student skills essential for cognition become more developed. A student advances from a stage of external descriptions of phenomena to a stage of comprehension of phenomena, learns the main laws of physics and chemistry, and learns biological patterns. A student develops an empirical perception of the world and learns creative thinking. The student tries to define humans' role and purpose in the world.

At the basic level of general education, a student develops the following skills:

- how to apply some modern methods of research
- how to research and use scientific literature
- how to plan and conduct experiments, and how to collect and process data
- how to critically analyze information and draw conclusions
- how to present findings (e.g., by creating graphs, diagrams, models)

## Teacher Professional Development Requirements and Programs

A teacher has the right to advance his or her status based on various professional development activities. To achieve the following objectives, teachers must meet several requirements:

- To obtain the status of senior teacher, a practitioner-teacher must prove competency in a subject and a profession by passing a barrier set by the Ministry of Education, Science and Youth of Georgia and meet the requirements established by the teacher's professional standard and career advancement scheme.
- To obtain the status of lead and mentor teacher, a senior or lead teacher must pass the subject test or confirm subject competence with a result of at least 50% or have a PhD. In addition, the teacher must go through a complex evaluation process that includes a written exam in general professional skills that corresponds to the intended status-level advancement, as well as an assessment of teaching practice (classroom observation, portfolio assessment, being interviewed by school society).<sup>8</sup>

The National Center for Teacher Professional Development offers both general professional as well as subject-oriented trainings to ensure teachers' continuous professional development. Training programs are differentiated to meet the needs of beginning teachers and teachers who hold higher status.<sup>9</sup>

The National Center for Teacher Professional Development offers teachers of natural science special training that includes teachings based on research, principles of conducting laboratory tests, and other practices. Trainings designed for math teachers address contextual topics as well as methods. Training focused on content is intended for beginning teachers. Beginning teachers study comprehensive courses in various branches of math, such as geometry, data analysis, and probability. Training for senior and lead teachers aims to acquaint them with modern technologies.

## Monitoring Student Progress in Mathematics and Science

Since 2006, the assessment scale in Georgia has been changed from a scale ranging from 2 to 5 to a scale ranging from 1 to 10. Teachers are required to develop their own assessment methods to measure their students' progress. The national curriculum provides regulations on student assessment, as well as recommendations on assessment strategies.

In 2011, the Ministry of Education, Science and Youth of Georgia introduced school leaving examinations. To obtain a school diploma, students in 12th grade were required to pass computer-adaptive standardized examinations in all school subjects. The National Assessment and Examinations Center administered the examinations online in every school. Those exams were abolished in 2019. In 2019, the National Assessment and Examinations Center presented a new national assessment project to the Georgian government.<sup>10</sup> In accordance with the new project, assessments are conducted at the end of fourth and sixth grades. The test is administered electronically across more than 300 schools in Georgia. Results are provided



electronically to students, teachers, and school principals. Schools use these results to improve the quality of learning and teaching, the school climate, and student achievement. Schools have the right to introduce their own examinations at the end of the academic year.

## Special Initiatives in Mathematics and Science Education

The Ministry of Education, Science and Youth of Georgia awards honor students with gold and silver medals after completion of secondary school. Additionally, the Ministry, along with the Educational and Scientific Infrastructure Development Agency, implements the subprogram My First Computer to increase the motivation of honor students. Within the framework of this program, students enrolled in public schools who have successfully completed the basic level of education (i.e., ninth grade) and continue their education in secondary school (10th grade) are awarded personal computers.

## Suggested Reading

National Assessment and Examinations Center. (2020). *Trends in International Mathematics and Science Study (TIMSS) 2019 results, Georgia*. Retrieved from <https://naec.news/2020/12/09/trends-in-international-mathematics-and-science-study-timss-2019-results-georgia/>

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