ARMENIA

Arsen Baghdasaryan
Lusine Atoyan

Introduction

Overview of Education System

Article 35 of the first constitution of the Republic of Armenia, ¹ adopted in 1995, stipulates that every citizen has the right to education, education is free of charge in state secondary education institutions, and every citizen has the right to receive professional education free of charge on a competitive basis in state professional education institutions. The National Assembly of the Republic of Armenia adopted the Law on Education² on April 14, 1999, which guided the subsequent development and reform of Armenia’s education system.

Languages of Instruction

Armenian is the official language of Armenia and the official language of instruction.³ The population of Armenia is approximately 3 million and comprises Armenian (approximately 98 percent), Yezidi, Russian, Assyrian, and Greek populations, and other subpopulations.

The Mathematics Curriculum in Primary and Lower Secondary Grades

The mathematics curriculum⁴ for Grades 1 to 4 includes the following main topics:

- Arithmetic operations
- Natural numbers
- Addition and subtraction with natural numbers
- Speed, time, and distance
- Multiplication and division with natural numbers
- Algebraic expressions and computations
- Fractions
- Geometric shapes and their study

The mathematics curriculum for Grades 5 and 6 includes the following main topics:

- Natural numbers and scales
- Operations with fractions
- Angles and their measurement
• Percent
• Rational expressions

In Grades 7 to 9, mathematics is divided into algebra and geometry. The algebra curriculum includes the following main topics:
• Addition and subtraction
• Multiplication and division
• Powers of natural numbers
• Simple algebraic proofs: logical algebra and figure algebra
• Equations with a single variable
• Binomials
• Square roots
• Quadratic polynomials
• Systems of linear equations
• Powers of whole numbers and fractions
• Arithmetic series
• Functions

The geometry curriculum includes the following main topics for Grades 7 to 9:
• Triangles
• Parallel lines
• Sides and angles of triangles
• Geometric constructions
• Quadrilaterals
• Circumference and circles
• Area of figures
• Similar triangles
• Similar figures
• Vectors

The Science Curriculum in Primary and Lower Secondary Grades

Science in the primary grades is divided into two subjects—Nature and Natural Science—and includes the following student objectives:
• Learn the basics of research in science
Learn about systems in nature
Learn about processes in nature
Understand the diversity and unity of nature
Understand the importance of achievements in the natural sciences for daily life
Understand the necessity of preserving the environment and human health

The science curriculum is structured around the following main topics:

- Basics of research
- Nature’s systems
- Nature’s processes
- Humans and the environment
- Basics of experimentation

Science in Grades 7 to 9 includes the following subjects: Geography, Geography of Armenia, Physics, Chemistry, and Biology. The curriculum for these subjects includes the following topics:

- Physics—The concept of “body” in physics and simple measurements; body movement and interactions in a reference frame; work, power, and simple machines; the structure of materials; pressure; kinematics and dynamics; mechanical vibrations and waves; heat and temperature; electrical and electromagnetic and optical phenomena; and the structure of atoms and nuclei
- Chemistry—Basic concepts of chemistry; oxygen, oxides, and combustion; hydrogen, acids, and salts; water, solutions, and bases; basic groups of inorganic compounds; the periodic table of the chemical elements; chemical bonds and the structure of molecules; electrolytic dissociation; subgroups of oxygen, nitrogen, carbon, and halogens; and organic compounds
- Geography—Earth and its geography; Earth’s continents and oceans; the geography of the Republic of Armenia and the Republic of Nagorny Kharabakh, their regions and states (nature, population, economy); and social geography
- Biology—Lower plant forms (algae); higher plant forms (moss, ferns, gymnosperms, angiosperms); bacteria, fungi, protozoans (infuzoria, sporozoa); metazoans (types of coelenterate, worms, mollusks, arthropods); chordates (fish, amphibians, reptiles, birds, mammals); humans (blood, blood circulation, the immune system); and human body systems (respiratory, digestive, excretory, nervous, musculoskeletal, endocrine, reproductive, sensory organs, skin, metabolism)

Teachers, Teacher Education, and Ongoing Professional Development

The State Pedagogical University of Armenia is the main provider of teacher education in Armenia. There also are many universities (e.g., the Yerevan Brusov State Linguistic University) that have pedagogical faculties as well as professional colleges that provide quality education and teacher preparation.
**Teacher Education Specific to Mathematics and Science**

New teacher education programs have been implemented in Armenia since 2005, with the aim of making teachers into leaders in the country’s process of educational reform. To ensure the effective implementation of new curricula, syllabi, standards, and assessment tools, subject-based teacher education programs were introduced in 2005, following the sequence of syllabi development. These programs have been conducted using the training of trainers model (i.e., a core group of central trainers is trained by international experts, the central trainers in turn train local trainers, and the local trainers train teachers). School-based training courses are conducted by school centers in all of the Marzes (regions) of Armenia and by the National Institute of Education (NIE) and its 11 Marz branches. Approximately 4,000 teachers have participated in courses in various subjects, creating potential for the expansion of the training programs.

In this age of information, as knowledge is expanding at an ever increasing rate, the main goal of education is to produce independent learners. In the past, the emphasis of education was on learning by rote; now, the emphasis is on navigating information, acquiring practical skills, and developing and applying competencies. This requires the active participation of students in the learning process and their development of the capability to organize the learning process independently. In the educational process, this goal may be achieved using both interactive and cooperative learning methods. To support teachers in implementing new cooperative learning methods, three 3-day seminars on the application of cooperative learning methods are being offered in Armenia at present.

**Requirements for Ongoing Professional Development**

The key factor of success in education is teachers’ professional development. As teachers are the core players in implementing general educational reforms, their ongoing professional development is of vital importance. For this reason, completing quality teacher education is only the initial requirement for teachers in Armenia. At present, the licensing process for teachers and headmasters is ongoing, which creates opportunity for professional skill development. Teachers attend training courses and seminars that culminate in system-wide examinations. Passing the examinations allows them to renew their license and continue to teach.

Ongoing teacher training courses also are available for improving computer literacy.
Instruction for Mathematics and Science in Primary and Lower Secondary Grades

Exhibit 1 presents the number of instructional hours per week for mathematics and science subjects in Grades 1 to 9.

Exhibit 1: Instructional Hours for Mathematics and Science Subjects, Grades 1–9

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Nature</td>
<td>1</td>
</tr>
<tr>
<td>Natural Science</td>
<td></td>
</tr>
<tr>
<td>Geography</td>
<td></td>
</tr>
<tr>
<td>Geography of Armenia</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>5</td>
</tr>
<tr>
<td>Algebra</td>
<td></td>
</tr>
<tr>
<td>Geometry</td>
<td></td>
</tr>
</tbody>
</table>

Grade at Which Specialist Teachers for Mathematics and Science are Introduced

In general, Armenian students do not have subject-specific teachers for mathematics and science in the primary grades (Grades 1 to 4). Beginning in middle school, students have separate teachers for mathematics and each science subject.

Instructional Materials, Equipment, and Laboratories

In Armenia, all schools use the same textbooks, which are selected by the Ministry of Education and Science on a competitive basis. Teachers are allowed to use alternative textbooks in addition to textbooks approved by the Ministry. For practical science coursework, laboratory equipment is used widely for scientific experimentation in addition to other equipment (e.g., models of molecules of different substances, models of physical mechanisms, models of human and animal body parts). During geography lessons, maps, globes, and models of Earth’s surface may be used. Wall posters, tables, formulas, and pictures of famous scientists with accompanying biographies also are used widely for all subjects.

Use of Technology

All schools in Armenia are equipped with computers, and nearly all schools are connected to the Internet. In many schools there is a computer room for instructional use. In addition, computers are
used to generate lists of teachers and students, databases, and assessment results. Computers also are used to deliver animated lessons and presentations to students. Computers, the Internet, and modern technologies are necessary tools used in every school to support the development of student abilities.

**Monitoring Student Progress in Mathematics and Science**

The Assessment and Testing Center in Armenia organizes and implements the following:

- School graduation examinations at Grade 12
- Final examinations in Grades 4 and 9
- University entrance examinations
- External assessments in sampled schools twice a year to monitor student progress, and to assist teachers in preparing classroom assessments using various testing methods
- National surveys
- International surveys (e.g., TIMSS)

**Use and Impact of TIMSS**

In the former Soviet Union, assessments comprised traditional paper and pencil tests. Curricula and test items were more theoretical and less practical. Armenia’s participation in TIMSS 2003 spurred a process of reform that began in 1999, and the practice of testing for national assessment was introduced gradually in Armenia. Armenia’s educational reform included reviewing curricula and textbooks in addition to introducing new methods of assessment.

During TIMSS 2007 and TIMSS 2011, Armenia already had some experience with the testing process. As such, these cycles of TIMSS led to the introduction of national assessments in different subjects in Armenia. Using TIMSS methods and procedures, Armenia has implemented national assessments that cover Armenian language, literature, and history, known in Armenia as HAAS. Armenia has developed and piloted national assessments that cover science subjects (i.e., physics, chemistry, biology, and geography), known as BAAS, and assessments that cover foreign languages, known as OLAS. TIMSS has had great impact on the process of educational reform in Armenia not only in terms of national assessments, but also on secondary school graduation and university entrance examinations.

Due to the impact of TIMSS on pedagogical reforms in Armenia, the testing process is used widely for all subjects and includes several methods (e.g., continual assessment, final and unified examinations, and national and classroom assessments). The Ministry of Education and Science has based conclusions regarding curricula, textbooks, methods of assessment, and continual assessment in Armenia on TIMSS results.

**Suggested Readings**


References