

Qatar

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Introduction

Overview of Education System

The human development pillar of the Qatar National Vision 2030 development plan aims to build a world-class education system that provides equitable opportunities for citizens to enroll in high-quality education and training. This will allow all learners to gain skills and the necessary competencies to achieve their ambitions in line with their potential and abilities to contribute to society. It also enhances the values and heritage of Qatari society and calls for tolerance and respect for other cultures.¹

The Ministry of Education and Higher Education (MOEHE) is responsible for managing education at all stages (K–12), education decision-making, and developing and advancing the education sector in the State of Qatar. The MOEHE’s responsibilities include developing education policies, curricula, and schoolbooks; developing methods to assess students’ performance; and overseeing and providing technical and administrative support for teaching and administrative personnel in schools.

The MOEHE is the government entity charged with supporting and regulating education in Qatar. That includes a full array of public and private schools and high-quality institutions of higher education.²

The education system in the State of Qatar is divided into five stages (see Exhibit 1): early childhood, preprimary, primary, preparatory, and secondary. The educational services institutions provide facilities for children in the early childhood stage, also called the prekindergarten stage (up to the age of 4), while the preprimary and primary stages focus on literacy and numeracy in addition to offering a variety of simplified subjects. Below are some key features of the education stages:

- early childhood stage: Education laws in Qatar do not allow early childhood centers (nurseries) to provide educational services but do allow them to provide childcare services to develop children’s skills and talents. The education laws also do not allow early childhood institutions to enroll students over the age of 4.
- preprimary stage: This stage (also called the kindergarten stage) is one of the early education stages that includes kindergarten 1 (KG 1) and kindergarten 2 (KG 2). Students who are eligible to enroll in preprimary school are between 4 and 5 years old.

- primary stage: Primary school students range from 6 to 12 years of age and attend Grades 1 to 6. Primary education is compulsory according to the laws of the State of Qatar and is provided free of charge to citizens in public schools. Both public schools and private schools provide educational services for students in the primary stage of education. Public and private schools apply Qatar’s national curriculum, while community schools can either apply the curriculum of their home country or follow the public school curriculum.
- preparatory stage: Students who have completed primary education become eligible to be enrolled in the preparatory stage. This stage consists of Grades 7 to 9 and is for students who are between 12 and 15 years of age.
- secondary stage: Students who have completed preparatory education are eligible to be enrolled in the secondary level of education. The duration is 3 years for students who are 15 to 18 years of age and encompasses Grades 10 to 12. Secondary education has two pathways: an academic pathway and a vocational pathway. The academic pathway is intended for students who plan to pursue their university education, whereas the vocational pathway is for students opting for employment.

Exhibit 1: Stages of Education in Qatar

Stage	Ages	Number of Years
KG 1 & 2	4–5	2
Primary	6–12	6
Preparatory	12–15	3
Secondary	15–18	3

The State of Qatar has several types of schools, each of which follow a specific curriculum (see Exhibit 2).

Exhibit 2: Types of Schools in Qatar According to the Curriculum Taught

School Type	Curriculum
Government	belongs to the MOEHE and applies the national curriculum
International	belongs to the MOEHE and applies an international curriculum
Community	applies the curriculum of each school’s national community
Private Arabic schools	belongs partially to the MOEHE and applies the national curriculum

Use and Impact of TIMSS

Qatar participated in TIMSS for the first time in 2007 and has participated in all TIMSS cycles since then. Participation in TIMSS has yielded clear insights into students' knowledge and skills in mathematics and science. After each cycle, TIMSS data are used to identify strengths and weaknesses in the mathematics and science curricula.

The results from TIMSS 2019 are considered extremely important for policymakers who evaluate education policies and strategies, with the aim of refining the education system so that student performance improves, leading to achieving the goals of Qatar National Vision 2030.

The MOEHE has benefited from recommendations that were presented as part of Qatar's national results after analyzing the results of TIMSS 2019. The MOEHE developed a plan to meet international standards in all schools in Qatar. The aim of this plan is to improve students' achievement in international studies through curriculum and standards and includes the following:

- recruit qualified teachers in primary education for Grade 4 and qualified teachers in science or mathematics for Grade 8
- amend the national curriculum based on international standards, thus including international curriculum standards in the school curriculum
- focus on practical skills such as problem-solving, interpretation, investigation, and creative thinking, and ensure that the curricula and textbooks include educational software for problem-solving and investigation, which is somewhat similar to the international test, especially at the primary level
- due to the general trend in education and learning in all countries of the world, move the State of Qatar toward e-learning and the use of educational platforms; since international tests are electronic in most countries, extensively integrate modern technologies into teaching, learning, and training students at various stages on using digital devices through various academic subjects while digitally applying one of the school's internal tests
- consider international studies and their results more seriously and promote the culture of international tests
- prepare information and awareness programs about international studies through various media on an ongoing basis
- benefit from the experience of schools that achieve the best results in the State of Qatar, as their results compete with those of developed countries

The Mathematics Curriculum in Primary and Lower Secondary Grades³

The mathematics curriculum in Qatar, based on the enVision math 2.0 series (2018 edition), is designed to develop students' arithmetic, linguistic, and intellectual abilities and enable them to achieve success and progress. The curriculum is based on the philosophy of teaching mathematics through understanding, which studies have proven useful and effective, as students' comprehension of a mathematical concept is enhanced when they can link it to a mathematical concept they have already learned. In this sense, understanding lies in the interdependence of topics, not only at the level of mathematics, but also in life applications. This is known as problem-based learning, which contributes to preparing an innovative and entrepreneurial generation capable of facing the challenges of the future.

The basic steps of an innovative education model can be defined as follows:

- problem-based learning: Concepts are presented through real-world issues of real meaning, linked to previous concepts and knowledge. When students make these connections, their conceptual comprehension is enhanced.
- visual learning: New mathematical concepts are progressively illustrated by problems enhanced by images, drawings, data, and tables, and contain direct instructions to illustrate the solution steps and stabilize the concepts.
- evaluation and differentiation: Students' understanding is ensured throughout the lesson through evaluative, diagnostic, or motivational questions that accompany the learning process. This is in addition to the various issues that are divided into several sections, as well as various diagnostic, formative, and final tests designed to achieve understanding.

The curriculum focuses on Qatar's mathematics standards, which are organized into three axes: numbers and algebra, geometry and measurement, and data processing. The curriculum is thus intertwined and coherent across subjects and levels of study and enhances accuracy in mathematics by considering the balance between conceptual comprehension, procedural skill, fluency, and applications.

The main goal of mathematics education is to build a confident personality capable of dealing with variables and solving problems, and Qatar's ambition is to prepare a generation of thinkers and creators; therefore, the curriculum has maintained the general foundations of common basic mathematics taught in the United States of America—Common Core State Standards—that harmonize mathematics standards on the one hand and mathematical practices on the other hand to make students able to see mathematics in the world around them. This stimulates analysis and promotes habits of thinking, processes, and behaviors that make students able to understand mathematics and its use proficiently in different ways.

Mathematical practice standards affect all aspects of mathematics. The following standards of mathematical practices comprise habits of thinking, procedures, and preparations that enable the learner to grasp mathematical concepts and the methods they use to solve problems:

- understand issues and persevere in solving them
- logically justify in an abstract and quantitative way
- construct mathematical arguments and critique the justification of others
- model
- use appropriate tools
- be precise
- find and use structure
- search and express regularity in logical justification using repetition in operations

Fourth-Grade Mathematics Curriculum

Exhibit 3 presents standards that are included in the Grade 4 mathematics curriculum.⁴

Exhibit 3: Mathematics Standards for Grade 4

Standard	Topic	Tasks
Numbers and Algebra	whole numbers to 1,000,000	<ul style="list-style-type: none"> • count to 1,000,000 • read and write whole numbers in numerals and words • represent the place value of six-digit numbers (100,000s, 10,000s, 1,000s, 100s, 10s, and 1s) using manipulatives and expanded notation • compare and order six-digit numbers using the symbols $<$, $=$, and $>$ • round three- or four-digit whole numbers to the nearest 10, 100, 1,000, or 10,000 • describe and find missing numbers in a number pattern
	factors and multiples	<ul style="list-style-type: none"> • identify and find multiples of any one-digit number • know that prime numbers have exactly two factors, itself and 1 • find common multiples of 2 one-digit numbers • identify and find factors of any number within 100 • find common factors of two numbers within 100
	four operations of whole numbers	<ul style="list-style-type: none"> • use and explain the algorithms for multiplication and division, involving numbers up to four digits by one digit for multiplication and division • estimate answers to whole-number calculations by using approximations • use and explain mental methods for the four operations (one-digit divisor) • solve two-step word problems involving the four operations

Exhibit 3: Mathematics Standards for Grade 4 (Continued)

Standard	Topic	Tasks
Numbers and Algebra	money	<ul style="list-style-type: none"> • read and write money in decimal form • convert riyals in decimal form to dirhams and dirhams to riyals in decimal form, up to two decimal places • solve up to two-step word problems involving the four operations (riyals and dirhams)
	fractions	<ul style="list-style-type: none"> • use manipulatives and diagrams to identify and find fractions of a set of objects • express an improper fraction as a mixed number and vice versa • compare and order improper fractions or mixed numbers • add and subtract two related fractions with denominators of given fractions not exceeding 12 • solve two-step addition and subtraction word problems involving fractions
	decimals	<ul style="list-style-type: none"> • read and write decimals with one or two places • represent place value in decimals with one or two places in words, manipulatives, or expanded form • use manipulatives and diagrams, including number lines, to compare and order a set of decimals with one or two places • round decimals to the nearest whole number or one decimal place • recognize fractions and decimals for one half, one quarter, and three quarters • use algorithm to add, subtract, multiply, and divide decimals with up to two places by a one-digit whole number • use and explain mental methods to add and subtract decimals up to one decimal place • solve one-step problems involving decimals, including rounding answers to the nearest whole number or one decimal place

Exhibit 3: Mathematics Standards for Grade 4 (Continued)

Standard	Topic	Tasks
Geometry and Measurement	shapes, angles, and symmetry	<ul style="list-style-type: none"> estimate and compare the sizes of angles and name them accordingly as obtuse or acute depending on their size use the labeling conventions for angles use a protractor to measure angles in degrees and to draw an angle given the size use knowledge of properties of squares and rectangles to draw squares and rectangles on a square grid and identify symmetric figures and lines of symmetry in two-dimensional (2D) shapes complete a 2D shape on a square grid to make it symmetrical, given a line of symmetry
	time	<ul style="list-style-type: none"> use timetables and calculate a duration in hours and minutes solve up to two-step word problems involving time in hours and minutes
	area and perimeter	<ul style="list-style-type: none"> find area and perimeter of figures made up of squares and rectangles find the length of one side of a square given the area or perimeter, a rectangle given the area and one side, and a rectangle given the perimeter and one side solve problems involving the area and/or perimeter of squares and rectangles
Data Processing	tables and line graphs	<ul style="list-style-type: none"> complete a table from given information and interpret data in tables represent, read, and interpret data in line graphs with a scale of 2, 4, 5, or 10 and multiples of tens or hundreds solve one-step problems using data from tables and line graphs

Eighth-Grade Mathematics Curriculum

Exhibit 4 presents standards that are included in the Grade 8 mathematics curriculum.

Exhibit 4: Mathematics Standards for Grade 8

Standard	Topic	Tasks
Numbers and Algebra	rational numbers	<ul style="list-style-type: none"> • identify and order rational numbers • convert rational numbers to terminating or recurring decimals and vice versa • perform combined operations of rational numbers and apply these skills in problem-solving • use a scientific calculator for calculations involving combined operations of rational numbers • round whole numbers and decimals, including measures, to a given number of significant figures • use rounding to estimate calculations
	percentage and proportion	<ul style="list-style-type: none"> • find a percentage of a percentage and simple interest • understand direct proportion and apply proportional reasoning to solve problems
	powers	<ul style="list-style-type: none"> • apply index notation and the laws of indices to simplify and evaluate expressions with integral powers • read and write numbers in the scientific notation $A \times 10^n$, where n is an integer and $1 \leq A < 10$ • use scientific notation in calculations and to estimate results of calculations and to make comparisons
	equations and inequalities	<ul style="list-style-type: none"> • solve linear equations and linear inequalities with rational number coefficients in one variable and solve problems involving them
	functions and graphs	<ul style="list-style-type: none"> • understand and find the gradients of straight lines • interpret and find the equation of a line in the form $y = mx + c$ • translate “y is proportional to x” into symbolism and into a linear equation with the constant of proportionality as gradient • recognize the proportional relationship between two variables (that is, if two variables are graphically connected by a straight line passing through the origin, then the two variables are proportional to each other), then use that information to find the constant of proportionality

Exhibit 4: Mathematics Standards for Grade 8 (Continued)

Standard	Topic	Tasks
Geometry and Measurements	transformations	<ul style="list-style-type: none"> • identify and draw rotation of a 2D shape, about the origin, a given point, or a vertex of the shape, through multiples of 90 degrees and conversely, find the center or angle of rotation when a shape and the resulting image are known • identify rotation symmetry and properties of 2D shapes, including triangles, quadrilaterals, and regular polygons, and draw 2D symmetrical figures • identify and draw enlargement of 2D shapes by positive integers and a positive scale factor using a given center of enlargement • deduce that the object and its image of enlargement are similar and find the scale factor or the center of enlargement
	similarity	<ul style="list-style-type: none"> • identify similar shapes and use the properties of similarity to determine unknown sides or angles • construct and interpret scale drawings and understand that if two shapes are similar, the ratio of the area of the shapes is the ratio of the squares of the lengths of the corresponding sides • in three dimensions, calculate the ratio of volume of a scale model to the volume of the actual object
	Pythagorean theorem	<ul style="list-style-type: none"> • state and apply the Pythagorean theorem • determine whether a triangle is right angled given the length of the three sides • apply the Pythagorean theorem to solve problems
	surface area and volume	<ul style="list-style-type: none"> • find the volume and surface area of right prisms, cylinders, and related solids
Data Processing		<ul style="list-style-type: none"> • use an appropriate method of data collection to address a given question, and choose representative samples to collect data from a primary source • answer questions by collecting, classifying, representing, and interpreting data, using frequency tables with equal class interval and frequency diagrams with equal class intervals • create and interpret scatter plots between two variables and identify positive and negative correlations • draw and interpret the line of best fit • generate and interpret dual frequency tables

Exhibit 4: Mathematics Standards for Grade 8 (Continued)

Standard	Topic	Tasks
Probability		<ul style="list-style-type: none"> • determine the probability of an event occurring in an experiment and use a scale in the form of a fraction, decimal, or probability, expressed as a percentage • calculate the theoretical probabilities of possible outcomes for a single event • use data obtained from experiments to estimate the probability of obtaining the desired outcome • realize the nature of different outcomes when an experiment is repeated, including comparing the probability of different options and listing all possible outcomes in an orderly manner using different representations of complex events • calculate the probability of simple compound events • determine experimental probability for tossing a coin or throwing a die

The Science Curriculum in Primary and Lower Secondary Grades⁵

The goals of the science curriculum are imperative to reflect the learning mindset of inquiry and to increase the motivation for learning science. The science curriculum aims to enable students to develop positive attitudes and acquire sufficient skills and knowledge.

The science content is divided into three strands: biology, chemistry, and physics. The strands are taught in an integrated way in primary and lower secondary grades. Each content strand is designed around the following themes that students can relate to in their everyday experiences and on commonly observed phenomena in nature:

- biology: structure and function of organisms, growth, organisms and their environment, and health and disease
- chemistry: materials and their properties, structure and bonding of matter, patterns in chemical reactivity, and chemistry in our world
- physics: waves, light, and sound; forces, motion, and scale; electricity and magnetism; matter and energy; and Earth and space

The skills and processes related to scientific inquiry (SI) have been integrated into the three strands of biology, chemistry, and physics.

The learning experiences in the science content are explicitly linked to one or more competencies. The science curriculum enhances five competencies: inquiry and research, critical and creative thinking, cooperation and participation, communication, and problem-solving. These competencies help students to take charge of their own learning and apply knowledge to develop explanations for new situations.

Fourth-Grade Science Curriculum

Exhibit 5 presents tasks within each science strand included in the Grade 4 science curriculum.

Exhibit 5: Science Strands and Tasks for Grade 4

Strand	Tasks
Biology	<ul style="list-style-type: none"> • describe the features of terrestrial, marine, and freshwater habitats; identify some living things in each habitat; and explain how these living things adapt to live in different habitats • discuss the positive and negative impacts of humans on habitats • discuss examples of humans trying to conserve habitats and wildlife • compare and contrast the life cycles of insects, fish, amphibians, reptiles, birds, and mammals • list some of the reasons that humans need clean water and describe the effects of dirty water on human health • describe how changes in body temperature can affect human health • examine how exercise affects heart rate • explain why regular exercise and a proper diet are important for health
Chemistry	<ul style="list-style-type: none"> • understand the terms <i>mass</i>, <i>volume</i>, and <i>shape</i> • classify matter as solids, liquids, or gases based on their observable characteristics
Physics	<ul style="list-style-type: none"> • define sound as a vibration and explain the variation of sound volume • investigate the effects of distance on how a sound is heard • explain how sound travels to our ears and explain how echo occurs • describe how living things are able to hear sounds • explain how and why loud sounds can damage the ear • demonstrate and explain that sounds can travel through liquids, solids, and air • investigate the effectiveness of different materials on muffling sound • estimate and measure the temperature of different objects using a thermometer and a data logger • investigate the changes in temperature of a hot and a cold object in a room • investigate the heat conducting and insulating properties of different materials

Eighth-Grade Science Curriculum

Exhibit 6 presents tasks within each science strand included in the Grade 8 science curriculum.

Exhibit 6: Science Strands and Tasks for Grade 8

Strand	Tasks
Biology	<ul style="list-style-type: none"> • explain the need for organ systems in terms of surface area to volume ratios • identify the sources and describe the functions of nutrients in a diet (carbohydrates, proteins, lipids, vitamins, minerals, water, and fiber) • describe the structures of the human digestive system and explain how the structures are adapted for their functions • understand the role of enzymes, gastric acid, and bile in controlling digestion • understand the structure and function of the human respiratory tract, including adaptations for ventilation and gas exchange • understand the structure and function of the human circulatory system • discuss factors that improve the health of the circulatory system • describe the link between an unbalanced diet, obesity, and diabetes • describe and evaluate the effects of tobacco smoke and its toxic components on health • analyze data and evaluate the effect of smoking and other risk factors on the incidence of coronary heart disease • explain how carbon and water cycle through the abiotic and biotic components of an ecosystem and how environmental change, including global warming, can affect biodiversity
Chemistry	<ul style="list-style-type: none"> • identify chemical changes and different types of chemical reactions • write word equations for simple reactions • outline how the atomic model changed over time • describe an atom as made up of protons, neutrons, and electrons • recognize that elements can be represented by chemical symbols • understand that atoms can combine to form molecules of constant composition • investigate the characteristics of common acids and alkalis • investigate the use of indicators to classify whether a solution is acidic, alkaline, or neutral • identify strong and weak acids, strong and weak alkalis, and pure water on the pH scale • describe the current composition of the atmosphere • understand the effects of humans on the atmosphere and suggest ways to reduce the main sources of atmospheric pollution

Exhibit 6: Science Strands and Tasks for Grade 8 (Continued)

Strand	Tasks
Physics	<ul style="list-style-type: none"> • explain the concept of energy and state the principle of conservation of energy • explain energy transfers by conduction, convection, and radiation • compare and contrast metals and nonmetals based on thermal conductivity • describe the formation of convection currents in different natural environments • investigate how the properties of different surfaces affect the amount of infrared radiation absorbed and/or emitted by them • determine the nature and position of an image in a plane mirror and use the laws of reflection to construct a periscope and explain how it works • understand how light refracts at the interface between two media • distinguish alternating current from direct current • recognize and discuss the hazards of mains electricity • describe the purpose and operation of safety devices • explain how electricity is generated in Qatar • understand the concept of power in the context of electrical appliances • calculate the cost of running different appliances from their power rating • recognize the main features of the solar system • explain the functions of natural and artificial satellites • explain eclipses in terms of the movement and relative sizes of the Sun, Earth, and the Moon • discuss the reasons for the differences between the Islamic calendar and the Gregorian calendar

Teacher Professional Development Requirements and Programs

Professional Development Requirements

According to data from the TIMSS 2019 cycle, fourth- and eighth-grade mathematics and science teachers in Qatar indicated that their highest professional development needs were in the following topics:⁶

- mathematics
 - integrating technology into mathematics instruction
 - improving students' critical-thinking or problem-solving skills
- science
 - integrating technology into science instruction

- improving students' critical-thinking or inquiry skills
- addressing individual students' needs

Ongoing Professional Development Programs

The Training and Educational Development Center (TEDC) in the MOEHE provides several professional development opportunities for all subject teachers in all stages of education (K–12) to keep them aware and updated about the latest teaching strategies, subject content, and class management techniques.

The training workshops are designed to meet teachers' needs, learning competencies, and professional standards. The workshops aim to raise teachers' performance, which will impact student achievement in general and in the TIMSS assessment specifically.⁷

Since 2019, the TEDC has delivered several training programs on topics that met the teachers' aforementioned needs, including but not limited to the following:

- effective methods for teaching algebra
- teaching mathematical concepts and skills
- 21st-century technological skills
- Python advanced
- integrating the Minecraft game in education in the math and science curriculum
- technology activation in classrooms
- strategies for teaching critical thinking and problem-solving
- integration of technology in education
- differentiating in education

The TEDC will continue addressing teachers' needs in general, and needs of the mathematics and science teachers for Grades 4 and 8 specifically,.

Monitoring Student Progress in Mathematics and Science

At all government schools, teachers must conduct four summative assessments per year (one at the end of each term and one in the middle of each term). In addition, teachers use formative assessments to monitor students' progress using a variety of methods, such as written tests and projects.

Summative and formative assessments are an important source of feedback for teachers, helping them gauge the effectiveness of their teaching strategies in relation to the curriculum, as well as to orient their teaching style to student learning styles.

Schools regularly provide parents with their children's progress through official reports, online portals, and parent-teacher meetings at schools.

Private schools throughout Qatar adopt the monitoring and assessment procedures related to their specific curricula. Many schools adapt the national assessment procedures of their country to suit the needs of their students.

Special Initiatives in Mathematics and Science Education

The Educational Supervision Department at the MOEHE implemented several procedures to enhance the academic practices of mathematics and science teachers. These procedures included:

1. conducting training workshops for teachers to help them to improve their teaching strategies and enhance basic competencies included in the general framework of the curricula. The workshops also focused on improving assessment strategies and developing teachers' skills. Question banks were built on the Qatar Education platform with the collaboration of the E-Learning and Digital Solutions Department to support teachers.
2. providing continuous support to teachers in elementary and middle schools to ensure they applied the knowledge and skills gained from the workshops and the training procedures. This support included:
 - a. conducting periodic visits to participating schools to observe and evaluate progress,
 - b. monitoring the implementation of new remedial procedures and ensuring the quality of teaching, and
 - c. integrating e-learning with traditional education in Qatar, which aims to enhance the education experience by combining the flexibility and accessibility of online resources with the structured environment and social interaction of conventional classrooms
3. establishing a dedicated channel on MS Teams titled "TIMSS 2023 Assessment" to facilitate communication and sharing of outstanding practices among schools. This platform encouraged collaboration and the exchange of effective teaching methods.
4. monitoring the implementation of developed textbooks and resources to help students acquire scientific knowledge and skills and train them to solve questions of varying difficulty levels

These procedures collectively aimed to enhance the teaching and learning practices in mathematics and science education.

In addition, the MOEHE annually organizes and supports many nationwide mathematics and science events to facilitate an interest in scientific languages and to promote access to mathematics and science in or outside of school. Examples of these events include the following:

- Training Camps program (STEM-FD): This program embodies a distinctive initiative aimed at providing students with immersive and comprehensive educational experiences focused on digital knowledge, financial science, science, technology, engineering, and mathematics where the first letter of each field forms the term *STEM-FD*. The program offers excellent opportunities for learning and development across various domains. By bringing together students and teachers, the program

ensures a well-rounded learning experience that emphasizes hands-on activities and fosters a sense of community among participants. Through problem-based exercises that necessitate collaborative teamwork, the camps encourage students to tackle real-life problems of global significance while incorporating the aims of sustainability. These camps take place in engaging educational environments outside the traditional classroom setting, allowing students to learn, interact, and forge friendships with peers from different schools. Such interactions facilitate the exchange of experiences, contributing to the academic, personal, and social growth of all participants. The program emphasizes discussion, analysis, and collaboration skills, empowering students to actively participate in shaping their learning journey. Practical courses are designed to enhance problem-solving abilities and enable students to apply their newly acquired knowledge within frameworks that address global challenges. In summary, STEM-FD exemplifies the commitment to building advanced education systems that provide diverse developmental opportunities. By immersing students in STEM-FD-focused experiences, fostering teamwork, and addressing real-world problems, the camps create an enriching educational environment that cultivates academic achievement, personal growth, and social success among participating students.^a

- National Innovation Olympiad (NIO): This is an annual national competition in mathematics, science, and technology for primary, middle, and high school students. Teams work to complete STEM-based projects themed around a challenge facing the planet.

In addition, there are numerous foundations, associations, and networks engaged in promoting mathematics and science. Most of them are involved in the events described above. Some also organize their own events, such as the Qatar Scientific Club and Texas A&M University at Qatar.

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^a See <https://www.edu.gov.qa/en/News/Details/8843400> and <https://thepeninsulaqatar.com/article/02/05/2023/education-ministry-launches-stemfd-based-training-initiative> for more information.

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