

Philippines

Department of Education
Republic of the Philippines

Introduction

Overview of Education System

The Department of Education (DepEd) is mandated by the Philippine government, by virtue of the Republic Act 9155, otherwise known as the Governance of Basic Education Act of 2001. It is responsible for achieving quality, equitable, and accessible formal and nonformal education in the country and is mainly tasked with supervising basic education—from kindergarten to Grade 12—at elementary and secondary levels in both public and private schools.

The levels of governance consist of national levels and field offices in regions, divisions, schools, and learning centers. The policy making body of the Department lies at the national level, while the field offices implement the education policies, programs, and projects. The highest ranking official in DepEd is the Secretary, who is appointed by the President of the Philippines and assisted by Undersecretaries and Assistant Secretaries.

In 2013, DepEd implemented the K to 12 Basic Education Program, in response to the creation of a functional basic education system of holistic citizens who are competent, skilled, and values-driven lifelong learners and future employees. This curriculum centers on learners and is anchored by standards of responsiveness, developmental appropriateness, relevance, research, cultural sensitivity, contextualization, and globalization. Further, it employs the principles of teaching and learning and adapts Mother Tongue Based Multilingual Education (MTB-MLE) and a spiral progression (Republic Act 10533, Enhanced Basic Education Act of 2013).

Grades K to 12 include kindergarten and 12 years of basic education (Exhibit 1).

Exhibit 1: Structure of Basic Education

Level	Years	Grades
Kindergarten	1	K
Primary education	6	Grades 1–6
Junior high school	4	Grades 7–10
Senior high school	2	Grades 11–12
Total	13	Grades K–12

The objectives of K to 12 education in the Philippines are as follows:

- Strengthening early childhood education (universal kindergarten)
- Making the curriculum relevant to learners (contextualized and enhanced)
- Ensuring integrated and seamless learning (spiral progression)
- Building proficiency through language (MTB-ME)
- Gearing up for the future (senior high school)
- Nurturing the holistically developed Filipino (college and livelihood readiness, 21st century skills)

DepEd is continuously addressing the challenges of basic education in the Philippines by making access to basic education a key priority of the government. Access to education is the initial avenue for helping Filipino learners achieve a promising future. At present, the Department is responding to the challenge to of improving students' learning performance. This goal is part of the 10-Point Education Agenda of the Secretary of DepEd, which seeks to harness cooperation with the private sector, communities, and bilateral and multilateral institutions to upgrade the Department's communication strategy, so that it can reach out to local, national, and global communities.

Sulong EduKalidad is a national effort initiated by DepEd to address the challenge of providing quality basic education.¹ As a rallying call, DepEd aims to align all of its programs and projects toward *EduKalidad* and is mobilizing field offices and schools to address gaps, improve student performance, and prepare students with essential global and 21st century skills.

With the Filipino learner as its core, *Sulong EduKalidad* has four pillars (designated with the acronym KITE):

- *K to 12 Curriculum, Delivery, and Instruction*—This pillar ensures that the core business articulated in the curriculum is responsive to the overall goal of the Philippine society and economy. It employs the following core strategies:
 - Implement a relevant, responsive, and inclusive curriculum
 - Ensure every child is a reader by Grade 3
 - Ensure senior high school graduates are employable
- *Improvement of Learning Environment*—This pillar ensures that every Filipino child is provided with a child-friendly, safe, and motivating learning environment that enables them to acquire the necessary skills envisioned in the curriculum. It employs the following core strategies:
 - Ensure child-friendly, gender-sensitive, safe, and motivating learning space for students
 - Provide appropriate technology for learning and administrative use
 - Address dental health, mental health, and overall well-being of learners

- **Teachers’ Upskilling and Reskilling**—This pillar ensures that every learner gets quality education from competent and well-skilled learners. It employs the following core strategies:
 - Integrate, align, and harmonize training and development initiatives
 - Develop and implement fair and reasonable career development initiatives
 - Ensure welfare and well-being of teachers and other employees
- **Engagement of Stakeholders for Support and Collaboration**—This pillar ensures that the entire society is engaged in making sure that every school gets the necessary support. It employs the following core strategies:
 - Institutionalize an inclusive, multisectoral education group for better engagement
 - Strengthen existing mechanism for *Brigada Eskwela* and Adopt-a-School
 - Advocate and localize Sustainable Development Goals 2030

Use and Impact of TIMSS

In 2003, the Philippines participated in TIMSS for students in Grade 8 (age 13). The participation of the Philippines was carried out by the Department of Science and Technology—Science Education Institute (DOST-SEI), DepEd, and the University of the Philippines—College of Education and National Institute for Science and Mathematics Education Development.

The results of the 2003 TIMSS study, which were significantly higher than the results in TIMSS 1999, were attributed to the Grade 8 sample.² The major findings from this study were the basis for recommendations for various education stakeholders, including science teachers, educators and teacher trainers, curriculum developers, principals and supervisors, other education officials, and policymakers. Similarly, a national report discussed policy recommendations to focus on school resources, class size, curriculum reforms, licensure examinations for teachers, teacher training, teacher recruitment, student assessment, and supervision of instruction.

Based on Republic Act 10533, Section 15, Commitment to International Benchmarks and DepEd Order No. 29, s. 2017 on Policy Guidelines on System Assessment in the K to 12 Basic Education Program, the Department of Education’s participation in TIMSS 2019 will provide the Department with an additional tool to measure the effectiveness of the enhanced basic education curriculum and its delivery systems. Further, the results of TIMSS will inform and support education policy decision making; identify weaknesses in the education system; and serve as benchmark to measure school effectiveness and determine the alignment of national standards with international standards.^{3,4}

The Philippines can also gain several perspectives through the TIMSS results by analyzing the information gathered in implementing reforms for quality through KITE (the acronym designating the four pillars of *Sulong EduKalidad*, which addresses challenges in basic education by shifting the focus from access to quality).

The Mathematics Curriculum in Primary and Lower Secondary Grades

The framework of the mathematics curriculum aims to develop critical thinking and problem solving skills. As a skills subject, mathematics provides a solid foundation for necessary concepts and life skills Filipino learners develop in basic education.

The mathematics curriculum in the K to 12 Basic Education Curriculum⁵ has two objectives: critical thinking and problem solving. These two goals are embedded in the curriculum with skills, processes, values, and attitudes of Filipino learners, which were given a great deal of consideration during its inception.

There are five content areas in the mathematics curriculum; Numbers and Number Sense, Measurement, Geometry, Patterns and Algebra, and Probability and Statistics. The mathematics curriculum aims to develop the following skills and processes: knowing and understanding, estimating, computing and solving, visualizing and modeling, representing and communicating, conjecturing, reasoning, proving and decision making, and applying and connecting. Further, it emphasizes the following attitudes and values: accuracy, creativity, objectivity, perseverance, and productivity. The curriculum encourages the use of technology aids as appropriate in the teaching of mathematics.

The education theories embodied in the mathematics curriculum are based on experiential and situated learning, reflective learning, constructivism, cooperative learning, and discovery and inquiry-based learning.

Mathematics learners must demonstrate understanding and appreciation of key concepts and principles of mathematics as applied using appropriate technology in problem solving; critical thinking; communicating; reasoning; and making connections, representations, and decisions in real life.

Key stage standards are elaborated in the following stages: K to Grade 3, Grades 4 to 6, and Grades 7 to 10.

Kindergarten to Grade 3

At the end of Grade 3, the learner demonstrates understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 10,000 and the four fundamental operations including money, ordinal numbers up to 100, basic concepts of fractions); measurement (time, length, mass, capacity, area of square and rectangle); geometry (two-dimensional and three-dimensional objects, lines, symmetry, and tessellation); patterns and algebra (continuous and repeating patterns and number sentences); statistics and probability (data collection and representation in tables, pictographs and bar graphs, and outcomes).

Grades 4 to 6

At the end of Grade 6, the learner demonstrates understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers, number theory, fractions, decimals, ratio and proportion, percentages, and integers); measurement (time, speed, perimeter,

circumference and area of plane figures, volume and surface area of solid/space figures, temperature and meter reading); geometry (parallel and perpendicular lines, angles, triangles, quadrilaterals, polygons, circles, and solid figures); patterns and algebra (continuous and repeating patterns, number sentences, sequences, and simple equations); statistics and probability (bar graphs, line graphs and pie graphs, simple experiments, and experimental probability).

Grades 7 to 10

At the end of Grade 10, the learner demonstrates understanding and appreciation of key concepts and skills involving numbers and number sense (sets and real numbers); measurement (conversion of units); patterns and algebra (linear equations and inequalities in one and two variables, linear functions, systems of linear equations, and inequalities in two variables, exponents and radicals, quadratic equations, inequalities, functions, polynomials, and polynomial equations and functions); geometry (polygons, axiomatic structure of geometry, triangle congruence, inequality and similarity, and basic trigonometry); statistics and probability (measures of central tendency, variability and position; combinatorics and probability).

Exhibit 2 shows the standards for each grade level.

Exhibit 2: Grade Level Standards

Grade	Standards
K	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 20, basic concepts on addition and subtraction); geometry (basic attributes of objects), patterns and algebra (basic concept of sequence and number pairs); measurement (time, location, nonstandard measures of length, mass, and capacity); and statistics and probability (data collection and tables).
Grade 1	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 100, ordinal numbers up to 10, money up to PhP100, addition and subtraction of whole numbers, one-half, and one-quarter); geometry (two- and three-dimensional objects); patterns and algebra (continuous and repeating patterns and number sentences); measurement (time, nonstandard measures of length, mass, and capacity); and statistics and probability (tables, pictographs, and outcomes).
Grade 2	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 1,000, ordinal numbers up to 20, money up to PhP100, the four fundamental operations of whole numbers, and unit fractions); geometry (basic shapes, symmetry, and tessellations); patterns and algebra (continuous and repeating patterns and number sentences); measurement (time, length, mass, and capacity); and statistics and probability (tables, pictographs, and outcomes).
Grade 3	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 10,000; ordinal numbers up to 100; money up to PhP1,000; the four fundamental operations of whole numbers; proper and improper fractions; and similar, dissimilar, and equivalent fractions); geometry (lines, symmetry, and tessellations); patterns and algebra (continuous and repeating patterns and number sentences); measurement (conversion of time, length, mass and capacity, area of square and rectangle); and statistics and probability (tables, bar graphs, and outcomes).

Grade	Standards
Grade 4 (grade level tested in TIMSS 2019)	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 100,000, multiplication and division of whole numbers, order of operations, factors and multiples, addition and subtraction of fractions, and basic concepts of decimals including money); geometry (lines, angles, triangles, and quadrilaterals); patterns and algebra (continuous and repeating patterns and number sentences); measurement (time, perimeter, area, and volume); and statistics and probability (tables, bar graphs, and simple experiments).
Grade 5	Understanding and appreciation of key concepts and skills involving numbers and number sense (whole numbers up to 10,000,000, order of operations, factors and multiples, fractions and decimals including money, ratio and proportion, percentages); geometry (polygons, circles, solid figures); patterns and algebra (sequence and number sentences); measurement (time, circumference, area, volume, and temperature); and statistics and probability (tables, line graphs, and experimental probability).
Grade 6	Understanding and appreciation of key concepts and skills involving numbers and number sense (divisibility, order of operations, fractions and decimals including money, ratio and proportion, percentage, integers); geometry (plane and solid figures); patterns and algebra (sequence, expression, and equation); measurement (rate, speed, area, surface area, volume, and meter reading); and statistics and probability (tables, pie graphs, and experimental and theoretical probability).
Grade 7	Understanding of key concepts and principles of numbers and number sense (sets and real number system); measurement (conversion of units of measurement); patterns and algebra (algebraic expressions and properties of real numbers as applied in linear equations and inequalities in one variable); geometry (sides and angles of polygons); and statistics and probability (data collection and presentation, measures of central tendency and variability).
Grade 8	Understanding of key concepts and principles of patterns and algebra (factors of polynomials, rational algebraic expressions, linear equations and inequalities in two variables, systems of linear equations and inequalities in two variables); geometry (axiomatic structure of geometry, triangle congruence, inequalities in a triangle, and parallel and perpendicular lines); and statistics and probability (probability of simple events).
Grade 9	Understanding of key concepts and principles of patterns and algebra (quadratic equations and inequalities, quadratic functions, rational algebraic equations, variations, and radicals) and geometry (parallelograms and triangle similarities and basic concepts of trigonometry).
Grade 10	Understanding of key concepts and principles of patterns and algebra (sequences, series, polynomials, polynomial equations, and polynomial functions); geometry (circles and coordinate geometry); and statistics and probability (combinatorics and probability, and measures of position).

The Science Curriculum in Primary and Lower Secondary Grades

The K to 12 science curriculum is anchored by the three domains: Understanding and Applying Scientific Knowledge in a Local and Global Setting; Performing Scientific Processes and Skills; and Developing and Demonstrating Scientific Attitudes and Values.⁶ The objective of the science curriculum is to integrate content and processes with appropriate consideration of contexts for learner-centered and inquiry-based instruction.

In the science curriculum, learners are expected to demonstrate understanding of basic science concepts and application of science-inquiry skills. They exhibit scientific attitudes and values to solve problems critically, innovate beneficial products, protect the environment and conserve resources, enhance the integrity and wellness of people, make informed decisions, and engage in discussions of relevant issues that involve science, technology, and environment.

Exhibit 3: Key Stage Standards in Science

Key Stage	Standards
K-3	At the end of Grade 3, students should have acquired healthy habits and have developed curiosity about their selves and their environment using basic process skills of observing, communicating, comparing, classifying, measuring, inferring, and predicting. This curiosity will help learners value science as an important tool in helping them continue to explore their natural and physical environment. This stage should also include developing scientific knowledge or concepts.
Grades 4-6	At the end of Grade 6, students should have developed the essential skills of scientific inquiry—designing simple investigations, using appropriate procedure, materials and tools to gather evidence, observing patterns, determining relationships, drawing conclusions based on evidence, and communicating ideas in varied ways to make meaning of observations and/or changes that occur in the environment. The content and skills learned will be applied to maintain good health, ensure the protection and improvement of the environment, and practice safety measures.
Grades 7-10	At the end of Grade 10, students should have developed scientific, technological, and environmental literacy and can make rational choices on issues confronting them. Having been exposed to scientific investigations related to real life, they should recognize that the central feature of an investigation is that if one variable is changed (while controlling all others), the effect of the change on another variable can be measured. The context of the investigation can be problems at the local or national level to enable them to communicate with students in other parts of the Philippines or even from other countries using appropriate technology. Students should demonstrate an understanding of science concepts and apply science inquiry skills in addressing real-world problems through scientific investigations.
Grades 11-12	At the end of Grade 12, students should have gained skills in obtaining scientific and technological information from varied sources about global issues that impact the country. They should have acquired scientific attitudes that enable them to innovate and/or create products useful to the community or country. They should be able to process information to obtain relevant data for a problem. In addition, students should have made plans related to their interests and expertise, with consideration for the needs of their community and the country, to pursue employment, entrepreneurship, or higher education.

Exhibit 4: Grade Level Standards in Science

Grade	Standards
K	Demonstrate an emerging understanding of the parts of their body and their general functions; plants, animals, and varied materials in their environment and their observable characteristics; general weather conditions and how they influence what you wear; and other aspects of the environment. Understand their bodies and their surroundings through exploration, questioning, and careful observation, inferring patterns, similarities, and differences that enable them to make sound conclusions.
Grade 1	Use their senses to locate and describe the external parts of their body; identify, external parts of animals and plants; tell the shape, color, texture, taste, and size of things around them; describe similarities and differences given two objects; differentiate sounds produced by animals, vehicles, cars, and musical instruments; illustrate how things move; describe the weather and what to do in different situations; use appropriate terms or vocabulary to describe these features; collect, sort, count, draw, take things apart, or make something out of the things; practice healthy habits (e.g., washing hands, choosing nutritious food) and safety measures (e.g., helping to clean or pack away toys, asking questions, and giving simple answers/descriptions to probing questions).
Grade 2	Use their senses to explore and describe the functions of their senses; compare two or more objects and using two or more properties; sort things in different ways and give a reason for doing so; describe the kind of weather or certain events at home or in school and express how they are affecting them; do simple measurements of length; tell why some things around them are important; decide whether what they do is safe or dangerous; give suggestions on how to prevent accidents at home; practice electricity, water, and paper conservation; help take care of pets or of plants, and tell short stories about what they do, what they have seen, or what they feel.
Grade 3	Describe the functions of the different parts of the body and things that make up their surroundings—rocks and soil; plants and animals; the Sun, Moon, and stars; classify these things as solid, liquid, or gas; describe how objects move and what makes them move; identify sources and describe uses of light, heat, sound, and electricity; describe changes in the conditions of their surroundings. Content leads learners to become more curious about their surroundings, appreciate nature, and practice health and safety measures.
Grade 4 (grade level tested in TIMSS 2019)	Investigate changes in some observable properties of materials when mixed with other materials or when force is applied to them; identify materials that do not decay and use this knowledge to help minimize waste at home, school, and in the community; describe the functions of the different internal parts of the body to practice ways to maintain good health; classify plants and animals according to their habitat and observe interactions among living things and their environment; infer that plants and animals have traits that help them survive in their environment; investigate the effects of pushing or pulling on the size, shape, and movement of an object; investigate which type of soil is best for certain plants and infer the importance of water in daily activities; learn about what makes up weather and apply knowledge of weather conditions to make decisions for the day; infer the importance of the Sun to life on Earth.
Grade 5	Decide whether materials are safe and useful by investigating about some of their properties; infer that new materials may form when there are changes in properties due to certain conditions; develop healthful and hygienic practices related to the reproductive system after describing changes that accompany puberty; compare modes of reproduction among plant and animal groups and conduct an investigation on pollination; become aware of the importance of estuaries and intertidal zones and help in their preservation; describe the movement of objects in terms of distance and time traveled; recognize that different materials react differently with heat, light, and sound; relate the abilities of materials to their specific uses; describe the changes that earth materials undergo; make emergency plans with their families in preparation for typhoons; observe patterns in natural events by observing the appearance of the Moon.

Grade	Standards
Grade 6	Recognize that when mixed together, materials may not form new ones, thus they may be recovered using separation techniques; prepare useful mixtures, such as food, drinks, and herbal medicines; understand how the different organ systems of the human body work together; classify plants based on reproductive structures and animals based on the presence or lack of backbone; design and conduct an investigation on plant propagation; describe larger ecosystems such as rainforests, coral reefs, and mangrove swamps; infer that friction and gravity affect how people and objects move; know that heat, light, sound, electricity, and motion are forms of energy and undergo transformation; describe what happens during earthquakes and volcanic eruptions and demonstrate what to do when they occur; infer that the weather follows a pattern in the course of a year; learn about the Solar System, with emphasis on the motions of the Earth as prerequisite to the study of seasons in a later grade.
Grade 7	Distinguish mixtures from substances through semiguided investigations; realize the importance of air testing when conducting investigations; after studying how organ systems work together in plants and animals in the lower grade levels, use a microscope when observing very small organisms and structures; recognize that living things are organized into different levels: cells, tissues, organs, organ systems, and organisms; recognize that organisms comprise populations and communities that interact with nonliving things in ecosystems; describe the motion of objects in terms of distance and speed and present this information in tables, graphs, charts, and equations; describe how various forms of energy travel through different mediums; describe what makes up the Philippines as a whole and the resources found in the archipelago; explain the occurrence of breezes, monsoons, and Intertropical Convergence Zone, and how these weather systems affect people; explain why seasons change and demonstrate how eclipses occur.
Grade 8	Describe the factors that affect the motion of an object based on the Laws of Motion; differentiate the concept of work as used in science and in layman's language; know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium; explain how active faults generate earthquakes and how tropical cyclones originate from warm ocean waters; recognize other members of the Solar System; explain the behavior of matter in terms of the particles it is made of; recognize that ingredients in food and medical products are made up of these particles and are absorbed by the body in the form of ions; recognize reproduction as a process of cell division resulting in growth of organisms delve deeper into the process of digestion as studied in the lower grades, giving emphasis on proper nutrition for overall wellness; participate in activities that protect and conserve economically important species used for food.
Grade 9	Gain a deeper understanding of the digestive, respiratory, and circulatory systems to promote overall health; gain familiarity with technologies that introduce desired traits in economically important plants and animals; explain how new materials are formed when atoms are rearranged; recognize that a variety of useful compounds may arise from such rearrangements; identify volcanoes and distinguish between active and inactive ones; explain how energy from volcanoes may be tapped for human use; gain familiarity with climatic phenomena that occur on a global scale; explain why certain constellations can be seen only at certain times of the year; predict the outcomes of interactions among objects in real life applying the laws of conservation of energy and momentum.
Grade 10	Realize that volcanoes and earthquakes occur in the same places in the world and that they are related to plate boundaries; demonstrate ways to ensure safety and reduce damage during earthquakes, tsunamis, and volcanic eruptions; explain the factors affecting the balance and stability of an object to help them practice appropriate positions and movements to achieve efficiency and safety such as in sports and dancing; analyze situations in which energy is harnessed for human use whereby heat is released, affecting the physical and biological components of the environment; complete the study of the entire organism with their deeper study of the excretory and reproductive systems explain in greater detail how genetic information is passed from

Grade	Standards
	parents to offspring, and how diversity of species increases the probability of adaptation and survival in changing environments; explain the importance of controlling the conditions under which a chemical reaction occurs; recognize that cells and tissues of the human body are made up of water, a few kinds of ions, and biomolecules and that these biomolecules may also be found in the food they eat.

Professional Development Requirements and Programs

From the start of this year, the professional development program of the Department of Education for teachers and school teachers will be fully integrated in terms of development, design, and delivery, to include the Teacher Induction Program (for new teachers), career progression programs, and special programs. All levels of governance will coordinate with the National Educators Academy of the Philippines, the training arm of the Department, for alignment of programs based on the standards and guidelines in the implementation of any professional development activities for teachers and school leaders.

The main anchor of the program for teacher professional development will be the Philippine Professional Standards for Teachers, which consists of 37 teaching areas, or strands, organized in seven domains: (1) Content Knowledge and Pedagogy, (2) Learning Environment, (3) Diversity of Learners, (4) Curriculum and Planning, (5) Assessment and Reporting, (6) Community Linkages and Professional Engagement, and (7) Personal Growth and Professional Development.⁷

DepEd emphasizes that the quality of learning is greatly influenced by the quality of teaching. Professional learning communities are important avenues for teachers to align their teaching with new education trends and practices, update their knowledge with recent teaching approaches and strategies, and revise traditional beliefs and assumptions to develop new mindsets for the profession. Teachers' continuing professional development is anchored on the framework of the School-Based Management and further elaborated in School Improvement Plans. Knowledge and discussion spaces are crucial for tackling teaching and learning issues and challenges that arise within and across the frame of pedagogy. As such, Learning Action Cells (LAC) encourage teachers to engage in collaborative learning opportunities in their respective schools and are headed by the school head or a designated LAC Leader.⁸ These school-based communities foster positive, caring, and safe spaces.

The objectives of LACs are the improvement of the teaching-learning process, which will result in improved learning outcomes; nurturing successful teachers; creating a support system for teachers to continuously improve their content and pedagogical knowledge, practice, skills, and attitudes; and providing a professional collaborative spirit among school heads, teachers, and the school community. The agenda of LACs focuses on the diversity of learners and student inclusion; content and pedagogy of the K to 12 Basic Education Program; assessment and reporting; 21st century skills and the integration of Information and Communications Technology into instruction and assessment; curriculum contextualization; and localization and indigenization.

In-Service Training (INSET) is a school-based seminar-workshop that focuses on the teaching needs of teachers to enhance their knowledge and skills, teaching methodologies, classroom

management, and professional growth and development for the improvement of learning outcomes and creation of a student-centered environment. INSET is another venue to update teachers' knowledge and mastery and boost their teaching morale as they discuss important issues within their contexts.

Monitoring Student Progress in Mathematics and Science

National assessment results are based on internal and external assessments used for different education, governance, and planning purposes—specifically for planning, monitoring, and evaluating mandates from the Department of Education. Data utilization is needed as a basis for system-level assessment to generate decision making and policy recommendations.

The Department of Education emphasizes that data utilization and generation within the agency is ultimately for the benefit of the Filipino learners. This belief is reflected in the different functions across levels of governance to align results for planning and program delivery, utilize data to provide appropriate technical assistance to schools, and prepare and adapt school-level programs for the improvement of learning outcomes and teaching-learning delivery.

The following agencies operate within the Curriculum and Instruction strand, under the Department of Education's Central Office, which supports regional, school division, and school field offices in employing national and system-level assessment results:

- The Bureau of Curriculum Development employs national and system-level assessment results to deliver a basic education curriculum that contains clear content and learning competencies in the different learning areas. Results of national assessments are used for planning and development of the curriculum.
- The Bureau of Learning Delivery develops pedagogical approaches and strategies based on the national assessment results to improve teaching quality and learning outcomes.
- The Bureau of Education Assessment is the assessment arm of the Department of Education and facilitates the implementation of national and system-level assessments to provide other curriculum and instruction bureaus with education and research-based data to improve learning outcomes.
- The Bureau of Learning Resources designs learning resources and materials for the learning needs of Filipino learners. National assessment results are employed for the development of these learning materials.
- The National Educators Academy of the Philippines—the training arm of the Department of Education—uses national assessment results for evaluation and design of training programs, school-based management practices according to their appropriateness with the Department's mandates, alignment with recent education practices and trends, and teacher hiring and qualifications for the improvement of instructional and supervisory functions of educational managers.
- Related functional offices employ national assessment results for the wider education spectrum in terms of educational planning; policy development and formulation;

program and project development and evaluation; expenditure tracking, monitoring and evaluation, pre-/in-service teacher assessment performance review and updating, bureau/office performance evaluation, and research directives and undertaking.

Special Initiatives in Mathematics and Science Education

Special Science Elementary Schools (SSES) is an education intervention designed for children who have keen interest and exceptional abilities in science and mathematics. The activities conducted in SSES are as follows: investigatory projects and student research relative to the program; student participation in development activities, such as leadership training workshops, seminars, and conferences related to the program; professional training and development of teachers and school heads including participation in program-related seminars, conferences, and workshops; purchase of assessment materials and payment for services of psychologists and psychometricians in the screening and identification of entrants; and minor repairs and maintenance of facilities and devices, such as science model apparatuses, scientific tools, and equipment.^{9,10,11,12,13,14,15,16}

The Science, Technology, and Engineering Program is designed to strengthen science and mathematics education delivered through special science classes in selected public secondary schools nationwide. The activities involved in this program are investigatory projects; student research relative to the program, including payment for supplies, laboratory tests, rentals of equipment, spaces, and transport; student participation in development activities, such as science and mathematics competitions, training, workshops, and other related seminars and conferences; professional training and development of science and mathematics teachers and school heads, including participation in related seminars, conferences and workshops; and minor repairs and maintenance of science laboratories and existing science equipment.

The National Science and Technology Fair (NSTF) aims to promote science and technology awareness and a culture of innovation among the youth.¹⁷ The NSTF also aims to identify the most creative and innovative student researchers from junior and senior high school who represent the country in the international science research fairs.

The National Science Innovation Expo is designed to showcase products and innovation of learners. It aims to crowd-source and display science and technology innovations and solutions to everyday challenges. Furthermore, it aims at developing appropriate technologies—in particular, by taking advantage of patent information to identify suitable solutions to technical problems.

Research competitions are conducted among junior and senior high school students from both public and private schools. The first place winners in each of the categories at the regional level represent the region at the NSTF competition as approved by the national Scientific Review Committee. Competitions are clustered into three categories: Life Science; Physical Science; and Robotics, Intelligent Machines, and Science Innovation Expo.

The Metrobank-Mathematics Teachers Association of the Philippines (MTAP)-DepEd Math Challenge is conducted by the Metrobank Foundation and MTAP in cooperation with DepEd regional and school division offices. The overall objective of the competition is to ensure maximum

participation in improving quality of Mathematics Education in the Philippines. Specifically, the challenge aims to awaken greater interest in Mathematics among elementary and junior high school learners in the country; challenge them to strive for mathematical excellence; and reward mathematical talent with awards and recognition so high achievers may serve as models for the youth.¹⁸

Republic Act No. 10612 aims to strengthen the country's science and technology education by fast-tracking graduates in science, mathematics, and engineering who will teach science and mathematics in secondary schools throughout the country.

Junior Level Science Scholarships

Republic Act No. 7687, also known as the Science and Technology Scholarship Act of 1994, provides scholarships to talented and deserving students whose families' socioeconomic status does not exceed the set cutoff values of certain indicators. Qualifiers must pursue priority fields of study in the basic sciences, engineering, other applied sciences, and science and mathematics teaching.

The DOST-SEI Merit Scholarship Program, formerly known as the National Science Development Board (NSDB) or National Science Technology Authority (NSTA) Scholarship under Republic Act No. 2067, is awarded to students with high aptitude in science and mathematics who are willing to pursue careers in science and technology.

Industry-Based Projects to Improve STEM Career Engagement

The Science, Technology, Engineering, and Mathematics (STEM) Leadership Alliance brings industry and education leaders together to strengthen STEM education in the Philippines. With the theme *Creating and Nurturing Innovators for Nation-Building through STEM*, a recent Roundtable for Taking Action aimed to establish industry-education initiatives related to innovation, strengthen linkages to develop a pipeline of future-ready innovators and workforce, and enable participants to explore and agree on specific areas of collaboration. Representatives from education and industry shared their insights on how technology-driven and human-centered innovation and creativity contribute to inclusive national development and workforce readiness, and how government, industry, and education can ensure value and impact.

STEM education for girls is a matter of community—of people working together in empowering girls to start down the path of choosing STEM careers. By addressing the beginning of the pipeline, the #STEMpower Our Girls project invests in a future where more young girls are given opportunities to shape our world and achieve job stability in a tech-focused society.

The Department of Education is providing more opportunities for Filipino learners in far-flung areas to access education through the provision of adequate education facilities, teaching and nonteaching personnel, and learning resources. To address gaps in education, the Department of Education is prioritizing the development of the Last Mile School Project for the 2020–2021 school year.¹⁹

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