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Abu Dhabi Department of Education and Knowledge

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Overview of Education System

Over recent years, Abu Dhabi has been working towards a more knowledge-based economy with the goal of establishing a global knowledge hub. Central to this goal is the focus on quality education, with review, evaluation, and reform as key priorities for the Emirate.

The Abu Dhabi Department of Education and Knowledge (ADEK) oversees the education process and is responsible for developing and regulating the private school sector. It also monitors the progress of students and evaluates the efficiency of the education system in each school.¹

ADEK is committed to supporting private schools in developing and implementing an inclusive education system that inspires and enables all students to achieve success and fulfilment in all aspects of their school lives. ADEK has oversight of the private schools in the Emirate of Abu Dhabi and is responsible for guiding, adopting, and implementing education change and strategic initiatives. ADEK plays a reg0.2 (c)-32 (a)-6c a, a p ple(o)TJ-1 (l)5r p



The national language in the UAE is Arabic. However, due to the diversity of nationalities of UAE residents, English is widely spoken along with some Asian languages, especially in the business world. Modern Standard Arabic is officially used for print communication and formal purposes and used in the delivery of the Ministry of Education Arabic curriculum.⁴

The multicultural nature of Abu Dhabi means that in some international schools, many students speak two or more languages, and there is a wide range of languages represented within the private school population.⁵

Curricula in Primary and Lower Secondary Grades

While the UAE national curriculum is used in Abu Dhabi public schools to teach mathematics and science, private schools use a variety of mathematics and science curricula depending on the school. The instruction of content and skills differs across the wide spectrum of schools, with some private schools aligning performance benchmarks to specific international standards. Private schools use a variety of curricula based on each school's curricular standards.⁶

Many private schools continue to implement initiatives to improve the curriculum and increase independent investigative skills in mathematics and science education. Positive gains have been made with further planning to expand mathematics and science curricula in private schools to include more challenging material and better progression.

Use and Impact of TIMSS

UAE's performance in international assessments carries great importance for the nation and is aligned with the UAE Vision 2021 National Agenda, which emphasizes the development of a first-rate education system and has set as a target UAE students ranking among the best in the world in mathematics and science.²¹

The success of Abu Dhabi's private schools in the international arena is a high priority for ADEK. Following the TIMSS 2015 cycle, a detailed analysis of student responses was undertaken. The analysis identified gaps and areas of weakness in the curriculum and provided the focus for an initiative in Abu Dhabi public and private schools that targeted the development of problem solving skills while providing regular experience in answering questions online.

Central to the focus on improving Abu Dhabi's results on the international stage is the knowledge that improving the fundamental teaching and learning that occurs in classrooms every day will lift the country's assessment results.

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With just over half of the students in Abu Dhabi attending private schools, summaries of the predominant curricula for mathematics in these schools are provided below:

- **British schools (National Curriculum in England)**—During Key Stage 2, which includes Year 5 (Grade 4), the focus of mathematics teaching and learning is to develop students' confidence in using whole numbers and place value and calculating with the four arithmetic operations, including the use of number facts. Students become more fluent



with calculations, including both written and mental approaches, and solving problems including those with simple fractions and decimals. Their understanding of shape and space increases with students developing accuracy in drawing and measuring, extending mathematical reasoning proficiency, and using analysis with shapes, their properties, and ensuing relationships. Year 9 (Grade 8) mathematics falls within Key Stage 3, which requires students to “work mathematically” through the processes: developing fluency, reasoning mathematically, and solving problems. Students have opportunities to deepen their knowledge, skills, and understanding of the mathematical content strands: number; algebra; ratio, proportion, and rates of change; geometry and measures; probability; and statistics.⁷

- **International Baccalaureate schools**—Within the structure of the International Baccalaureate, students in Grade 4 are in the Primary Years Programme, while those in Grade 8 participate in the Middle Years Programme. In the Primary Years Programme, mathematics is predominantly taught through interdisciplinary themes that use inquiry-based learning and integrate learning across the subjects.⁸ In Grade 8, students study mathematics within a context that allows for authentic problem solving and the application of mathematical skills and knowledge.⁹
- **American curriculum (US) schools**—In Abu Dhabi, most American schools adopt the Common Core State Standards (CCSS) in mathematics relevant to a specific US state and adapt these standards to meet the needs of their students within the Abu Dhabi context. The CCSS stipulate both content standards and mathematical practices that describe the processes and proficiencies required for successful mathematics learning. In Grade 4, the focus is on three main areas: multidigit multiplication and division, fraction equivalence and simple computation (addition, subtraction, multiplication), and analysis of geometric figures. By Grade 8, the three critical areas requiring focus are expressions, linear equations, and systems of linear equations; functions and their use in quantitative relationships; and the analysis of two- and three-dimensional shapes, including similarity and congruency, and the Pythagorean theorem.¹⁰
- **Indian schools (Central Board of Secondary Education and Kerala State Education Board)**—The Indian mathematics curriculum, developed by the National Council of Educational Research and Training (NCERT), is relatively prescriptive with an emphasis on memorization, particularly in the lower grade levels. In Class IV (Grade 4), students study a range of domains with particular focus on number concepts. In Class VIII (Grade 8), the curriculum suggests a shift beyond algorithms to establishing understanding of mathematical concepts and problem solving within real world contexts. The strands within the Grade 8 curriculum include the Number System, Algebra, Ratio and Proportion, Geometry, Mensuration, Data Handling, and Introduction to Graphs.¹¹



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Summaries of the most widely used science curricula in private schools in Abu Dhabi are as follows:

- British schools (National Curriculum in England)**—In Year 5 (Grade 4) within Key Stage 2, students have opportunities to experience scientific principles and learn about the world around them. They use scientific inquiry and observe patterns and relationships, asking questions, taking measurements, and analyzing the data appropriately. Throughout the teaching of content, practical scientific methods, processes, and skills are embedded as part of the “working scientifically” framework. The study of science at the secondary level (Key Stage 3), which includes Year 9 (Grade 8), encourages students to develop understanding of the three scientific disciplines: biology, chemistry, and physics. Students need to be able to connect the various disciplines and develop understanding of the big ideas that are the foundation of scientific knowledge and understanding. Students are encouraged to use experimentation and modeling to develop and evaluate explanations, facilitating the use of critical and creative thought.¹²
- International Baccalaureate schools**—Grade 4 students participating in the TIMSS assessment are in the Primary Years Programme of the IB, while Grade 8 students are in the Middle Years Programme. The approach in the Primary Years Programme is for science to be taught through interdisciplinary themes that emphasize the use of inquiry-based learning within authentic contexts.¹³ Students in Grade 8 use the sciences framework for the Middle Years Programme to investigate issues through research, observation, and experimentation. Students are required to work both independently and collaboratively. Students focus on the three disciplines of biology, chemistry, and physics; however, some schools may choose to include additional scientific disciplines.¹⁴
- American curriculum (US) schools**—Similar to the mathematics context, a number of US schools in Abu Dhabi adopt the Next Generation Science Standards (NGSS) relevant to a specific US state, and adapt them to meet the needs of their students within the Abu Dhabi context. In Grade 4, students learn about energy; waves and information; structure, function, and information processing; and the Earth’s systems. Grade 8 is incorporated in the standards for middle schools, and students study content and processes within the disciplines of the physical sciences, life sciences, Earth and space sciences, and engineering design.¹⁵
- Indian schools (Central Board of Secondary Education and Kerala State Education Board)**—Science in Grade 4 uses an integrated approach incorporating a number of subjects, with students studying themes such as family and friends, food, shelter, water, travel, and things we make and do. In Grade 8, science is taught through the following cross-disciplinary themes: food; materials; the world of the living; moving things, people, and ideas; how things work; natural phenomena; and natural resources. At this stage, while science is still an integrated subject for all students, the separate disciplines of physics, chemistry, and biology begin to emerge. At all grade levels, there is an attempt in assessment to shift from a focus on content, to establishing problem solving and competency-based assessment.¹⁶



Professional Development Opportunities

Professional development opportunities are available within each private school or system, with expectations for personalized and meaningful professional development experiences for teachers tied to the UAE National School Inspection Framework.¹⁷ ADEK expects that all teachers be adequately equipped to provide effective instruction and follow-up support to every child, as he or she learns new concepts and skills. The introduction of specialist teachers, in general, commences near the end of primary schooling, however timing varies from school to school according to curricula.

Assessments

Most Abu Dhabi private schools embrace assessment procedures that relate to their specific curricula. For example, the US, British, International Baccalaureate, and Indian schools participate in external national or international examinations relevant to their specific mathematics and science curricula. These standardized assessments measure student achievement against benchmarks and enable comparison of all students undertaking instruction on the same curriculum. Some schools also elect to implement standardized assessments sourced from external companies, as these assessments are a valuable source of data for measuring and tracking student progress over time. Most curricula offer students a qualification achieved toward or at the end of their school career; British schools, for example, offer the General Certificate of Secondary Education (GCSE) and A levels.

Assessing student progress and planning instructional strategies linked to assessments are in the main, core responsibilities of teachers in private schools. Classroom teachers are generally responsible for developing additional authentic tasks and conducting ongoing assessment, with the support of senior staff.¹⁸

Instructional Strategies

The intention is for all students in Abu Dhabi private schools to be at the center of an active teaching and learning environment supported by schools, families, and the community. Key priorities are student health and safety, well-being, and individualized learning. Goals for improvement include developing strong Arabic and English literacy and numeracy, critical thinking, problem solving, and creativity, while continuing to emphasize cultural and national identity among Abu Dhabi students.

With the goal of raising the academic outcomes for all Abu Dhabi students to an internationally comparable level, to meet the expectations of the Abu Dhabi Economic Vision 2030, ADEK targeted public and private school students in the TIMSS 2019 cohort for an initiative involving regular online interaction with mathematics and science questions. The *Question-a-Day* initiative provided schools with regular data and teacher resources that focused on improving problem solving strategies and developing thinking skills. This regular data source, coupled with instructional resources and workshops, emphasized the need for teachers to differentiate among students in classroom lessons, and provided a model for using data to inform the teaching and learning cycle.



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