

A Perspective of Mathematics Education In the People's Republic of China

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The Present School System

In contemporary China, a student's formal general education lasts ten years. Some children between the ages of three and seven may attend kindergartens where instructional emphasis is on socialization and the acquisition of basic knowledge through informal means. Children begin primary school at age seven. The period of schooling lasts five years. Classes meet five and one-half days per week for ten months a year. The average school day lasts from 7:30 a.m. to 4:30 p.m., with a two-hour break for lunch within which the children may return home for their meal. A typical primary school program may include the following subjects:

- Politics - 2 classes/week
- Chinese Language - 11 classes/week
- Mathematics - 6 classes/week
- Physical Education - 2 classes/week
- Music - 1 class/week
- Art, including calligraphy - 1 class/week
- General Knowledge - 2 classes/week
- Agricultural Work - 1 week/term
- Industrial Work - 1 week/term

The Middle School

In graduating to the five-year middle school, a student encounters a

program that is fairly heavy in the study of science:

- Chinese Language and Literature - 5 classes/week for 5 years
- Mathematics - 5-7 classes/week for 5 years
- Politics - 3 classes/week for 5 years
- Physics - 2 classes/week for 3 years
- Chemistry - 2 classes/week for 3 years
- Biology - 2 classes/week for 3 years
- History
- Geography
- Foreign Language (Russian, English, Japanese)
- Fine Arts
- Physical Training
- Productive Work

Middle school also meets six days a week. Class periods range from 45 to 50 minutes each, and a typical school day will consist of either six or seven periods of study. During the school year, approximately 30 per cent of student time is spent in productive work experiences either in the school itself or in the countryside or a factory.

The following is a brief outline of the current middle school mathematics curriculum.

First year -
Operations on rational numbers;
operations on polynomials; equa-
tions in one and two variables.

Second year -
Algebra is continued during the
first semester; second semester -
plane geometry, rectangular co-
ordinates, trigonometry, and some
solid geometry.

Third year -
Geometry - regular polygons, cir-
cles, spheres, and conic sections;
surveying; blueprint reading.

Fourth year -
Functions - linear, quadratic,
logarithmic, exponential, and
trigonometric.

Fifth year -
Sequences and limits; analytic
geometry; polar co-ordinates; and
parametric equations.

Mathematics Teachers

Mathematics teachers have two classes daily with each usually numbering from 45 to 55 students. The rest of the day is spent in preparation of lessons, evaluation of homework, preparation and grading of examinations, helping students, supervision, reporting to parents, and visits to the home. They may participate in self-study groups aided by more experienced teachers to extend their knowledge of mathematics or the teaching of mathematics. They may give after-school lectures for more talented students. Sometimes they take trips to factories and farms to learn about applications which would make school studies more relevant and meaningful. Experiences are shared with other teachers in the neighborhood. Teachers are evaluated on political attitude, ability to "use their brain," health, ability to assist students with problems, and ability to organize the best students for helping others.

Shanghai Mathematics Teaching Materials Compiling Group

The group was organized in 1976 to review and to develop the mathematics curriculum for the primary and middle schools. Teachers from primary school, middle school, and college levels were selected for the group, which is also concerned with methods of teaching and training of teachers. According to the group, students entering the middle school are expected to: (1) calculate with whole numbers, integers, fractions, and decimals, (2) recognize and "manage" simple geometric figures, (3) use simple algebraic expressions up to the third degree, and (4) solve simple applied problems. The group is working on an eight-volume series for the last four years of the middle school. Teachers are expected to volunteer suggestions for the content of the eight volumes. After completion, the volumes will be tried by members of the group, then revised according to the opinions of the teachers and students. The following topics will be covered in the volumes:

- linear equations
- inequalities
- systems of equations
- operations on polynomials and rational expressions
- powers, roots, and radicals
- distance formula
- quadratic equations
- logarithmic operations
- geometric forms; parallel lines
- congruence of triangles
- properties of parallelograms
- measurement
- circle properties
- solution of right triangles
- solid geometry
- trigonometric ratios
- linear functions
- logarithmic functions
- exponential functions
- trigonometric functions

- quadratic curves (second-degree relations in two variables)
- polar co-ordinates
- parametric equations
- complex numbers and variables
- plane vectors
- calculus

Children's Palaces

Outside of formal school programs, children and young people may strengthen their knowledge either directly or indirectly by participating in a variety of after-school extracurricular activities. These activities are conducted on school grounds and/or at local district centres called Children's Palaces. An excellent variety of self-study and enrichment materials for children is available in Chinese bookstores.

Peking University

- Founded in 1898.
- 20 departments - 10 science, 7 liberal arts, 3 foreign languages.
- 2,700 teachers.
- 7,000 students; once had 10,000 students; 130 foreign students from 37 countries; Mao attended (1918, 1920) and worked in the library.
- Mao set forth all educational lines: education should serve utilitarian quality and be productive morally, mentally, and physically (mentally, physically, and ideologically).
- Gang of Four wanted the uneducated worker rather than the educated elite. The university was, in effect, closed during the reign of the Gang of Four.
- Admission standards are now different than before the reign of the Gang of Four; some students

are admitted directly from the middle (high) school, others come from the country or the factory.

- Degree will take four years in the future, with some specialties taking longer.
- In 1976, 38 per cent of the students were women.
- Students attend free, plus stipend, plus free medical care.
- Classes meet six days per week. Seven weeks are for festival and winter and summer vacations. Five weeks per year are spent in agriculture, military, or industry.
- 140 mathematics teachers with 150 students in computational (applied and abstract) mathematics and information theory. Calculus is more intuitive.
- Library is two years old. It has 24,000 square metres of floor space. It contains 3.1 million volumes.

Peking Teaching University

- Purpose is to train teachers for the middle school.
- Founded in 1902.
- 15 departments (no background given).
- 1,000 teachers and research workers.
- 3,000 students (three times that of preliberation days).
- 15,000 students in correspondence and supplementary training courses.
- Library collection over two million books.
- Since the liberation in 1949, many changes have taken place at the university. The spirit of the university is also changing (no details provided).

- Three courses required of all students:
 - History of Chinese Communist Party
 - Political Economy
 - Production (I believe this is correct; my tape was not clear.)
- During the past few years, they have been emphasizing the combination of theory and practice.
- Every year the students spend a certain period of time (not specified) in the factories, in communes, or in practice with the army units.
- University also runs several small factories where they combine teaching work, student work, and production work.
- Senior students have to practice (I assume practice teaching) in the middle school.
- In recent years the University has run spare time (correspondence) courses for in-service teachers.
- University was damaged by the Gang of Four disrupting the educational work.

Fudan University (Shanghai)

- 2,200 faculty, 4,000 students, 14 departments, 1,100 teaching faculty. 1.3 million volume library, two 22-week terms with

two-week review period before exams plus two-week period working in the country, factory, or military (18 weeks of classes).

- Students come from all of China - determined by Peking.

The University Mathematics Program in the People's Republic of China

First year -

Algebra
 Analytic Geometry (plane and solid)
 Mathematical Analysis (calculus)
 General Physics
 Foreign Language
 Politics

Second year -

Analysis
 Physics
 Differential Equations
 Complex Variable
 Higher Algebra (one-half year)

Third year -

Real Variable
 Probability and Statistics
 Numerical Analysis
 Computer Programming

Fourth year - electives from:

Modern Algebra
 Differential Geometry
 Topology
 Logic