

CONCEPT SCHOOLS MATHEMATICS VISION

Concept Schools Mathematics Department believes that the educational goals for students must reflect the importance of mathematical literacy. Toward this end, Concept Schools K-12 Math Standards articulate five general goals for all students.

1. Learning to Value Mathematics:

Students should have numerous and varied experiences related to cultural, historical, and scientific evolution of mathematics so that they can appreciate the role of mathematics in the development of our contemporary society and explore relationships among mathematics and the disciplines it serves: the physical and life sciences, the social sciences, and the humanities.

2. Becoming Confident in One's own Ability:

As a result of studying mathematics, students need to view themselves as capable of using their growing mathematical power to make sense of new problem situations in the world around them. To some extent, everybody is mathematician and does mathematics consciously. School mathematics must endow all students with realization that doing mathematics is a common human activity. Having numerous experiences allows students to trust their own mathematical thinking.

3. Becoming a Mathematical Problem Solver:

The development of each student's ability to solve problems is essential if he or she is to be a productive citizen. Problem solving must be the focus of school mathematics.

4. Learning to Communicate Mathematically

The development of a student's power to use mathematics involves learning the signs, symbols, and terms of mathematics. This is best accomplished in problem situations in which students have an opportunity to read, write, and discuss ideas in which the use of the language of mathematics become natural.

5. Learning to Reason Mathematically

Making conjectures, gathering evidence, and building an argument to support such notions are fundamental to doing mathematics. A demonstration of good reasoning should be rewarded even more than students' ability to find correct answers.

Concept Schools see classrooms as places where interesting problems are regularly explored using important mathematical ideas. We believe that what a student learns depends to a great degree on how he or she has learned it.

Concept Schools Mathematics Department believes that with these goals students will become mathematically literate. This term denotes a students' ability to explore, to conjecture, and to reason logically, as well as to use a variety of mathematical methods effectively to solve problems.

Concept Schools K-12 Mathematics program specifies the student activities associated with doing mathematics. Two general principles have guided our descriptions:

- Activities should grow out of problem situations.
- Learning occurs through active as well as passive involvement with mathematics.

We believe that learning should not be conceived of as a process in which students passively absorb information, storing it in easily retrievable pieces as a result of repeated practice and reinforcement.

The constructive, active view of the learning process must be reflected in the way much of mathematics is taught. Therefore, mathematics instruction should vary and include opportunities for

- Appropriate project work;
- Group and individual assignments;
- Discussion between teacher and students and among students;
- Exposition by the teacher.
- Practice on mathematical methods;

In Concept Schools Math Program K-12, three features of mathematics are embedded in the Standards.

First, “Knowing” mathematics is “doing” mathematics. A student gathers, discovers, or creates knowledge in the course of some activity having a purpose. We do not assert that informational knowledge has no value, only which its value lays in the extent to which it is useful in the course of some purposeful activity.

Second, some aspects of doing mathematics have changed in the last decade. The computer’s ability to process large sets of information has made quantification and the logical analysis of information possible in such areas as business, economics, biology, medicine, and engineering. We believe that the curriculum for all students must provide opportunities to develop an understanding of mathematical models, structures, and simulations applicable to many disciplines.

Third, the new technology not only has made calculations and graphing easier, it has changed the very nature of mathematics and the methods mathematicians use. Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning. In Concept Schools, we believe that it is very effective to integrate mathematical content and technology in a manner that enables students to do playful mathematical studies and even discoveries.

Because technology is changing mathematics and its uses, Concept Schools Mathematics Department believes that

- Appropriate calculators should be available to all students at all times;
- A computer, a projector and Smart board/Starboard should be available in every classroom for demonstration purposes;
- Every student should have access to a computer for individual and group work;

- Students should learn to use the computer as a tool for processing information and performing calculations to investigate and solve problems.

We recognize, however, that access to this technology does not guarantee that any student will become mathematically literate. The technology in the classroom is needed to simplify, but not to accomplish, the work at hand.

Mathematical Practices at Concept School Curriculum in line with Common Core Standards.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in reasoning.

The mathematical expectations for new employees in industry:

- The ability to set up problems with appropriate operations
- Knowledge of a variety of techniques to approach and work on problems
- Understanding of the underlying mathematical features of a problem
- The ability to work with others on problems
- The ability to see the applicability of mathematical ideas to common and complex problems
- Preparation for open problem situations, since most real problems are not well formulated
- Belief in the utility and value of mathematics.