

Florida Department of Education
Office of School Improvement
“Ride the Wave” to Success in the Classroom



A mathematics classroom should provide practical experience in mathematical skills that are a bridge to the real world of jobs and adult responsibilities. In a classroom that is preparing students for the world outside of school you might observe students -

- ◆ Interacting with each other, as well as working independently, just as adults do in work
- ◆ Using textbooks as only one of many resources. Manipulatives such as blocks and scales and technology such as calculators and computers are useful tools, and students should be learning how and when to use them
- ◆ Becoming aware of how mathematics is applied to real life problems, not just learning a series of isolated skills
- ◆ Realizing there are many ways to correctly solve many mathematics problems and that some problems have more than one correct solution. Students might explain the different strategies they used to reach a solution and why they've made the choice to utilize one strategy over another.
- ◆ Working in groups to test solutions to problems, learning how to communicate mathematical ideas with one another in a physical setting that promotes teamwork

You might observe teachers -

- ◆ Raising questions that encourage students to explore several solutions and challenge their deeper thinking about real problems
- ◆ Moving around the room to keep everyone engaged and on track
- ◆ Allowing students to raise questions about mathematics for which there is no “answer in the book,” and promoting discussion of these questions.
- ◆ Using manipulatives and technology when it is appropriate
- ◆ Drawing on student discovery and creativity to keep them interested
- ◆ Encouraging students to go on to the next challenge once a step is learned, understanding that not all students learn at the same pace

- ◆ Bringing a variety of resources into the classroom from guest speakers to creatively use technology
- ◆ Working with other teachers to make connections between disciplines to show how mathematics is a part of other subjects
- ◆ Using assessments that reflect the way mathematics is being taught, stressing understanding and problem solving skills
- ◆ Exploring with students career opportunities that emphasize mathematical concepts and applications

Best Practices

The following listed *Best Practices* come from Project BETTER—Building Effective Teaching Through Educational Research, Maryland State Department of Education.

- ◆ **Attitude of Teacher and Student** - Teachers who demonstrate an appreciation for their subject and their students promote learning through their behavior and instructional approaches because students who have positive feelings about mathematics exert more effort, spend more time on tasks, and are more effective learners than students with poor attitudes.
- ◆ **Student Achievement** - Teachers who identify what they are trying to teach and what students are to remember promote achievement because students can focus their attention and efforts appropriately. The purpose should be emphasized at the beginning of the lesson and summarized at the end.
- ◆ **Teacher Enthusiasm and Encouragement** - Teachers who demonstrate enthusiasm and encouragement promote learning because students' attention and interest in the work at hand are increased.
- ◆ **Discovery Techniques** - Teachers who use discovery techniques that have students make generalizations, recognize patterns and identify relationships promote long-term retention of mathematics because students develop intellectual foundations and a familiar framework for addressing new topics.

- ◆ **Problem Solving Techniques** - Teachers who implement a problem-solving approach to teaching by asking questions frequently, using a variety of problem sources, and encouraging students to think for themselves promote learning because students are better able to understand problems, plan solution strategies, and get correct results.
 - ◆ **Engaged Time** - Teachers who actively engage students in instruction promote learning because the more time students spend on task, the more mathematics they learn.
 - ◆ **Mathematics Background Knowledge and Experience of Children** - Teachers who make connections with knowledge that students bring with them promote learning because mistaken ideas can be corrected and new facts and skills can be presented in a nonthreatening context.
 - ◆ **Development of Mathematical Thinking** - Teachers who use the do-talk-record approach where children participate in activities, talk about them with each other and their teachers, and record the activities and results promote the development of students' skills in speaking and listening, as well as writing and reasoning. Students learn to think for themselves, form their own opinions, follow their own logic, and communicate their thinking.
 - ◆ **Teacher Clarity** - Teachers who carefully choose vocabulary and explain the why and how in solving problems promote learning because clarity develops more positive attitudes toward mathematics among students.
 - ◆ **Questioning** - Teachers who use questioning techniques promote learning because questioning is conducive to the development of mathematical thinking by students.
 - ◆ **Cooperative Learning and Peer Tutoring** - Teachers who provide students the opportunity to work in small groups, to talk about and exchange ideas and listen to their peers, facilitate students' development of their abilities to communicate and reason. Small-group work can empower students to become more independent in their own learning while enabling teachers to interact more closely with students.
 - ◆ **Estimation** - Teachers who present estimation activities as a step in all computational activities promote learning because students discover and develop effective estimating techniques and learn to rely on their estimates as aids in computation and problem solving.
- Successful Practices Specific to Florida Schools**
- ◆ Instructional materials are state-adopted, in alignment with the Sunshine State Standards (SSS), adopted at the school level based on unique needs of the students, and are in alignment with the SSS standards and district grade level benchmarks.
 - ◆ Students of both genders and of different racial, cultural, and linguistic backgrounds have equal access to all mathematics courses, activities and materials.
 - ◆ Teachers are assigned to or have chosen grade level, student groups, or content area(s) that best match their instructional content expertise and knowledge of student needs.
 - ◆ All faculty and staff are knowledgeable about the mathematics benchmarks that are assessed at their school level and understand their role in student preparation for success on the mathematics Florida Comprehensive Assessment Test (FCAT). Successful performance on FCAT depends upon knowledge of all Sunshine State Standards strands, problem solving abilities, written explanation of problem-solving reasoning, and the ability to judge whether one's answer is reasonable.
 - ◆ Instructional enrichment activities are implemented such as mathematics clubs, peer-tutoring, mathematics labs, Math SuperStars, mathematics electives offered to students needing additional support, and mathematics related competitions.

For more information contact the Florida Department of Education, Office of School Improvement (850) 487-1023, SC 277-1023. Information can also be obtained at: <http://osi.fsu.edu>

Resources and References are available on our Web Site <http://osi.fsu.edu> or call (850) 414-9892, SC 994-9892.

Bibliography

Florida Sites and/or Programs

Resources

Mathematics Consultants

Web Sites

Jim Horne
Commissioner of Education

