

The
CLEMSON UNIVERSITY
MIDDLE SCHOOL MATHEMATICS
PROJECT

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Adapted for the Casio Algebra FX2.0
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Materials Reproducible Only for Face-to-Face Instruction

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CLEMSON MIDDLE SCHOOL MATHEMATICS PROJECT INTRODUCTION

Background

Several research studies have indicated that during the middle school years, American students fall behind their international peers. The American middle school curriculum is often one of repetition from the late elementary years when skills that students have not mastered are re-taught. Certainly it is important that students acquire these skills. However, studies have revealed that a contextually based course steeped in problem solving not only is far more effective in helping students learn real mathematics, but also in helping students master the skills that they did not acquire through traditional direct instruction.

The materials presented in the Clemson Middle School Mathematics Project try to do exactly that. They provide a rich, motivating context for helping students develop their problem solving skills and mastering the key strands in the middle school curriculum. These materials are aligned with the Standards produced by the National Council of Teachers of Mathematics, as they focus not only on problem solving, but also connections, communication, and mathematical reasoning.

Just as the Clemson Algebra Project did, the Clemson Middle School Mathematics Project merges technology training with ready-to-use materials that teachers can implement immediately in their classrooms. The primary technological tool for this version of the project is the Casio *Algebra FX 2.0* Graphing Calculator. The Casio EA-100 data collector is also used in some of the work. Although no specific mention is made in the materials, digital cameras can also play an important part as students make presentations to the class on their solutions to some of the problems.

The Program

The eight units in this program are based on strands identified in the Standards and encompass major topics that are taught in most middle school mathematics courses. Within each of the eight units, four problems are presented. Detailed solutions, including the necessary keystrokes, are provided for the first two problems. Participants, working in small groups, are expected to solve the last two.

A few of the problems require work with scientific notation, algebraic expressions, and writing equations in two variables. Familiarity with these topics might be helpful, but is certainly not essential, for the middle schools students. Depending on the background of their students, teachers may choose to use the provided context to introduce these topics.

The materials have been correlated to some of the best selling middle school math texts currently on the market. It should be noted, however, that the materials are not correlated to some middle school series that have been identified as exemplary by the Department of Education. This is because the exemplary materials are already activity based, and, although the materials presented here would complement the exemplary programs, there is no specific section to which each of the modules can be correlated.

During the Clemson Middle School Project training session, you, as a participant, will be expected to be actively involved. As you work with others to solve problems and prepare presentations for the rest of the class, you may find that many of these problems challenge you. As all of us involved with math education attempt to raise the bar for middle school students, our first step must be to raise our own bar. Most people, including many teachers, simply have not had the opportunity to use technology to explore sophisticated mathematical ideas, nor have they had the opportunity to explore these ideas in a meaningful context. If you find yourself struggling with some of the problems, do not be discouraged. This, in fact, is a positive sign that you are developing higher levels of mathematical power that you will be able to pass on to your students.

Those new to Casio calculators will find that the technology is easy to use and can facilitate in-depth learning. The calculators can be used to explore realistic problems using real data and to represent the underlying mathematical ideas in a variety of ways. As you explore the problems posed in these materials, we hope that you will gain confidence not only in your ability to use technology but also in your ability to apply mathematical ideas to real world situations. You will likely experience first-hand many of the same things your students will experience as they struggle with these inquiry-based activities. The impact upon your classroom will be felt immediately. We hope you will join us in our efforts to improve mathematics education for all children.