

Introduction

The greatest influence on student success is the decisions that the teacher makes in the classroom on a daily basis. These decisions have more of an impact than any demographic factor the child bears, or any instructional material the school purchases. Yet, the American math teacher is trained to follow the textbook, demonstrate examples and administer homework. We have not been trained to make informed decisions on effective ways of teaching mathematics. Overcoming that hurdle is what this book is all about.

For six years, *The Math Projects Journal* has offered innovative tools for teachers who are looking to step out of the traditional model of instruction, without leaving the traditional curricula, and to make decisions on behalf of the students. (see *The MPJ Story*) This book is a compilation of *MPJ*'s best lessons, articles and activities that have been published in our newsletter. To truly understand both the intent and the content of this book, you need to understand the following premises:

1. The primary purpose of these lessons is the mathematical competency of our students.

Yes, the activities in this book appeal to the interest of students and, henceforth, are considered to be fun and engaging. However, we want the students to be intellectually engaged, not just physically or socially. Therefore, while some of these lessons involve such educational fads as cooperative learning, active learning, and manipulatives, these methods are implemented only when they take students beyond superficial memorization, and assist them in gaining a deep and rich understanding of conventional mathematical content. Our students need to be able to solve, factor, and graph equations as well calculate probability, surface area and volume, and ultimately, prove mathematical conjectures. In the current climate of high stakes testing, without exceptions or excuses, our students must know their stuff.

2. There is no one best way to teach.

There are several effective ways to teach, and an innumerable amount of ineffective ways. From personal experience and from the feedback of *MPJ*'s readership, I can say with confidence that the lessons offered here are very effective. I believe all the lessons in this book are good; some are great; and several are absolutely awesome. That does not make them a panacea. The very nature of the book implies that there always exists another way to approach a topic, which may help the teacher reach students that previously were unreachable.

3. It is the teacher that teaches, not *MPJ*.

If you simply disseminate our student handouts as worksheets to be collected and graded as homework, then you will still be following the conventional, textbook-driven model of instruction. If you choose to do this, you will have wasted your time and money with this book. These lessons are only a vehicle for you, the instructor, to impart mathematical knowledge, understanding and skill to your students. You are the teacher. *MPJ* is only a tool.

4. *MPJ* very loosely defines the term projects.

I have been called to task a few times for my use of that word. Many people view projects as long-term, activities in which the student creates some product, much like a model of the solar system at a science fair. Some of our projects are like that. Some are not. In fact, the nature of the projects vary as widely as the topics they address. They range in length from ten minutes to an entire week. Some are student-driven, while others are more teacher-directed. *MPJ* has never been formulaic, so the term *projects* refers to any non-traditional lesson that helps the students understand mathematics. Semantics aside, anything that works is good by us.

Introduction *(continued)*

With that said, here is what you will find in *MPJ's Ultimate Math Lessons*:

Projects, projects and more projects

The best of *MPJ's* previously published lessons have been compiled by course (Pre-Algebra, Algebra and Geometry) in a sequence that corresponds to traditional curricula. The majority of the projects have both lesson plans as well as student handouts. This book also contains some new student handouts for some of our most popular lessons that did not have them previously.

Articles

Since the teachers' decisions are so crucial to successful learning, our most informative and thought provoking articles are included here. As a whole, these articles embody the general philosophy of *The Math Projects Journal*, and are intended to radically change the way you think about education and the way you approach your teaching of mathematics. There are also articles of a more pragmatic nature, addressing issues of testing, grading, portfolios, etc. This section also includes various samples of Greg Rhodes' cover art, which has been such a special part of *MPJ's* history and spirit.

Activities

Several issues of the newsletter included a section titled "Whatever Its Worth." As the subtitle indicated, these were activities that qualified as "really cool stuff that you don't know what to do with, but is worth doing anyway." These activities are relatively brief, but offer substantial mathematical content.

If you have read this far, then I know you share in the goals and purpose of *MPJ*, and that you desire to take your students mathematically deeper and higher than any drill-n-kill, textbook regime can ever attempt to go. On behalf of your students, I applaud your courage. On behalf of *The Math Projects Journal*, I thank you for your support.



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