

MATH FOR PARENTS MINI-COURSE

Thinking About . . .

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$$\frac{1}{6}$$

.05

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10%

.333

Fractions, Decimals, and Percents

by **Linda Griffin**
with **Darcy Schroeder and Mary Schumacher**





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THE MATH FOR PARENTS COLLECTION

The Math for Parents Collection was developed by Math And Parents Partnerships in the Southwest (MAPPS), a project funded by the National Science Foundation and administered by the Department of Mathematics at the University of Arizona, with collaborators from the Office of Public School Programs at the Maricopa Community College District. The collection was created to enable a school district, university/school district partnership, or other appropriate organization to organize and administer an effective parental involvement program in mathematics. Individual pieces can, of course, be used to conduct smaller scale activities for parents in a variety of contexts.

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PUBLICATIONS

Math for Parents Mini-Courses

Thinking About Fractions, Decimals, and Percents by Linda Griffin with Darcy Schroeder and Mary Schumacher
Thinking About Numbers by Fred Stevenson with Darcy Schroeder and Mary Schumacher
Thinking in Patterns by Nora Ramirez
Geometry for Parents by Alfinio Flores
Data for Parents by Joanne Rossi Becker

Math Awareness Workshops for Parents

K-4 Workshops One - Nine by Nora Ramirez and Darcy Schroeder
What is Multiplication?, Number Sense, Step by Step, Problem Solving, What is Geometry?, Raggedy Anne's Party, Understanding Data, Patterns, and Equal or Not?

5-8 Workshops One - Nine by Darcy Schroeder and Nora Ramirez

My Giant, Garage Patterns, Styles in Tiles, Problem Solving, Distance Around, Probability, Wrap It Up!, Show Me the Money, and Back to the Future

Handbooks

Guidebook for a MAPPS Program by Mary Schumacher with Jill Bratton and Emily Bernier

Videos

Making a Difference with MAPPS, Parent Impact, Leadership Development, Four Things to Make a MAPPS Program Successful, An Evening at a Math Awareness Workshop, and An Evening at Math for Parents by Derek Griffith

PREFACE

Math for Parents Mini-Courses

It's a Tuesday evening in March. Parents assemble on the lawn in front of the high school. Everybody is relaxed. You can hear the friendly banter of Spanish and English as the parents solve a problem. They have gathered to do mathematics --- as they have done every Tuesday evening for the last several weeks. Tonight's task is to figure out the relationship between the radius and circumference of a circle. But where are the can lids? (And where are the desks?) No puny circles here! The parents are creating monster-sized circles of their own. (No one is sitting down: There are no desks!) There's a lot of motion. A parent holds one end of a rope and turns in place. Another holds the other end taut while walking in a circle. She counts out loud the steps she takes until she returns to the position where she began the walk. The final number measures the circumference. She hands the rope to a third person and counts out the number of steps from one end of the rope to the other. This number measures the radius. A fourth parent records the pair of numbers --- to be examined later along with other similarly created pairs. Other parents watch and wait their turns to create and measure their own circles. In the background you hear the sounds of traffic. Occasionally, a teenager's car honks to draw the parents' attention away from their task. There's a chuckle in response. But nobody pays much mind. This is serious business. And it's fun.

This is a scene from a Math for Parents Mini-Course, a course for parents of K-12 children. There are five such mini-courses, each based on a theme of school mathematics: algebra, geometry, whole numbers, fractions, and data. (The scene above is from the mini-course based on geometry.) Each takes place in eight two-hour sessions over the course of two to three months --- roughly one session every week (with an occasional two-week break between sessions). Sessions build on parents' own intellectual resources --- their knowledge and their experience solving problems. In each session parents actively engage themselves in doing mathematics: Parents solve problems cooperatively in groups, use hands-on materials, and communicate results of their investigations to the whole class. The sessions are exciting and enjoyable.

To The Parents

What can you expect in a Math for Parents mini-course session?

First of all, you will be gathering with other parents just like you, having a good time solving problems. The atmosphere will be non-threatening. There will be no pressure to perform on tests! You will be able to work on material at your own pace.

At each session you'll probably be interacting with a group of four or five other parents. As your group comes up with a solution to a problem the whole class is working on, you may take part in presenting the results of your group's solution to the rest of the class. You will have a chance to hear how other groups solve the problem as they present their solutions.

You will have a chance to learn by using hands-on materials such as Place Value Blocks, Cuisenaire rods, and Geoboards. These are items that you might find in your children's classroom, but they are useful for adults, too. Your learning of mathematics should give you a feeling for your child's learning --- because both of you will struggle and experience frustration and both of you will experience the exhilaration of success. As you learn a mathematical idea, your instructor may discuss how children at different ages learn it.

You will have occasions to talk with other parents openly, with enthusiasm and humor, about mathematics and about learning it. You will get the chance to reflect on your mathematical past and perhaps have the opportunity to tell a story about it (a good or bad one!) and listen to others tell theirs.

You will learn that you can do mathematics and that mathematics is something that everyone can do, like breathing in and breathing out. The sessions will build your confidence as a learner of mathematics.

PREFACE

You will look forward to coming to each session. Perhaps you will find that mathematics is something you like doing, something to get a kick out of, something to take pleasure in, and something that is important in your life.

We hope that sometimes you will shout “Ah! Ha!” when you’ve solved a difficult problem. We hope that you will smile over an enjoyable challenge and a satisfying solution.

In the end we hope that your participation in a Math for Parents course will give you one more thing to talk about with your children. We hope that your experience will help you to encourage your children as they do math -- - to persevere, to enjoy, and to take more courses. Who knows? Maybe you will be able to help them with their homework! In any case, you will be able to share the fact that you are on the same trip together --- you are both mathematical learners

To The Teacher

We suggest that each offering of a mini-course be open to 25-30 parents. You might want to employ one or two teachers from the parents’ district to assist you. If you are not English/Spanish bilingual yourself, you may want to find a district teacher who is bilingual to help you present Math for Parents sessions in a bilingual fashion. This should be someone who, in addition to being bilingual, knows mathematics and is acquainted with Spanish equivalents for English mathematical terms. Each course should provide parent participants with in-depth experiences of the important ideas in a major thread of school mathematics --- as woven through many grade levels. Try to provide the parents with many occasions to share their own everyday uses of the topic (such as geometry in construction, tiling, or sewing) and, as much as possible, have important ideas flow from these “funds of knowledge”. The materials are designed so that successive sessions of the course build on earlier ones. The materials are designed to be taught in ways that reflect the good teaching practices outlined in the NCTM Standards: the use of hands-on materials, the involvement of parents in the discovery of mathematical ideas and techniques, the use of cooperative learning, and the communication of mathematical ideas and solutions.

The text for each mini-course has two parts:

- **A Facilitator’s Guide.** This provides a script for the activities and discussions that take place during the sessions. The guide is accompanied by a set of black line masters (BLMs) for handouts to be used during the sessions.
- **Bringing Mathematics Home.** This has two sections:
 - Materials for the parents to take home for their own learning (both recaps of what takes place in the sessions and suggestions for further study).
 - Related activities for parents to carry out with their children.

The text for each mini-course will be available in both Spanish and English.

About MAPPS (the project that created the Math for Parents Mini-Courses)

MAPPS -- Math and Parent Partnerships in the Southwest—is a program designed to engage parents of K-8 children in the mathematics of the schools. MAPPS activities

- provide parents with in-depth experiences with school mathematics and the processes used in teaching and learning it;
- help parents to become aware of what is happening in their children’s classrooms; and
- offer parents occasions to take on leadership roles in working with teachers, administrators, and other parents.

MAPPS has developed three types of activities with accompanying materials available in both Spanish and English.

- Two-hour, self-contained **workshops** --- for all parents and their children, to give them a stimulating and enjoyable experience with a single topic of mathematics, such as multiplication, surface area, number sense, the nature of π , or making sense of data.

PREFACE

- **Mini-Courses** on themes from school mathematics --- algebra, geometry, whole numbers, fractions, and data.
- **Leadership Development Sessions** --- for parents and teachers who will lead workshops and recruit new parents to participate in the programs.

The goal of MAPPS is to create, in each school district, a community of parents who

- experience mathematics as a human activity;
- have real learning experiences with mathematics;
- do math with their children;
- believe that their children can be successful at learning mathematics;
- are aware of what is happening in their children's mathematics classrooms;
- understand the connection between school mathematics and access to future careers;
- and are aware of ethnic and gender biases as they relate to expectations and success in mathematics form partnerships with teachers and schools in supporting good mathematical learning and teaching for their children.

ACKNOWLEDGMENTS

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Many educators have generously contributed to my “bag of tricks” over the years. I appreciate them all and would like to give special acknowledgement to Kim Boling who has been my collaborator in putting together ways to understand rational numbers through manipulatives.

Finally, I would like to thank the many people who made this book possible. I would like to thank the National Science Foundation for recognizing the need for parent programs, and putting their trust in Dr. David Gay and Dr. Marta Civil to lead the MAPPS project. I would like to thank David and Marta for trust in me to author this book and their support while the project was under way.

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INTRODUCTION

Introduction

This course consists of eight two-hour sessions. Sessions are sequential and designed to be a glimpse into some of the fundamental principles of rational numbers. It is not intended to be a comprehensive treatment, but rather an introduction.

Many parents will be very nervous and unsure of themselves when beginning a mathematics course after many years out of school. Some will bring negative preconceptions about mathematics and be unsure of themselves as learners. For this reason, it is important to keep the sessions informal, fun, and non-threatening.

There are several features to the course.

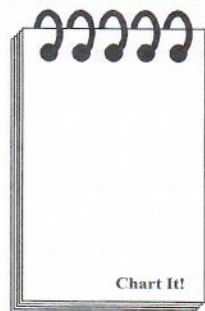
Investigations

Each session has at least one major hands-on investigation. In many cases this activity will take a long time. The instructor should allow all the time that is necessary to understand the concepts demonstrated by the activity.

Use of Manipulatives

This course is not a paper and pencil course; it is a hands-on experience. Each session uses a manipulative while exploring concepts. The manipulatives help participants see ways that they can make the concepts come alive for their children.

Use of Recording Tools



There should be an opportunity to keep track of important movements that occur during each session. We suggest that you set up an easel with chart paper to be used for the Chart It! during each session. The purpose of the Chart It! is to record significant concepts. It is used during each class to list terminology, summaries of activities, issues or questions that occur, as well as important concepts that the instructor wants to return to in a later class. Throughout the session, the Chart It! icon (shown to the left) will be used to suggest charting an idea. Fractions, Decimals, and Percent charts will be used to record applications for rational numbers in the real world.

Use of Group Work

Working in groups is important to the atmosphere and the success of the investigations. To provide a comfortable environment for group work, choose a room that has adult-sized tables and chairs. During group work be sure to walk around and listen to the conversations in order to know what the participants are thinking.

Presentations

Providing opportunities for participants to present and talk about their ideas is essential. Opportunities are provided for participants to present their ideas within their groups and to present to the whole class. This process is time consuming, but well worth the time in exchange for the understanding that comes from such discussions.

MATERIALS FOR INSTRUCTORS AND PARTICIPANTS

Materials needed by instructor (every session)

- Overhead projector, screen, pens and blank transparencies
- Pencils and paper for participants
- Chart It! (created during sessions)
- Fraction-Decimal-Percent Charts
- Set of manipulatives used in each of the sessions for the overhead projector
- Chart paper and markers

Materials needed for participants

Session	1	2	3	4	5	6	7	8
Tangrams	•							
Supply of Newspaper and magazines	•							
Index Cards, 5 x 8	•							
Post-it® Notes, 3 x 5	•	•	•					•
Color Tiles		•					•	
Pattern Blocks			•					
Cuisenaire® Rods				•				•
Base Ten Blocks					•			
Scissors					•	•		•
Calculator						•		
Rubber Bands						•		
Construction Paper, 12 x 18						•		
Tape, Transparent						•		•
Adding Machine Tape, 5' strips							•	
Sticky Dots, 2 colors							•	
Chart Markers								•
Certificates of Completion (optional)								•