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# **WRITING MATH**

## A Project-Based Approach

by

Sharon Z. Draznin

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A Miniature Math Museum

The concept of mathematics and numbers being all around us, embedded throughout our everyday lives, is the theme of this chapter. Students are asked to bring to school either pictures of or actual small objects which have numbers on them. Examples are: pages from a catalogue, a phone book, license plate, receipt, etc.. A classroom “museum” is set up to display these items. The writing component of this chapter asks students to write about their contribution to the “museum” and to justify why they chose their particular item/s to display.

**CHAPTER TWO** **PAGE 33**  
The Apple Doesn't Fall Far From the Tree

This is a chapter for fall which uses the mathematical ideas of counting, graphing, weighing, measuring, and also includes cooking. The language arts component uses writing about the tastes, textures, and uses of apples as well as incorporating sequential writing about the steps followed in preparing a recipe.

**CHAPTER THREE** **PAGE 51**  
Writing Number Stories

This chapter teaches students how to write addition, subtraction, multiplication, division, and fraction stories. Students are asked to use a context such as: money, animals, flowers, or toys whenever they write a number story. They also generate specific numbers and write number stories using those numbers. Correct sentence structure and punctuation usage are emphasized in the writing component of this chapter. A classroom book of number stories is compiled. Use this chapter throughout the year. As each computation skill is taught, add the “Writing Number Stories” component.

## **CHAPTER FOUR** December Holiday Fun

**PAGE 65**

The overall goal for this chapter is listening and following directions. This chapter contains a paper folding activity: making a box. This box can be decorated by using sponges cut into pattern block shapes and dipped in paint. A special holiday gift can be placed in this box. Mathematically, this chapter addresses the concepts of fractions and geometric shapes. The writing component includes making a holiday card with a poem inside as the “message.” Poetry writing and listening activities are extensions of this chapter. The paper folding is extended into origami and includes two holiday projects which provide additional resources for both students and teachers.

## **CHAPTER FIVE** Toothpicks and Marshmallows, Straws and Clay: Constructing Polygons

**PAGE 97**

This chapter consists of “building” two and three dimensional shapes using miniature marshmallows and toothpicks then naming the shapes. The writing component focuses on descriptive writing as students are asked to compose riddles entitled “Who Am I?” This activity can be expanded into another writing activity entitled, “Painting With Words.” The math work can be expanded into creating rigid structures and estimation. Descriptive and narrative writing assignments follow.

## **CHAPTER SIX** Chinese New Year or Gung Hey Fat Choy!

**PAGE 117**

The mathematics component of this chapter involves counting forward and backward by 12 using four digit numbers (years). Students also become familiar with the various animals which make up the Chinese Zodiac. Research reports on the animals are the writing component of this chapter. Students working in pairs will address the physical characteristics of these animals, their origins, what they eat, where they live, and any other information which they consider to be significant. All animals except the dragon are real.

## **CHAPTER SEVEN**

### Trash Bashing

**PAGE 145**

The concepts of numeration or counting, weighing, data collection, and graphing are the focus of this chapter. Students will collect a week's worth of classroom trash, sort it, count it, weigh it and extrapolate the amounts to include the entire school for the entire school year. Students will write descriptively about what they've done in math class in addition to learning correct letter writing format. They will write persuasive letters to adults urging them to recycle. Extensions of this activity include using the recycled material to create a "junk sculpture," decorating recycling boxes for other classrooms and writing instructions for their use, as well as a visit to a community recycling center.

## **CHAPTER EIGHT**

### Growing Plants

**PAGE 165**

This chapter centers on measurement and graphing. Students will grow either one classroom plant or bulb, or individual plants. They will estimate, measure and graph the growth on a regular basis. The writing component of this chapter involves keeping a scientific journal, an objective day-by-day account of what they see as their plant grows.

## **CHAPTER NINE**

### The White Elephant Sale

**PAGE 181**

"The White Elephant Sale" offers practical experience in using money. Students will bring several old toys or books to school for the purpose of selling them to classmates. They will gain experience with buying and selling, using money, pricing, and making change. The writing activity is a sequential writing paper entitled, "The White Elephant Sale: How We Did It!" This activity includes composing and writing ads prior to the sale urging fellow classmates to buy a particular piece of "merchandise." A classroom book incorporating the students' ads and articles can be published as well.

## A Potpourri of Ideas: Discovery Stations

This activity can be two or three days in length and requires setting up six “stations” throughout the classroom. Each station addresses a particular math concept. After their rotation through the six stations is complete, students will write a report about what they discovered. They will also write about their favorite activity and tell why they liked it.

# INTEGRATING MATH AND LANGUAGE ARTS

## Introduction

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**S**O OFTEN, WHEN MEETING WITH PARENTS OF STUDENTS IN ANY CLASSROOM, I've heard the comment, "Math! No wonder my child is having difficulty. I hated math too when I was a child." The activities in this book grew out of a philosophical base whose aim it is to transform the negative feelings many adults and children have towards math into a love of math and an appreciation for its usefulness in our everyday lives.

The United States is quickly moving out of first position as a global industrial leader, in part because of the lack of a skilled and prepared workforce. All too frequently, employers have to institute remedial writing and mathematics programs for new employees. Often students take only the minimum amount of math courses required for high school graduation. We can expect to compete in world markets in today's highly technological society only if American youngsters begin to see the value of advanced mathematics courses as well as overcome their fear or dislike of math.

We, as educators, parents and administrators, can excite and interest children in math, beginning with their earliest school experiences. As children discover the usefulness and pervasiveness of math in their everyday lives, they will become able to utilize and apply it with confidence and enjoyment. This book has been written to help a child begin his or her first steps toward reaching these goals.

### STATEMENT OF PURPOSE

**T**HE PURPOSE OF THIS BOOK IS TO PROVIDE TEACHERS a means by which to link together two ordinarily quite disparate subjects: mathematics and language arts. The National Council of Teachers of Mathematics, in the Standards (1989, page 26), states:

In grades K-4, the study of mathematics should include numerous opportunities for communication so that students can

- ▶ relate physical materials, pictures and diagrams to mathematical ideas;
- ▶ reflect on and clarify their thinking about mathematical ideas and situations



- ▶ relate their everyday language to mathematical language and symbols;
- ▶ realize that representing, discussing, reading, writing, and listening to mathematics are a vital part of learning and using mathematics.

The activities in this book are not designed to be a total curriculum. They can instead be used to supplement and complement any math curriculum. Most activities involve cooperative learning groups, either partners or small groups of three to four students. These groupings help students to build self-esteem, to complete a task and do it well, and to have successful experiences in school.

Students can be paired or grouped in many ways. You might pair a girl and a boy, a weaker and a stronger student, two students who are wearing the same color shirt or blouse, two students whose names begin with the same letter, or allow students to select their own partners. The possibilities are endless. You may also find that some students do not work well together, and you may have to assist those students so that they find suitable partners or are placed in groups that will function effectively.

This book consists of math-initiated projects which incorporate strong language arts components. The projects and activities are suitable for kindergarten, first, second, and third grade students. Parents, principals, administrators, and either math or language arts coordinators will find this book useful, helpful and exciting.

## HOW TO USE THIS BOOK

**T**he thesis that mathematics is part of our everyday lives—indeed, that it permeates our lives—will become readily apparent as one uses this book. Just think about going to the grocery store, figuring out the interest on a loan or savings account, computing mileage on your car, ordering from a catalogue, making a phone call, reading a graph in the newspaper, using a calculator, creating a budget, and so on. There are ten chapters arranged in a “school year” sequence—fall to spring. This arrangement enables the classroom teacher to use one chapter a month, September through June. Many of the projects or sets of activities last five to six school days. They employ materials commonly available in the classroom or easily brought from home. The projects contain interesting, engaging and exciting activities which promote active involvement using manipulatives. The mathematics concepts cover a wide variety of topics, ranging from number awareness to basic arithmetic operations, to fractions, geometry, using money, measurement, and graphing.

The written components of the chapters in this book incorporate a variety of skills, such as scientific journal writing and persuasive letter writing. Stress is placed upon the

use of correct capitalization and punctuation, as it is developmentally appropriate.

Together, the mathematics and language arts strands of this book fulfill the communication standard of the NCTM by facilitating meaningful mathematics learning while at the same time giving students the opportunity to clarify their thinking through written work. Any primary teacher, administrator, or parent who is interested in broadening mathematics teaching and extending math concepts to include cross-curricular activities will find this book useful.

In addition to linking mathematics and language arts, the monthly projects in this book provide ample opportunity for incorporating art projects, oral expression and even science and social studies concepts. The interesting part of all of this cross-curricular teaching is that mathematics is the initiating strand of the activity rather than being merely an afterthought—again vividly illustrating the fact that math is an integral and pervasive part of our everyday lives.

The chapters in this book are arranged in an easy-to-follow, “teacher-friendly” format for the busy primary teacher. The lessons, which are best implemented in a sequential order (as presented), are designed to be completed in forty-five minute to one hour classroom sessions. Each chapter contains a week’s worth or more of teacher instructions for both the math and language arts activities (art, science, and/or social studies where appropriate), student worksheets and ideas for extending the activities (again, when appropriate).

It would be useful to set up a book display using the activities bibliography found at the back of the book prior to beginning each lesson. Also, reading one of the suggested books would be an appropriate introduction or supplementary activity to “set the tone” for the chapter. Integrating books from the activities bibliography into the daily lessons would be another way to fully utilize the suggested book list.

A math-based literature bibliography can also be found in the back of this book. It will be particularly useful as it is divided into major headings, such as Problem Solving and Measurement, and then into subheadings such as estimation, number concepts and relationships, weighing, and time. Each chapter has references leading the teacher to those headings and subheadings which would be especially useful when teaching the designated concepts in that particular chapter.

Each chapter also contains instructions and illustrations for creating materials either for demonstration purposes or for specific student lessons. It would be helpful to try out the projects prior to teaching them to the students.

The author encourages students to be independent workers, students who can get what they need to begin to work. Therefore, materials are placed where students can pick them up. This procedure allows teachers to spend time teaching rather than distributing materials. It provides students with the opportunity to get up and move around for an acceptable reason. Setting up materials ahead of time enables the teacher to serve as a facilitator for learning rather than as an “impartor of knowledge.” The teacher sets up the

learning environment by placing materials where the students have easy access to them so that they can then “explore and discover.” The teacher is able to assist students by listening to and guiding conversations and by assessing through observation. These are practices that the NCTM standards advocate and that reflect the author’s general philosophy of children’s learning.

### **SUMMARY OF CHANGES IN CONTENT AND EMPHASIS IN K-4 MATHEMATICS**

Increased attention in instructional practices needs to be given to:

- use of manipulative materials
- cooperative work
- discussion of mathematics
- questioning
- justification of thinking
- writing about mathematics
- problem solving approach to instruction
- content integration
- use of calculators and “computers”

From *NCTM Curriculum & Evaluation Standards* (Reston, VA: 1989), page 20.

# CHAPTER ONE

## A Miniature Math Museum

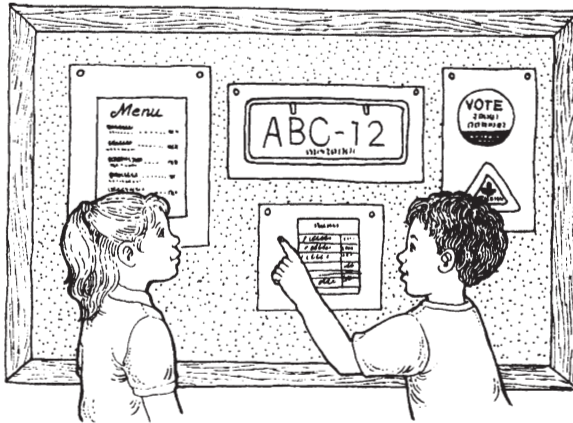
### INTRODUCTION:

The broad aim of this chapter is to enhance students' awareness of numbers. Progressing through the chapter may take a week or longer, but the individual activities take only a short part of the total math class time. (On the first day, the activity may take longer than on subsequent days.) A classroom display can be used at additional times throughout the year, particularly when studying measurement, fractions, and two- and three-dimensional shapes.

For this chapter, you may want to review books in the Mathematics-Based Literature Bibliography under the section entitled "Numbers." The references for "Numeration and Counting" and "Number Concepts and Relationships" should be especially helpful.

### DAY 1

#### Numbers on Display



### Math Objective:

Students will become aware of the prevalence and importance of numbers in daily life.

### Materials and Preparation:

1. Prepare a display area. This could be a bulletin board, a large sheet of butcher paper or a very large box top.
2. Cut out letters or make a strip sign that says "Room \_\_\_\_'s Miniature Math Museum."

3. Tell students to look around their homes for items with numbers on them that can be brought to school. Some examples include pages from a phone book or catalog, a bill for a meal at a restaurant, a grocery store receipt, an old automobile license plate, or a phone bill.
4. Prepare a 12" x 18" piece of tagboard for each student. Create an inch-wide border on each piece.

**Activity:**

Distribute one piece of tagboard to each student. Ask students to glue their items with numbers on them to the tagboard and decorate the border with mathematical symbols, shapes, patterns, or any other mathematical representation. Students may then bring their tagboard pieces to the display area one at a time. As they bring up their completed piece, have them tell the class about the numbers on it.