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Integration Of Children's Literature and Mathematics With Literature-Based Supplemental Activities in a First Grade Classroom

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in a First Grade Classroom

by

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The Essential Academic Learning Requirements developed by the various subject committees selected by the Washington State Commission on Student Learning and the recommendations made by the National Council of Teachers of Mathematics are addressed. The benefits of integrating children's literature and mathematics are studied. Integrated activities and an annotated bibliography of children's literature that could supplement a traditional mathematics curriculum for primary age students are developed.

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CHAPTER ONE

BACKGROUND OF THE PROJECT

Introduction

Legislators and educators throughout the nation have been focusing on student achievement as well as better methods to teach our students. The Washington State Commission on Student Learning (WSCSL) selected various subject advisory committees which developed the academic goals named the Essential Academic Learning Requirements (EALRs). The goals which were developed for mathematics are based upon the 1989 recommendations of the National Council of Teachers of Mathematics (NCTM). The NCTM's four generic standards are: mathematics as problem solving, mathematics as communication, mathematics as reasoning, and mathematics as connections (NCTM, 1989). The NCTM suggests that students participate in more reading, writing, and discussing of mathematical ideas with each other, and not just crunch numbers together in silent practice (cited in Whitin, 1992). It is through curriculum reform, new teaching methods, and integrating real-life learning experiences into mathematics, that the standards set by the WSCSL and the NCTM can be achieved. According to Whitin (1992), the use of children's literature in the classroom is the most powerful vehicle for meeting the new goals in mathematics.

Purpose of the Project

The purpose of this project is to integrate children's literature to supplement and enhance the MathLand mathematics curriculum currently being used in the author's school district. Supplementing the

MathLand curriculum will be done with activities using literature-based children's books in which mathematical concepts are embedded in the stories. The development of these activities will allow students to realize mathematics is a part of their every day life, while also using manipulatives to strengthen existing skills. These activities will also provide meaningful and stimulating learning experiences which will strengthen mathematical problem solving, communication, reasoning skills, and connections.
This project will consist of two components:

1. Mathematics activities and worksheets that are based on children's literature that will be used to supplement the MathLand mathematics curriculum currently being used in the author's district.
2. An annotated bibliography of children's literature that could be used to supplement a primary mathematics curriculum.

Significance of the Project

This project will provide the author and the author's colleagues with numerous children's literature books and techniques to enhance student learning and achievement in mathematics while aligning these with the recommendations of the WSCSL and the NCTM. This project was developed after comparing the recommendations of the WSCSL's Essential Academic Learning Requirements' Benchmarks for grades four, seven and ten, and the NCTM's standards with the current mathematics curriculum in the author's school district. It will allow students to realize mathematics is a part of their every day life, while using hands-on manipulatives to provide meaningful and stimulating learning experiences to strengthen their

mathematical problem solving, communication, reasoning, and connections skills.

Limitations of the Project

This project will not provide a complete children's literature bibliography, and it will not include all the possible activities for each book that could be used to supplement a mathematics curriculum. The supplemental mathematics activities will be a review and extra practice of concepts already learned, not an introduction to new concepts. These activities will be aligned with the NCTM's recommendations and Washington State's EALRs, though they may not be aligned with every states' mathematical outcomes.

Definition of Terms

Essential Academic Learning Requirements: Academic standards developed by various subject committees and mandated by Washington State which provide educators with specific benchmark levels for students to meet in grades four, seven and ten.

Integration: Connecting and bringing together as a whole the inclusion of children's literature and the process of mathematics.

Literature-Based Activities: Activities which are based on a selected children's literature book that show integration of subjects (such as reading and mathematics).

Manipulatives: Objects which assist students in mathematical computation and problem solving. The may include various types of counters, such as linker cubes and teddy bear counters, and plastic money.

Overview of the Remainder of the Project

Chapter Two will provide a review of related literature which pertains to the integration of children's literature and mathematics. Chapter Three will describe the procedures used to develop and organize the project. Charter Four consists of the project. It contains mathematics activities and worksheets based on children's literature that will strengthen the students' existing skills in problem solving, communication, reasoning, and connections to real-life mathematical situations. Chapter Four also contains an annotated bibliography of children's literature that could be used to supplement a primary mathematics curriculum. Chapter Five provides a summary and the author's recommendations, and conclusions.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter will review the integration of children's literature and mathematics to introduce and teach mathematical concepts in early childhood education programs. According to Findell (1996), international test results indicate that students in the United States are not measuring up to world standards in mathematics education. Our country is very concerned about the mathematical competence of our young children. Studies show a slight improvement in the mastery of basic facts, though there still appears to be no marked progress in the areas of problem solving and critical thinking (Whitin, 1992). The mathematical system is too abstract for many students to understand (Whitin, 1992). Many students view mathematics as a series of rules to follow or facts to memorize and most students have not been able to relate mathematics to their own lives (Whitin, 1994). Mathematics needs to be highlighted as a natural part of a student's daily living, in and out of the classroom. If the truth were known "most kids do not equate math with fun. The mere mention of the word arithmetic can conjure up horrifying visions of homework assignments, tests or working at the chalkboard in front of the class" (Maughan , 1996, p. 30).

The primary goal of a mathematics program should be to encourage the students to think like mathematicians while integrating mathematics into students' daily lives (Whitin, 1992, 1994). To attain this goal, the author examined three areas. The first was the

recommendations set forth by The National Council of Teachers of Mathematics (NCTM). The second was The Essential Academic Learning Requirements (EALRs) published by The Washington State Commission on Student Learning (WSCSL), and third, the research and practice of using children's literature to introduce, teach, and practice mathematical concepts was examined.

The National Council of Teachers of Mathematics

In the Curriculum and Evaluation Standards for School Mathematics document, the NCTM (1989) advocates significant changes in mathematics instruction. Four generic standards proposed by the NCTM are problem solving, communication, reasoning, and connections. The NCTM has set five mathematical goals for all students:

1. Students will learn to value mathematics
2. Students will become confident in their own ability
3. Students will become problem solvers
4. Students will communicate mathematically
5. Students will reason mathematically. (p. 5-6)

The NCTM recommends that students should have opportunities to be problem posers as well as problem solvers. Educators are urged to provide children with opportunities to represent mathematical ideas in many different ways, such as, numerically, writing, drawing, and discussion. Mathematics should be viewed as a way of thinking, not as a series of rules to be mastered. The NCTM recognizes the importance of experiences that allow all students to realize that doing mathematics "is a common human activity" (NCTM, 1989 p. 6). It also

advocates the use of children's literature as a vehicle for communicating mathematical ideas.

The Washington State Commission on Student Learning

The WSCSL is another group that has been focusing on reforming the way we teach. The WSCSL has published the Essential Academic Learning Requirements (EALRs) for each subject. In the area of mathematics, there are five requirements:

1. The student understands the basic concepts and procedures of mathematics.

   To meet this standard, the student will:

   1.1 understand and apply concepts and procedures from number sense

   1.2 understand and apply concepts and procedures from measurement

   1.3 understand and apply concepts and procedures from geometric sense

   1.4 understand and apply core concepts and procedures from probability and statistics

   1.5 understand and apply concepts and procedures from algebraic sense

2. The student uses mathematics to define and solve problems.

   To meet this standard the student will:

   2.1 investigate situations

   2.2 formulate questions and define the problem

   2.3 construct solutions

3. The student uses mathematical reasoning.

   To meet this standard the student will:

3.1 analyze information

3.2 predict results and make inferences

3.3 draw conclusions and verify results

4. The student communicates knowledge and understanding in both everyday and mathematical language.

To meet this standard, the student will:

4.1 gather information

4.2 organize and interpret information

4.3 represent and share information

5. The students understands how mathematical ideas connect to other subject areas and real-life situations.

To meet this standard, the student will:

5.1 relate concepts and procedures within mathematics

5.2 relate mathematical concepts and procedures to other disciplines

5.3 relate mathematical concepts and procedures to real-life situations. (Washington State Commission on Student Learning, 1997, p. 53-55)

Research and Practice

The integration of children's literature and mathematics in the school curriculum can be justified for several reasons. Whitin (1992) says, it is "through books learners see mathematics as a common human activity, which can be used in various contexts" (p. 4). Children's literature provides a fun, non-threatening way to explore and extend mathematical thinking, while also developing the four basic skills of

reading, writing, mathematics, and oral communication. It is through their own explanations that students gain new knowledge about mathematical concepts, and teachers learn more about students' level of understanding than through correct or incorrect answers to routine computations (Findell, 1996). Math-related children's literature allows students to view mathematics as a natural part of their every day life. Mathematics can no longer be referred to as workbook pages, but must become a purposeful tool for solving problems and making decisions. Whitin and Wilde (1992), believe children's literature restores a meaningful context to the use of numbers, since mathematical concepts are naturally embedded in stories. Integration of children's literature and mathematics is a powerful way to implement many of the changes that the NCTM proposed in the Curriculum and Evaluation Standards for School Mathematics document (NCTM, 1989). According to Whitin (1992, 1994), children's literature encourages learners to be mathematical problem solvers, supports learners in reasoning mathematically, provides a meaningful context for children to communicate mathematically, as well as building the learner's confidence in their own mathematical capabilities. According to Whitin (1992, 1994), children will value mathematics and realize it is a part of their every day life as they learn mathematical concepts and relate it back to their own world.

Mathematics as a language can be celebrated through children's literature. Children's literature teaches reading, as well as enriching learning and language development. Gailey (1993), suggests that mathematics and language skills develop simultaneously as students listen, read, write, and talk about mathematical ideas. The NCTM advocates, " learning to communicate mathematically" as an essential

goal for mathematics instruction (1989, p. 5). According to the NCTM's professional teaching standards (1991), teachers foster communication in mathematics when they ask students to clarify and justify their answers, remain neutral when incorrect answers are given, and encourage students to react to each other's ideas. This is very similar to goal four of the EALRs for mathematics which states, "the student communicates knowledge and understanding in both everyday and mathematical language" (WSCSL,1997, p. 54). Teachers provide a natural, meaningful context for encouraging students to talk and write about mathematics when literature is shared regularly in the classroom (Lewis, 1993).

Children's literature demonstrates that mathematics develops out of human experience. The NCTM has recommended that students engage in "varied experiences related to the cultural, historical and scientific evolution of mathematics" (1989, p.5). The use of multicultural children's literature can encourage students of all backgrounds to experience a variety of perspectives. According to Karp (1994), critical for students' meaningful mathematics learning have been investigations of actual situations from their own real-world experiences, or those described by children from similar cultural backgrounds.

Goal three of the EALRs for mathematics states "the students uses mathematical reasoning" (WSCSL, 1997, p. 54). Reasoning mathematically is enhanced through the integration of children's literature. According to Whitin (1992), no book fosters this spirit of mathematical reasoning better than Anna's Hat Trick by Anno. In this children's book there is a series of logical puzzles that involve trying to deduce the color of the hat one character is wearing based on both the color hat that the other characters are wearing and on whether those

other characters can deduce what color their own hats are. "Strategies that involve acting out and creating drawings are important for problem solving and support learners in trying to eliminate possibilities and to think deductively" (Whitin, 1992, p. 25).

Number sense can be developed through the reading of children's literature. The NCTM (1989) recommends that estimation and number sense be considered important goals in school mathematics. The various dimensions that need to be encouraged are: developing number meaning, exploring number relationships with manipulatives, understanding the relative magnitude of numbers, developing referents for measuring common objects, and building a sense about the relative effect of operating on numbers.

Many mathematical concepts are taught during kindergarten through third grade. Harsh (1987) suggested that many prenumber skills are emphasized at kindergarten which include classification, ordering, conservation of number, cardinal number, or number recognition. After examination of a number of instructional objectives for mathematics programs, the experts suggested there are ten strands of concepts taught in kindergarten through third grade (Smith & Wendelin, 1981). These include positional concepts, geometric concepts, measuring concepts, size concepts, time concepts, money concepts, numeral names and counting, ordinal numbers, quantity concepts, and arithmetic operations. Smith and Wendelin (1981) maintain these concepts facilitate in the development of number sense.

Children's literature generates many opportunities for contextual problem solving. Smith (1996) suggested that the contextual problems embedded in children's literature provide challenges, are thought

provoking, and are within reach of elementary students when there is classroom discussion and the opportunity to use multiple solutions. Researchers have found that children's literature fosters the idea of mathematical problem solving as well as enhancing thinking skills (Gailey,1993; Lewis, Long, & Mackay, 1993; Whitin, 1992, 1994). The NCTM advocates that "problem solving should be the central focus of the mathematics curriculum" (1989, p. 23). Students should be able to think and solve the problems that occur as a result of daily living, and see mathematics involved in daily life. According to Leitze (1997), connecting problem solving and literature is one way to achieve simultaneously several of the NCTM's standards.

Integration of children's literature and mathematics can be an effective way to tap into the abilities of all students. According to Harsh (1987), teachers should be careful when choosing children's literature, and suggested using the following criteria:

1. Book illustrations and written text should be accurate and portray mathematical ideas correctly.
2. Book illustrations should be attractive and appeal to young children.
3. Book illustrations should be appropriate in size and detail in keeping with the developmental characteristics of young children.
4. Written text of the books should be easily understood and interesting to young children. (p. 24-25)

Jennings, Jennings, Richey, and Dixon-Krauss (1992) conducted a study to test the hypothesis that using children's literature to teach mathematical concepts to kindergartners improved their math

achievement test scores, increased their interest in mathematics, and increased the number of times they use mathematical vocabulary during free-play. The subjects, from two different school districts in north-central Arkansas, were 61 kindergarten children, 32 females and 29 males, ranging in age from five years, six months, to five years, nine months. The students were divided into four groups, two control groups and two experimental groups at each school. The intervention that was used on the experimental groups were 20 children's books which were integrated into the mathematics curriculum for a period of five months. The control groups were taught using the traditional mathematics curriculum. At the beginning and the end of the study, testing was completed using the Test of Early Mathematics Ability (TEMA), and the Metropolitan Readiness Test (MRT), as well as observations of vocabulary usage during free-play. The pre- and posttest mean scores on the TEMA showed the experimental group had a mean pretest score of 8.41 and a mean posttest score of 23.41 points. The control group had a mean pretest score of 7.94 and a mean posttest score of 13.69 points. The experimental group had much more growth (15.00 points) than the control group (5.75 points). During free-play observers tallied both groups mathematical vocabulary usage. The experimental groups were observed using specific mathematical vocabulary 2,007 times, while the control groups used specific mathematical vocabulary 371 times. According to Jennings, et al (1992), this study demonstrated the positive effect of using children's literature to teach mathematics to kindergarten students. Comments made by all those involved, which included teachers, parents, other significant adults, and the children themselves reflected an increase in their interest in mathematics.

Summary

Integration of children's literature and mathematics is recommended by experts in mathematics and researchers of young children. Children's literature encourages thinking about mathematical concepts in many areas of the school curricula. According to Smith, "Literature selections that encourage teachers and children to make authentic connections between mathematics and other curricular areas are essential" (1995, p. 288). Integrating curriculum areas allows children to see that all areas of the curriculum are related and allows for children to see how mathematics is an important part of the world around them.

Students need to meet the goals and standards set by the NCTM, and also those set by the WSCSL. Included in their goals, the WSCSL stated, "students must also develop the ability to be independent thinkers who can solve real-life problems and keep up with the latest developments. And students must see the connection between their studies and their world" (1997, p. 3). Integration of children's literature and mathematics will help students develop the necessary skills to be independent thinkers, and solve real-life problems while connecting their studies to the world around them. According to Whitin (1992), the use of children's literature in the classroom is the most powerful vehicle for meeting the new goals in mathematics.

CHAPTER THREE

PROCEDURES OF THE PROJECT

The process used to develop this project consisted of several steps. Prior to the development of this project, the author spent many hours looking for children's literature books which would link with and enhance the mathematical curriculum being used in her school district. These books needed to have mathematical concepts embedded in the stories to be of benefit during a mathematics lesson. From this experience, the idea for the project was conceived.

First, the author located research and literature regarding the integration of children's literature and mathematics. These journal and research articles were obtained through the use of the Internet and the Educational Resources Information Service (ERIC) computer search. Also located was an annotated list of children's books in mathematics titled, The Wonderful World of Mathematics by Diane Thiessen, Margaret Matthias, and Jacquelin Smith.

Second, a background of the project was written which included the purpose and rationale of the study. The author identified some inconsistencies between the NCTM and the WSCSL standards and the MathLand mathematics curriculum being used in her school district.

Third, the author listed the ten units of the district's MathLand curriculum and separated the concepts taught in each unit. From this, the information from The Wonderful World of Mathematics helped the author to create an annotated list of children's literature titles which would enhance and supplement each unit in the MathLand curriculum. The titles

chosen for each unit have a mathematical concept embedded in the story, though some titles may address several mathematical concepts. While this annotated bibliography of children's literature titles was developed with the Mathland curriculum in mind, it should be noted that the bibliography of children's literature titles could be used to supplement any primary mathematics curriculum.

Fourth, the NCTM's recommendations and the WSCSL's EALRs were considered.

Finally, mathematical activities and worksheets were developed based on the titles chosen from the children's literature annotated bibliography. The author chose these titles based on the connection to the specific mathematics lesson and the author's perceived quality of the book.

CHAPTER FOUR

THE PROJECT

Project Organization

The organization of this project is based on the mathematics curriculum "MathLand", adopted in 1996 by the author's school district, and consists of two parts. The first part contains a listing of the ten mathematical units of the "MathLand" curriculum with their key mathematical ideas. The author also chose ten children's literature books, one for each unit and developed activities to teach the key ideas and mathematical concepts which are embedded in the stories. The activities for each book are aligned to the NCTM goals and to the EALRs. The worksheets and supplemental materials developed for the titles can be found in each unit section.

The second part of the project consists of an annotated list of children's literature in mathematics for each unit based upon the key mathematical ideas. These key mathematical ideas listed at the top of each unit page are directly from the "MathLand" curriculum.

While not all school districts have adopted "MathLand" as their curriculum, it should be noted that the children's literature bibliography would be a useful resource for any primary mathematics teacher.

Math Units

- **Unit #1** — **All About Us**
  Collecting And Reporting Data
- **Unit #2** — **Snap, Clap**
  Early Experiences With Patterns
- **Unit #3** — **How Many?**
  Counting And Comparing Numbers to 20
- **Unit #4** — **Collections And Questions**
  Problems And Games For Logical Thinking
- **Unit #5** — **Number Combinations**
  Constructing Number-Pair Relations
- **Unit #6** — **Making Comparisons**
  Experiences With Length, Balance, And Time
- **Unit #7** — **Equations**
  Communication Mathematical Situations
- **Unit #8** — **Tens And Extras**
  Exploring Numbers to 100
- **Unit #9** — **Seeing Shapes**
  Explorations In Geometry And Visual Thinking
- **Unit #10** — **Take A Chance**
  Beginning Experiences With Probability

Unit #1
All About Us
Collecting And Reporting Data

One Hundred Is A Family

Written by Pam Munoz Ryan
Illustrated by Benrei Huang
Published by Hyperion Books for Children

This book explores and celebrates the meaning of family. The colorful illustrations by Benrei Huang depict families from different cultures. Whether gazing at the stars, planting a garden, or sharing a neighborhood street, the people in this book connect the ever-widening circles, creating families of community, heritage, and simple love and friendship. Children can practice counting first from one to ten and then by ten to one hundred.

Concepts that could be taught using this book are:

* counting by 1's to ten
* counting by 10's to one hundred
* estimation
* comparison
* graphing

ACTIVITY 1:

Objective: The students will estimate, count, and graph the total number of brothers and sisters their classmates have.

1. Read the book to the class. The teacher will record each students' estimation on chart paper. The students will draw on paper a picture of their brothers and sisters (p.21). Each student will count the brothers and sisters from their own drawing and report the data to the teacher. The teacher will add up the total and the class will compare the estimated number with the actual number. The class will then create a graph to determine if there are more brothers or more sisters. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1, 3.1, 3.2)

ACTIVITY 2:

Objective: The students will fill in the number of brothers and sisters they have on their drawing and report this data to the class by sharing their drawing.

2. As a culminating activity, make a class book of the students' drawings of their brothers and sisters. The students will count and fill in the correct number in the sentence frames: I have _____ brothers. I have _____ sisters (p.21). The students will share their data with the class. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1, 4.3)

Name _____

Brothers

I have ____ brothers.

Sisters

I have ____ sisters.

UNIT #1
All About Us
Collecting And Reporting Data

Key Mathematical Ideas

- **Organizing information makes it easier to talk about.**
- **Data can be presented using pictures and symbols.**

Bibliography of Children's Literature of Collecting and Reporting Data

Butler, A. (1994). *Mary wore her red dress.* San Diego, CA: Teaching Resource Center.

This book is a story about Mary and what she wore all day long. The item changes in the verse and children can make predictions. Concepts: collecting data, predicting.

Ryan, P. (1994). *One hundred is a family.* New York, NY: Hyperion Books for Children.

This book explores the many different meanings of the word family. Colorful pictures by Benrei Huang depict families from different cultures. Concepts: collecting data, numbers, counting from one to ten by ones, counting to one hundred by tens.

Simon, N. (1976). *Why am I different?* Morton Grove, IL: Albert Whitman & Company.

Some people can't each chocolate, and some are good at whistling. Some people are tall, some are short. People want different things for their birthdays. If we were all the same; it would be like seeing everything in gray-boring! Being different makes the world a colorful and exciting place. Concept: collecting data, differences.

Wright, A. (1997). *Alice in pastaland: A math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's The Adventures Of Alice In Wonderland, with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn

into this new world by a White Rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

Unit #2
Snap, Clap
Early Experiences With Patterns

Math Counts Pattern

Written by Henry Pluckrose
Illustrated by Chris Fairclough
Published by Children's Press

Wallpaper, tennis shoe soles, fabric, dishes, carpets, butterflies, leaves, and flowers - all these are illustrated in brilliantly colored photographs as examples of patterns in the world around us. Rotational and line symmetry are present in these patterns as well as in the examples using legos, pattern blocks, paper cutouts, paint and markers. This book should help readers become more aware of the patterns in the world around them and provide inspiration to create original designs.

Concepts that could be taught using this book are:

* counting
* patterning

ACTIVITY 1:

Objective: The students will be able to recall the various patterns illustrated in the book. The students will search the room for patterns and record their findings.

1. After reading the book, ask the students to recall the various patterns from the book. Then ask the students to search the room for patterns and record them on the worksheet (p.26). What are some other patterns they have seen? The students can record these on the same worksheet. The teacher may want to also chart some of the students' ideas. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1, 5.2, 5.3)

ACTIVITY 2:

Objective: The student will create a pattern picture with various colored pre-cut shapes. The students will write a sentence about their pattern and share it with the class.

2. Using various colored pre-cut shapes, have the students create a pattern picture on a large piece of construction paper. After the picture is completed, have the students write a sentence about their picture and allow each student to share their creation with the class. (NCTM goals 2, 4: EALRs Math 1.1, 4.1, 4.3)

Name _____

Patterns Around The Room

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Other Patterns I Have Seen

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

UNIT #2
Snap, Clap
Early Experiences With Patterns

Key Mathematical Ideas

- **Patterns can be expressed in a variety of ways; symbolically physically, verbally, and with objects.**
- **The same pattern can be translated from one medium to another.**
- **Two-dimensional patterns can be generated from linear patterns.**

Bibliography of Children's Literature of Pattern

Baker, K. (1991). *Hide and snake*. New York, NY: Voyager Books.

A wonderful picture book showing a snake traveling and twisting through various places. Students must really look at the pictures to see the snake and its pattern. Concept: patterning.

Cook, T. (1994). *So much*. Cambridge, MA: Candlewick Press.

Each time the door bell rings a new relative enters the house. Each new person wants to play with the baby. After some time with the baby, everyone sits and waits until the door bell rings again and the scenario is played out again. The pattern in this book's story line helps the reader to predict what will happen next in the story. Helen Oxenbury's delightful illustrations capture the joy and light hearted humor of the story. Concept: patterning.

Enderle, J.R., & Tessler, S. G. (1994) *Six snowy sheep*. New York, NY: Scholastic Inc.

This children's book is about six sheep playing in the snow. One by one, the sheep have an accident until only one sheep is left. Concepts: numbers, counting to six, reverse counting, subtraction.

Friedman, A. (1994). A cloak for a dreamer. New York, NY: Scholastic, Inc.

The tailor's three sons each take a challenge of constructing a quilted cloak for the king. Each uses a different geometric shape to construct his cloak. Two of the sons find success in their strategy, but one son lacks basic understanding of geometry. Concepts: square, triangle, circle, hexagon, patterning.

Kalan, R. (1995). *Jump, frog, jump!* New York, NY: Greenwillow Books.

Jump into measurement and patterning with this cumulative tale for young listeners. Concepts: measurement and patterning.

Maccarone, G. (1996). *The silly story of Goldie Locks and the three squares.* New York, NY: Scholastic Inc.

A version of *Goldie Locks and the Three Bears* only with geometric shapes instead. The children will enjoy looking for all the shapes. Concepts: patterning, geometric shapes.

Moroney, L. (1989). *Baby rattlesnake.* San Francisco, CA: Childrens Book Press.

A retelling of a Native American tale that weaves the study of linear pattern with a teaching tale about what happens when you get something before you're ready for it. Concept: patterning.

Murphy, S. (1996) *A pair of socks.* New York, NY: Scholastic Inc.

A colorful book of socks, which includes the task of trying to match the sock with another. Concepts: matching, patterning.

Pluckrose, H. (1988). *Math counts pattern.* Chicago, IL: Children's Press.

This book encourages children to look closely at patterns in their everyday surroundings. Thought provoking questions and colorful photos of common patterns found in urban and natural settings get students thinking about the practical and artistic uses of pattern.
Concept: patterning.

Sharratt, N. (1996). *My mom and dad make me laugh.* Cambridge, MA: Candlewick Press.

This lively story is packed with colorful patterns. Children will enjoy naming all that they see, as well as counting how many different patterns they can find in the story. The wild shapes and colors make this book a delight. Concept: patterning.

Sitomer, M. (1970). *What is symmetry?* New York, NY: Thomas Y. Crowell Company.

An introduction to symmetry, this author provides examples of symmetry. This book offers a good opportunity to integrate mathematics with science and art. Concept: symmetry.

Turpin, L. (1991). *The sultan's snakes.* New York, NY: Child's Play Ltd.

Beautiful and intricate patterns surround the sultan. As children look at the patterns in his world, they can find his clever snakes. This book will give children a good reason to describe the colorful, repeating designs of the sultan's world. Concept: patterning.

Williams, R. (1995). *The crayola counting book.* Cypress, CA: Creative Teaching Press.

The children will enjoy reading this book and counting the crayons on each page. Concepts: counting by ones, twos, five's and tens, sorting by color, patterning, tallying, comparing size, place value.

Unit #3
How Many?
Counting And Comparing Numbers to 20

The M & M's Counting Book

Written By Barbara Barbieri McGrath
Published by Charlesbridge Publishing

This yummy counting book teaches the numbers one to twelve, six colors of the M & M's candies, and three primary shapes: the circle, square and the triangle. Students are also introduced to the sets of twelve. In the last section of the book, students are introduced to subtraction as they eat the M & M's.

Concepts that could be taught using this book are:

* counting one to twelve
* addition
* subtraction
* number sets
* sorting
* estimation
* comparison
* graphing
* primary shapes: circle, square and the triangle
* colors

ACTIVITY 1:

Objective: The students will estimate the total number, count the total number, and sort by color a bag of M & M's candies.

1. Read the book to the class. Ask the class to estimate the total number of M & M's in a regular size bag. Chart the students' estimations and then explain to the children that every bag may not have the same number of candies in them. Then give each student a regular size bag of M & M's candies and ask them to count the total number. With younger children you may want to provide each student with a hundreds chart so they can place the M & M's candies on each number to help with counting (p. 32). Chart each student's count and compare the actual numbers of candies to the estimated numbers. Have the students sort the candies by color and

record their answers on the paper (p. 33). (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 1.4, 2.1)

ACTIVITY 2:

Objective: The students will make their own M & M's Counting Book using pre-cut colored circles for the numbers one to twenty.

2. Provide the students with 1 inch pre-cut colored circles and half sheets of paper. The students will paste the circles on each page and write the number, creating pages for the numbers one to twenty (p. 34). Staple the pages together and allow each child to share their favorite number page with the class. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Name _____

M & M's Sorting and Counting

red _____

yellow _____

green _____

orange _____

brown _____

tan _____

blue _____

UNIT #3
How Many?
Counting And Comparing Numbers To 20

Key Mathematical Ideas

- **Any number can be represented with objects in many different ways.**
- **Numerals are a way to record *how many*.**
- **The number sequence has many patterns and is a useful tool for comparing and ordering numbers.**

Bibliography of Children's Books of Counting and Comparing Numbers

Also see Number Combinations, Equations and Tens and Extras

Accorsi, W. (1992). *Billy's button.* New York, NY: Greenwillow Books.

Billy has lost his button and the reader is challenged to find Billy's button throughout the various events illustrated in this book. Buttons are used to illustrate all round objects in each illustration. Some buttons have one hole or two, three or five holes, but Billy's button has four holes exactly. Concepts: attribute of number, number concept of four, counting one to five, sorting.

Aker, S. (1990). *What comes in 2's, 3's, & 4's?* New York, NY: Scholastic Inc.

A counting book that takes a close look at how numbers 2,3, and 4 occur in our daily lives. This book invites the children to count and make comparisons. Concepts: numbers 2, 3, and 4.

Anno, M. (1977). *Anno's counting book.* New York, NY: Harper Collins.

This wordless picture book offers an introduction to numbers zero through twelve. Anno's beautifully illustrated pictures show the progressive growth of a village and the transformation of the town throughout the months and seasons of the year. Masterfully done, the reader will be delighted to discover the many objects that can be counted on each page (except for the page on zero!). Concepts: numbers and counting zero to twelve.

Anno, M. (1982). *Anno's counting house*. New York, NY: Philomel Books.

In Anno's Counting House the author masterfully illustrates the blending of art, imagination and mathematics! Two houses sit side by side. One is empty, one is full of ten people, five male and five female. One by one the occupants of the full house move to what is the empty house until all ten people have moved. Delightful detailed illustrations are sure to delight the reader. The author provides notes to the reader at the beginning of the book on how to use the book in counting games. At the end of the text he provides additional notes directed towards adults which explain children's cognitive growth and development of acquisition of number sense. Concepts: number sense, counting, conservation to ten.

Appelt, K. (1996). *Bat jamboree*. New York, NY: Scholastic Inc.

In this book a bat jamboree takes place every year. Children will start counting the batsfrom one to ten. Then the bats line up to make a pyramid of 55 bats. Concepts: number sense,counting to ten, and then to 55.

Baker, A. (1991). *Raps & rhymes in math*. Portsmouth, NH: Heinemann Educational Books.

This resource book is filled with rhymes, songs, riddles and finger plays that all have to do with mathematics. This book is geared toward use with primary age children. Concepts: counting, reverse counting, arithmetic, measuring, time, and probability.

Baker, A. (1994). *Gray rabbit's 1, 2, 3*. New York, NY: Kingfisher Books.

This colorful children's book is a counting book. Gray Rabbit makes animals, birds and insects from clay as he counts from one to ten. The children will enjoy the colorful pages as well as predicting what animal Gray Rabbit will make next. Concepts: prediction, counting to 10.

Bang, M. (1983). *Ten, nine, eight*. New York, NY: Greenwillow Books.

A count down book of a father helping his young daughter get ready for bed. Concept: reverse counting ten to one.

Base, G. (1988). *The eleventh hour*. New York, NY: Harry N. Abrams.

When Horace turns eleven, he decides to host a party for his friends. He prepares for the party by creating eleven different sorts of food and planning eleven games. Everyone comes dressed in costumes and has a wonderful time playing games. When the eleventh hour strikes and it is time to eat the feast, they discover the birthday feast has disappeared! The fanciful pictures and the rhyming text will capture the attention of the reader. Concepts: counting to eleven, time.

Beck, L. (1992). *Five little ducks*. New York, NY: Henry Holt and Company.

This book is based on a familiar children's song of five little ducks who go swimming over the hills and far away. Each time mama duck calls her children back less ducklings come back than started out. Concept: reverse counting from five to one.

Blumenthal, N. (1989). *Count-a-saures*. New York, NY: Scholastic, Inc.

Blumentahl uses the scientific names for ten kinds of dinosaurs to show numbers one through ten. Illustrations by Jay Kaufman. Concepts: numbers and counting one to ten.

Bogart, J. (1989). *10 for dinner*. New York, NY: Scholastic, Inc.

This book explores the different number combinations of 10. Margo describes the detail of her birthday party: 5 guests came at 5:00, 2 came at 5:10, 2 came at 5:15, but one guest arrived early. Concepts, counting, number combinations, time.

Boyton, S. (1977). *Hippos go berserk*. Boston, MA: Little, Brown and Company.

"One hippo all alone, two hippos on the phone..." It isn't long before the lonely hippo is overrun with hippo company. The hippos go beserk and party all night long. Concepts: numbers and counting one to nine, reverse counting.

Brown, M. (1976). *One, two, three: An animal counting book*. Boston, MA: Little, Brown and Company.

A beginning counting book. Brown illustrates animals in groups of one to twenty. Numbers are hidden within the design of each animal. Concept: numbers one to twenty.

Butler, C. (1988). *Too many eggs*. Boston, MA: David R. Godine, Publisher.

An interactive book where the reader is encouraged to place paper eggs into Mrs. Bear's mixing bowl as she mixes a cake for Mr. Bear's birthday surprise. But why does everyone run for cover? They know that bears can't count and that means disaster when it comes to baking! Illustrated by Meg Rutherford. Concepts: counting, measuring and arithmetic.

Calmenson, S. (1991). *Dinner at the panda palace.* New York, NY: HarperCollins Publishers.

This children's counting book with entertaining illustrations describes in rhyme the animal customers who come to dine at the Panda Palace. Among the quests are two carsick lions, three pigs running from a wolf, and six roof painting giraffes. Fifty-five diners have stuffed the restaurant when one last guest, a mouse, comes through the door. Mr. Panda, the proprietor, must find a seat for this final guest. Concepts: counting, arithmetic.

Carle, E. (1968). *1, 2, 3, to the zoo: a counting book.* New York, NY: Philomel Books.

This counting book colorfully illustrates train cars carrying increasing numbers of animals, on their way to the zoo, Beginning with the train engine, each car is individually displayed, along with the numeral for the number of animals in the car. The numerals progress from one to ten. For review, a smaller version of the train towing the previously pictured cars is displayed at the bottom of each page. The final page is a fold-out portraying all the animals having finally arrived at the zoo. Concepts: counting to ten, arithmetic.

Carle, E. (1972). *The very hungry caterpillar.* New York, NY: Scholastic Inc.

The very hungry caterpillar sets out to find some food. On Monday he ate through one apple. On Tuesday he ate through two pears. He continues eating each day of the week until he doesn't feel good and isn't hungry. Then he turns into a beautiful butterfly. Concepts: counting from one to five, the days of the week.

Carle, E. (1972). *The rooster who set out to see the world.* New York, NY: Franklin Watts.

A rooster decides he would like to see the world. He doesn't get very far before he begins to feel lonely. The rooster invites some new acquaintances to go along on his adventure around the world. When evening comes the traveling band finds that none have prepared very well for their journey. With nothing to eat, and no place to sleep, the fellow travelers decide to return to their homes. Concepts: counting forwards and backwards between one and five.

Carter, D. (1988). *How many bugs in a box?* New York, NY: Simon and Schuster Books.

A pop-up book filled with some creepy surprises! Each page is constructed in such a way that different kinds of bugs pop out of the box. Concept: counting to ten.

Charosh, M. (1974). *Number ideas through pictures.* New York, NY: Thomas Y. Crowell Company.

This book presents mathematics through play. It addresses odd and even numbers, and square and triangle numbers. Giulio Maestro provides the illustrations for this text. Concepts: odd and even numbers, triangular numbers, addition, subtraction.

Crews, D. (1968). *Ten black dots.* New York, NY: Scholastic Inc.

This children's book asks the question, "What can you do with ten black dots? " A simple yet powerful question can be answered with a world of possibilities. Concepts: counting to 10, logical thinking, visual thinking.

Cole, N. (1994)). *Blast off! : a space counting book.* Watertown, MA: Charlesbridge Publishing.

This picture book is a counting book for those who dare to count where no one has gone before. The rhyming text begins with zero, then invites the children to count one, two, buckle your astronaut shoe. Three, four, close the spaceship door. They also count six stars, seven rockets, and eight moons. When they reach twenty, the book helps children count to 100 by tens, and then to one trillion by thousands, millions and billions. Finally the children count backwards to return to zero. Concepts: counting to twenty, counting to one hundred, large numbers, arithmetic.

Christilow, E. (1991). *Five little monkeys sitting in a tree.* New York, NY: Clarion Books.

Five little monkeys go on a picnic with their mother. While she naps, the monkeys have fun teasing the crocodile. One by one the monkeys disappear after each attempt of the crocodile to snatch them off a tree branch. Concepts: reverse counting from five, subtraction.

Cristaldi, K. (1996) *Even Steven and odd Todd.* New York, NY: Scholastic Inc.

Even Steven likes only even numbers: 2, 4, 6, 8, 10, 12, and so on. Odd Todd likes only odd numbers: 1, 3, 5, 7, 9, 11, 13 and so on. Concept: even and odd numbers.

de Regniers, B. (1985). *So many cats!* New York, NY: Clarion Books.

This is a story of how a family comes to own twelve cats. there are lots of opportunities to count throughout the book as the reader tries to keep track of how many cats belong to the family. Concepts: counting to twelve, a dozen.

Dunrea, O. (1989) *Deep down underground.* New York, NY: Macmillan Publishing Company.

The movement of a mole as he tunnels his way underground has a rippling effect on the movement of nine other groups of creatures that live under the surface of the earth. Wonderful illustrations of a view of the life underground, this book is sure to be a delight to children. Concepts: counting forwards and backwards from one to ten.

Ehlert, L. (1990). *Fish eyes.* San Diego, CA: Voyager Books.

A neon bright colored book of fish eyes to count from one to ten. Concept: counting from one to ten.

Enderle, J. R.., & Tessler, S. G. (1994) *Six snowy sheep.* New York, NY: Scholastic Inc.

This children's book is about six sheep playing in the snow. One by one, the sheep have an accident until only one sheep is left. Concepts: numbers, counting to six, reverse counting, subtraction.

Ernst, L. (1986). *Up to ten and down again.* New York, NY: Lothrop, Lee & Shepard Books.

A family is going on a picnic. From the arrival at the picnic site, to the departure due to a rainstorm, the author uses objects from each scene to show a different set of numbers. Concepts: numbers, counting one to ten, reverse counting.

Farber, N. (1979). *Up the down elevator.* Reading, MA: Addison-Wesley Publishing Co.

At the first floor, one passenger gets into onto the elevator. Up the elevator goes ten floors, stopping at each floor to pick up new passengers. The pictures are done in black, white and gray. Concepts: counting and number concept.

Feelings, M. (1971). *Moja means one.* New York, NY: Penguin Books.

This book is beautifully illustrated and white drawings of African scenes lends the interest in learning to count to ten in Swahili. Concept: counting one to ten.

Fleming, D. (1992) *Count!* New York, NY: Henry Holt and Company.

Bold and colorful, this book illustrates numbers one to fifty through the animal theme. Fleming's use of brilliant colors against a contrasting background practically makes his paintings jump off the page! Concepts: numbers, counting to ten, counting ten to fifty by tens.

Ga'g, W. (1929). *Millions of cats.* New York, NY: Coward-McCann.

A farmer goes off to find a cat for his wife, but when he comes across millions of cats, he can't decide which cat is the most beautiful. He decides to let all of them follow him home. How will they ever be able to feel all those cats? Concept: large numbers.

Giganti, P. (1992) *Each orange has 8 slices.* New York, NY: Scholastic Inc.

By asking readers to count sets and subsets of delightfully illustrated animals and objects, this book has children doing repeated addition, a fundamental step towards understanding multiplication. Concepts: numbers, sets of numbers, addition, multiplication.

Gill, S. (1997). *Count Alaska's colors.* Homer, AK: Paws IV Publishing.

This brightly illustrated book illustrates addition, subtraction, and the colors for young readers. each page displays the number of Alaskan animals or plants of the numeral found on the preceding page. The page also includes an additional animal or plant mostly hidden or smaller on the page's corner and/or in the surrounding foliage or terrain. The mostly hidden or smaller animal or plant illustrated addition or subtraction. The color of the highlighted animal or plant is featured in the first sentence. The second sentence draws the readers attention to an additional animal on the page. The arithmetic expression is also printed on the page. Concepts: addition, subtraction, color, counting.

Grossman, V. (1991). *Ten little rabbits.* San Francisco, CA: Chronicle Books.

This unusual counting book celebrates Native American culture as well as various Native American traditions. Weaving, fishing, and storytelling are all a part of this book as it teaches young children to count from one to ten. Concept: counting from one to ten.

Grover, M. (1988). *Amazing and incredible counting stories.* San Diego, CA: Browndeer Press.

Unbelievable newspaper headlines of a missing skyscraper, inflatable pickles, carrot icicles, and dancing refrigerators. The bright pictures and silly news stories are sure to delight students and keep them counting. Concepts: numbers and counting, 1 to 25, 50, 75 and 100.

Hague, K. (1986). *Numberbears.* New York, NY: Scholastic Inc.

The teddy bears in this book count from one to twelve with great ease in this rhyming book. Children will enjoy the teddy bear pictures as well as the rhyming verse. Concept: counting to twelve.

Hamm, D. (1991). *How many feet in bed?* New York, NY: Aladdin Paperbacks.

A family of five enjoy a morning of laughter and fun as each family member climbs in and out of the parent's bed. One child keeps track of how many people are in the bed by counting each pair of feet. Concepts: counting by twos to ten, reverse counting by twos from ten to zero.

Hammond, F. (1987). Ten little ducks. New York, NY: Scholastic Inc.

A wonderful counting book to the number ten which encourages children to count the pictures as the teacher reads the pages. Concept: counting from one to ten.

Hoban, R. (1974). *Ten what? A mystery counting book.* New York, NY: Charles Scribner's Sons.

Amusing characters are on a mysterious mission. Each page provides the reader with many opportunities to count. Concept: counting to ten.

Hoban, T. (1972). *Count and see.* New York, NY: Collier Books.

Black and white photographs of items are used to present number concepts and promote counting from one to fifteen, then twenty to fifty by tens. Concepts: counting, number concept.

Hoberman, M. (1973). *The looking book.* New York, NY: Alfred A. Knopf.

Ned has lost his cat and goes looking for him through the pages of this book. The story line is written in rhyming verse which adds interest to this text. Concept: counting one to twenty-eight.

Howard, K. (1979). *I can count to 100...can you?* New York, NY: Random House.

A little mouse teaches the reader how to count to one hundred by ones. Numbers one to twenty are counted by objects. Twenty to thirty are demonstrated through addition establishing the pattern needed to count on to one hundred. Colorful pictures and easy text. Concepts: number concepts one to thirty, counting by ones from one to one hundred, addition.

Hulme, J. (1991). *Sea squares.* New York, NY: Hyperion Books.

Pre-multiplication and square numbers. It is an ocean full of fun to go from basic counting to learning how to square numbers. The frolicking rhymes and intriguing, full color illustrations provide students real opportunities to count from 1 to 10, and at the same time be introduced to early multiplication. Concepts: counting from one to ten, multiplication.

Hughes, S. (1985). *When we went to the park.* New York, NY: Lothrop, Lee & Shepard.

When a little girl and her grandfather go for a walk in the park, they encounter many things to count. Concepts: numbers, counting one to ten.

Hutchings, A. & Hutchings, R. (1997). *The gummy candy counting book.* New York, NY: Scholastic Inc.

This books shows different kinds of gummy candy and counts to twelve. Sets and beginning multiplication are also mentioned. Concepts: counting to twelve, number sets and multiplication.

Hutchins, P. (1982). *1 hunter.* New York, NY: Greenwillow Books.

A nearsighted hunter walks past two elephants, three giraffes, and continue on passing number after number of hidden animals. He finds a surprise when he turns around and discovers that there is a whole jungle of animals who are tracking him! Concepts: counting, sequencing numbers one to ten.

Katz, M. (1990). *Ten potatoes in a pot.* New York, NY: Harper and Row Junior Books.

A collection of counting rhymes dealing with numbers from one to twelve. Colorfully illustrated by June Otani. Concepts: number concept, counting.

Keats, E. (1971). *Over in the meadow.* New York, NY: Scholastic Inc.

Keats illustrates this old Southern Appalachian counting rhyme which relates the activities of various animals that live in a meadow. Concept: numbers, counting one to ten.

Kitchen, B. (1987). *Animal numbers.* New York, NY: Dial Books.

Primarily a picture book of animals and numbers, the text takes numbers one through ten, illustrating each number concept with a mother animal and a correlating number of off spring. After the number ten, the examples jump to fifteen, twenty-five, fifty, seventy-five, and one hundred. Concepts: numbers one through ten, fifteen, twenty-five, fifty, seventy-five and one-hundred.

LeSieg, T. (1961). *Ten apples up on top.* New York, NY: Random House.

Three animals challenge each other to balancing apples on top of their heads. First one, then two and on until all are balancing ten apples up on top of their heads. The new challenge is to perform stunts without letting the apples drop. This is a humorous and action packed book. Concepts: counting one to ten, counting by tens to one hundred.

Leuck, L. (1997). *My baby brother has ten tiny toes.* Morton Grove, IL: Albert Whitman & Company.

This illustrated children's counting book centers around a cheerful baby boy and his affectionate older sister. In this story told in rhyme, the numbers one to ten are introduced as the older sister counts her baby brother's body parts and possessions. Concepts: counting one to ten, arithmetic.

Lewin, B. (1981). *Cat count.* New York, NY: Dodd, Mead & Company.

Lewin uses comical black and white drawings of cats to relay a rhyming account of all the cats she knows. Her brother has two cats, her sister has three, her uncle has four, and on it goes. A running tally is kept of how many cats there are altogether. Would you believe there are over fifty-five cats in this book? Concepts: counting one to ten, addition.

Lindbergh, R. (1987). *The midnight farm.* New York, NY: Dial Books for Young Readers.

While under the blanket of night, a mother and child stroll about the farm. There they discover domestic and wild animals peaceful and protected by friendly darkness. This counting rhyme story has wonderful illustrations that lend to the tranquil feeling of this book. Concept: counting one to ten.

Long, L. (1997). *Domino addition.* New York, NY: Scholastic Inc.

A math game and counting book that takes advantage of the natural understanding of addition that children gain from a set of dominoes. First, students learn to use simple addition to find the total number of dots, zero to twelve on each domino. Then they see if they can find the dominoes with each total hidden in the picture. Concepts: counting, addition.

MacMillan, B. (1986). *Counting wildflowers.* New York, NY: Lothrop, Lee & Shepard.

MacMillan uses photographs of wildflowers to show number sets. Each page shows a different set of numbers. Concepts: counting from one to twenty, number sets.

Maestro, B. (1977). *Harriet goes to the circus.* New York, NY: Crown Publisher.

Harriet wants to be first in line at the circus so she can have the best seat. The line grows longer, then suddenly someone opens the door at the opposite end of the line. Now Harriet is last in line. Concept: ordinal numbers first through tenth.

Mathews, L. (1978). *Bunches and bunches of bunnies.* New York, NY: Scholastic Inc.

This counting rhyme, illustrated with hundreds of bunnies, is a perfect first book of numbers and beginning multiplication. Concepts: counting from one to one hundred forty-four, multiplication from one to twelve.

Mayer, M. (1978). *Little monster's counting book.* New York, NY: Golden Press.

Mercer Mayer uses a whole cast of monsters to show numbers one through twenty-one. Questions are posed on each page to encourage the reader to count objects in the pictures. Concepts: numbers, counting one to twenty-one, reverse counting ten to one.

McGrath, B. (1994). The m&m's counting book. Watertown, MA: Charlesbridge Publishing

This book teaches the numbers one to twelve, six colors, and three primary shapes: the circle, square, and triangle. At the end of the book, the children will have fun practicing subtraction. Concepts: addition, subtraction, counting one to twelve, number sets, sorting.

Medearis, A. (1993). *Picking peas for a penny.* New York, NY: Scholastic Inc.

Picking Peas for a Penny is a rhythmical, richly lyrical counting rhyme and a biographical poem filled with heartwarming memories about the author's mother Angeline, her uncle John, and life on their grandparents' farm during the Depression. Concepts: counting from one to ten, money.

McMillan, B. (1996). *Jelly beans for sale.* New York, NY: Scholastic Inc.

A photo essay that shows how different combinations of pennies, nickels, dimes, and quarters can buy varying amounts of jelly beans. Concept: counting, money.

Merriam, E. (1996). *12 ways to get to 11.* New York, NY: Simon & Schuster Books.

This charming book illustrates different combinations of objects, people, and animals that can be added together to make eleven. It's great for introducing addition of three and four numbers. It will also encourage the children to look for things in their surroundings to count. Concepts: counting from one to eleven, addition.

Moore, J. (1991). *Six-dinner sid.* New York, NY: Simon & Schuster Books.

Sid the cat is a pet of six different owners, but no one knows except for Sid. He enjoyed six different dinners a day, has six different beds to choose from and six different people to scratch him. He discovers this is not a bad life until he gets a cold and is taken to the vet's six times. Concept: counting from one to six.

Moncure, J. (1985). *My five book.* Chicago, IL: Childrens Press.

This book is about a boy named Five, Five has many adventures which involve finding five carrots in the garden, chasing rabbits, fishing and more. Children will enjoy relating to the boy's activities, and the arithmetic challenges put forth in the story line. Concepts: number concept of five, addition, subtraction.

Moniker, J. (1985). *My four book.* Chicago, IL: Childrens Press.

This book is about a boy named Four. Four visits the zoo and discovers all the animals are in groups of four. Concepts: number concept of four, addition, subtraction.

Moncure, J. (1985). *My one book.* Chicago, IL: Childrens Press.

This book is about a boy named One. One lives in a one room house that has one chair and one table. He has one of everything he owns, and everything he does, he does one time, giving the reader a lot of opportunity to explore the concept of one. Concepts: number concept of one, addition, subtraction.

Moncure, J. (1985). *My two book.* Chicago, IL: Childrens Press.

This book is about a girl named Two. Two lives in a two room house that has two windows. She goes for a walk and has lots of adventures discovering many things in groups of two. Concepts: number concept of two, addition, subtraction.

Nol, S. (1984). *Off and counting.* New York, NY: Greenwillow Books.

A wind-up toy frog hops and leaps over a number of toys to show numbers one through ten. Concepts: numbers, counting one to ten.

O'Donnell, E. (1989). *I can't get my turtle to move.* New York, NY: Morrow Junior Books.

A little girl can get three kittens to move, six inchworms to munch on a leaf, even ten rabbits to nibble on lettuce, but she can't get her turtle to come out of its shell. Concepts: numbers, counting one to ten.

O'Keffe, S. (1989). *One hungry monster.* New York, NY: Scholastic Inc.

One by one monsters go looking for something to eat. Just what does one feed to a hungry monster? A counting book in rhyme sequencing numbers from one to ten. Concept: counting one to ten.

Pallotta, J. (1997). *The icky bug counting book.* Watertown, MA: Charlesbridge Publishing.

This book begins with zero, noting there are zero bugs on that page, and proceeds through twenty-six varieties of icky bugs. After readers have counted twenty-six army ants, they turn the page and learn that the book counts up to twenty-six, so there is one icky bug for each letter of the alphabet - backwards. Concepts: counting from one to twenty-six, addition, the alphabet.

Pluckrose, H. (1995) Math counts counting. Chicago, IL: Childrens Press.

This book encourages students to practice counting using interesting photographs. There is also thought provoking questions and colorful illustrations. Concepts: counting, larger numbers.

Pluckrose, H. (1995). *Math counts numbers.* Chicago, IL: Childrens Press.

The photographs and text in this book have been chosen to encourage talk about topics that are essentially mathematical. By talking, the young reader can explore some on the central concepts that support mathematics. Concept: numbers.

Reid, M. (1990). *The button box.* New York, NY: Scholastic, Inc.

Grandma's button box holds much more than just buttons. There are favorites to sort and count, like and unlike to compare. Textures tell tales of where some buttons come from or the clothes they once adorned. This book is an excellent resource for introduction to sorting and classifying. Concepts: counting, sorting and classifying.

Reiss, J. (1991). *Numbers.* Scarsdale, NY: Bradbury Press.

A brightly colored picture counting book that begins by sequencing numbers from one to twenty, then goes on to count by tens to one hundred. Concepts: counting from one to twenty, counting to one hundred by tens.

Ryan, P. (1994). *One hundred is a family.* New York, NY: Hyperion Books for Children.

This book explores the many different meanings of the word family. Colorful pictures by Benrei Huang, depict families from different cultures. Concepts: collecting data, numbers, counting from one to ten by ones, counting by twos, counting to one hundred by tens.

Ryan, P. (1996). *The crayon counting book.* Watertown, MA: Charlesbridge Publishing.

This picture book encourage children to count and read numbers from one to twenty-four. The book is divided into two parts with a page for each number. The first section covers the even numbers from zero to twenty-four, counting by two's. accompanied by sentences using vocabulary important for developing number sense. The second section develops the odd numbers and uses descriptive words relating to the colors as the theme for the narrative. Concepts: counting from zero to twenty-four, odd and even numbers.

Slater, T. (1996). *Stay in line.* New York, NY: Scholastic Inc.

The children will observe in this book how one dozen children can be grouped in different ways. Seeing how to take apart a number and put it together in different ways helps children to develop and understanding for numbers. Concepts, counting to twelve, one dozen, number combinations.

Smith, M. (1995). *Counting our way to Maine.* New York, NY: Orchard Books.

The family's vacation trip to Maine begins with packing one baby, two dogs, and three bicycles into the family car. The story goes on recounting twenty memorable events of the trip. Wonderfully illustrated the pictures add to the humor of the book. Concepts: number sense, counting from one to twenty.

Szekeres, C. (1994). *Cyndy Szekeres' counting book 1 to ?.* New York, NY: Golden Books.

A beginning counting book with delightful illustrations of active field mice whose numbers increase on each page. Concepts: numbers, counting from one to ten.

Tafuri, N. (1986). *Who's counting?* New York, NY: Greenwillow Books.

An introductory book of counting one to ten with pictures of animals and flowers to illustrate the concept of each number. Large, beautiful watercolor illustrations fill the entire page throughout the book. Concepts: numbers, counting from one to ten.

Testa, F. (1982). *If you take a pencil.* New York, NY: Dial Press.

This imaginative book that begins with one pencil and ends with twelve treasure chests. Concepts: numbers, counting from one to twelve.

Tildes, P. (1995). *Counting on calico.* Watertown, MA: Charlesbridge Publishing.

This book uses the story of a mouse to discuss the characteristics of cats while counting from one to twenty. The story begins with one tail and describes what a tail is used for and how you can determine the cat's behavior from its tail. As you move through the numbers you come to eleven birds to watch, which discusses the cat's hunting instincts. Finally, there are twenty paw prints which lead to the mouse who runs away to hide. Concepts: counting from one to twenty.

Tudor, T. (1956). *1 is one.* New York, NY: Macmillan Publishing Co.

This Caldecott Honor book starts at one and ends counting at twenty. Children will love the wonderful illustrations and also enjoy counting the pictures on each page. Concepts: counting from one to twenty.

Wadsworth, G. (1997). *One on a web: Counting animals at home.* Watertown, MA: Charlesbridge Publishing.

This picture book helps young readers count from one to twenty as they meet a score of creatures inside their homes. The book is illustrated with large scale paintings that depict four beavers swimming toward their lodge, twelve piglets in their pen, and fourteen penguins in their rookery. Concepts: counting from one to twenty.

Walsh, E. (1991). *Mouse count.* New York, NY: Scholastic Inc.

The mice are playing in the meadow while watching out for snakes, but then they get sleepy and forget about the snakes. The illustrations in this book are cut-paper collage. Concepts: counting from one to ten, reverse counting from ten to one.

Walton, R. (1983). *How many, how many, how many.* Cambridge, MA: Candlewick Press.

This engaging book will capture children's interest as they guess the answer to familiar trivia from nursery rhymes to science facts. Each answer is a number and is represented in each picture. Concepts: numbers, counting from one to twelve.

Warren, C. (1983). *The ten-alarm camp-out.* New York, NY: Lothrop, Lee & Shepard Books.

Mama armadillo loves even numbers and a straight line. She also loves picnics and camp-outs, but the latest outings with her little ones causes a panic with the unsuspecting towns people. Concepts: counting from one to ten, opportunity for addition and subtraction.

Wild, R. (1978). *The bears' counting book.* New York, NY: Harper & Row Publishers.

A play on the classic *Goldie Locks and the Three Bears,* the three bears go for a walk and discover a farmhouse where no one is home. They try out the chairs, beds, and food, then move on to investigate other household items and personal belongings they find in the house. Each room has a different number of things to count. They even find things to count when their curiousity takes them outside. Concepts: counting by ones from one to ten, counting by tens from twenty to fifty.

Williams, R. (1995). *The crayola counting book.* Cypress, CA: Creative Teaching Press.

The children will enjoy reading this book and counting the crayons on each page. Concepts: counting by ones, twos, fives and tens, sorting by color, patterning, tallying, comparing size, place value.

Williams, R. (1995). *Spiders, spiders everywhere.* Cypress, CA: Creative Teaching Press.

The children will enjoy this counting spider book. They will count in reverse from ten to one. Concept: counting in reverse from ten to one.

Wise, W. (1993). *Ten sly piranhas.* New York, NY: Scholastic Inc.

A counting in reverse and subtraction book about ten piranhas that eat one fish at a time. In the end, the old crocodile eats the last piranha. Concepts: Counting in reverse from ten to one, subtraction.

Write, A. (1997). *Alice in pastaland: a math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's *The Adventures Of Alice In Wonderland,* with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn into this new world by a White rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

Yolen, J. (1976). *An invitation to the butterfly ball.* New York, NY: Parents' Magazine Press.

A counting rhyme relating a story of animals getting ready for the Butterfly Ball. Concepts: counting from one to ten, reverse counting.

Yolen, J. (1994). *Old dame Counterpane.* New York, NY: Philomel Books.

First she sews the sun, then the sky, the seas, and the flowers, the animals, and the people. As each day passes, a new marvelous part of the world appears on Old Dame Counterpane's quilt. On the tenth day the world is complete. The verse in this book will encourage children to count along as Old Dame Counterpane's quilt unfolds. Concept: counting from one to ten.

Ziefert, H. (1997). *Bears odd, bears even.* Penguin Books USA Inc.

How many bears do you need for a basketball game? How many do you need for each team? Which number is odd, and which is even? This book encourages independent reading while introducing the concept of odd and even numbers. Concept: Numbers, odd and even numbers.

Unit #4
Collections And Questions
Problems And Games For Logical Thinking

Pigs Will Be Pigs

Written by Amy Axelrod
Illustrated by Shirley McGinley-Nally
Published by Simon & Schuster Books for Young Readers

Bright colors and wild busy prints dominate the illustrations of the Pig family and their zany antics as they search their home for enough money to buy dinner at their favorite restaurant. As they hunt for money Mrs. Pig finds two nickels, five pennies, and one quarter to add to the two dollar bill that Mr. Pig has hidden in his socks. The piglets found six dimes in the toy chest, a dollar bill on the book shelf, and two hundred pennies in their penny collection. After finding more money they set off for the Enchanted Enchilada. Complete with appetizers, soups, salads, desserts, beverages, and specialties, the menu that the waitress hands them is reproduced on a separate page at the end of the book. The problem solving questions posed at the book's end involve how much money the Pigs found, spent and had left. The reader is also encouraged to choose other menu items that would cost the same amount of money.

Concepts that could be taught using this book:

* problem solving
* money
* counting by ones (pennies), five's (nickels), and tens (nickels)

ACTIVITY 1:

Objective: The student partner groups will count the money in their bag and choose various menu items that they wish to buy.

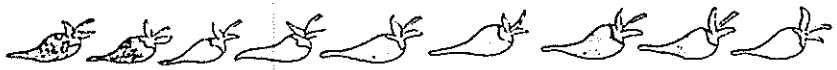
1. Read the book to the class. Provide each partner group of two students with enough play money to purchase various menu items from the menu in the book (p. 54 & 55). Allow each child to count the money and have several opportunities to decide which menu items to purchase with the play money. Then let each group make up their own dessert menu. Provide food magazines for the students

to cut and paste the pictures when developing the menu. Each group will decide the price of the items on their menu and allow the students to "pretend" to purchase an items. from the various menus. As a final activity you may want to make ice cream sundaes with various kinds of ice cream and toppings at different prices. The students must then use problem solving techniques , counting and addition and subtraction skills to determine if they have enough money to purchase the flavors of ice cream and kind of toppings they want. (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 2.1, 2.2, 2.3, 5.3)

ACTIVITY 2:

Objective: The students will earn play money from the teacher for performing various helpful tasks during a two week period and keep a record of their earnings. The students will decide which items to purchase from the teacher's store.

2. The students and the teacher will brainstorm ideas of how to earn money in the classroom. The teacher will chart this and the class will agree on these. Over a two week period the students will keep a record of the money they have earned on the "Money Record S Sheet" (p. 56)and place their coins in a container in their desk. The teacher will develop a store with pencils, erasers, individual crayons and markers, scissors, pieces of construction paper and small containers of glue. On a specified day the students may purchase items of their choice by determining if they have enough money. The students may also choose to "save" their money if they don't have enough to purchase what they want. This activity could last for two weeks or as long as the teacher and the students want to continue it. (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 2.1, 2.2, 5. 3)



APPETIZERS

Nacho chips with salsa $ 1.50

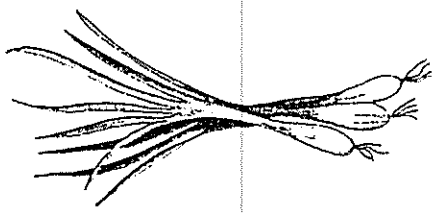
Stuffed jalapeños $ 2.00

EGG DISHES

Huevos rancheros
ranch-style eggs
(tortillas topped with fried eggs, spicy chili sauce, grated cheese, and sliced avocado) $ 2.99

Migas
scrambled eggs with tostado
(eggs scrambled with pieces of crispy tortilla, tomato, fried pepper, onion, and garlic) $ 2.99

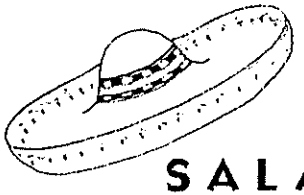
All egg dishes served with green-chili corn bread.



SOUPS

Black bean Cup $ 1.25
Bowl $ 2.25

Chef's special
(a hearty soup of potato, cheese, and green chilis)
Cup $ 2.00
Bowl $ 3.00



SALADS

Salad bar
Make your own tostados—top crispy tortillas with black beans, chili sauce, grated cheese, chopped tomatoes, and lettuce. Finish with sour cream.

With dinner $ 1.99
Salad bar only $ 2.99

Taco salad
(mixed green salad with spicy dressing in a crispy tortilla bowl) $ 2.99

Tax and tip included

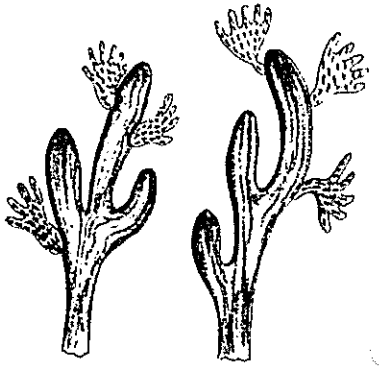
TORTILLA SPECIALTIES

Cheese enchiladas
(3 corn tortillas filled with cheese and red chili sauce—served with southwestern rice) $ 4.99

Guacamole enchiladas
(3 corn tortillas filled with guacamole and green chili sauce—served with southwestern rice) $ 4.99

Bean burritos
(3 flour tortillas wrapped around frijoles refritos and grated cheese—served with southwestern rice) $ 4.99

Chimichangas
(3 deep-fried bean burritos topped with salsa and guacamole—served with southwestern rice) $ 4.99



MEXICAN PIZZA

Large $ 3.99
Small $ 2.99

SIDE DISHES

Colache
southwestern succotash
(string beans, corn, tomatoes, summer squash, and hot green chilis) $ 3.00

Calavacitas
(summer squash, corn, onions, garlic, and chilis) $ 3.00

Quelites
(spinach and pinto beans with scallions, garlic, and chilis) $ 3.00

Texas caviar
(marinated black-eyed peas) $ 1.50

Frijoles refritos
(refried pinto beans) $ 1.50

DESSERTS

Sopaipillas
deep-fried honey puffs $ 2.00

Flan
custard $ 1.50

Biscochitos
Mexican cookies $ 1.50

Natillas
islands of meringue on custard $ 2.50

Deep-fried ice cream
(chocolate or vanilla) $ 2.00

Fresh mango/papaya $ 2.00

BEVERAGES

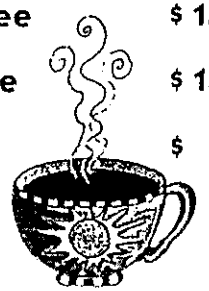
Cola glass $ .75
pitcher $ 2.00

Frozen delight
(strawberry or mango) $ 2.25

Mexican coffee $ 1.00

Regular coffee $ 1.00

Tea $ .75



TODAY'S SPECIAL

Cup of chef's special soup

Combo of:

1 cheese enchilada
1 guacamole enchilada
1 chimichanga

(served with southwestern rice and green-chili corn bread)

Unlimited visits
to our salad bar

Coconut smoothie

Sopaipillas or
deep-fried ice cream

Coffee/tea

ALL FOR ONLY $ 7.99
Tax and tip included

Name _____

$ Money Record Sheet $

	tally	$
pennies	_____	_____
nickels	_____	_____
dimes	_____	_____
quarters	_____	_____
half-dollar	_____	_____
dollars	_____	_____

UNIT #4
Collections And Questions
Problems And Games For Logical Thinking

Key Mathematical Ideas

- **Objects can be sorted based on one or more defined attributes.**
- **Making an organized recording is helpful in finding all the solutions for a problem.**

Bibliography of Children's Literature of Problems and Games For Logical Thinking

Anno, M. (1982). *Anno's math games II.* New York, NY: Philomel Books.

A sequel to Anno's Math Games book, this book uses whimsical elfish characters to challenge the readers thinking and observations of the world around him. Easy to read, Math Games II contains five chapters. Chapter one deals with relationships and the use of abstract symbols to represent real objects. Chapter two deals with comparison, chapter three deals with dots and coordinates, chapter four number value, and in chapter five, measurement. Concepts: relationships, comparison, direction, number concepts, measurement.

Axelrod, A. (1994). *Pigs will be pigs.* New York, NY: Simon & Schuster Books for Young Readers.

Perplexing pig problems! Join the hungry Pig family as they turn the house upside down looking for enough money to buy dinner at the local restaurant, the Enchanted Enchilada. And then after they get there, help them figure out how much they spent and if they get any change back. Concepts: money, problem solving.

Barner, B. (1995). *Space race.* New York, NY: Rooster Books.

Two robots have a race to build a structure to blast off to space using various shaped building materials. Written in rhyming verse with colorful, simple illustrations. The book deals with problem solving with geometrical shapes. Concepts: problem solving, geometrical shapes.

Burningham, J. (1980). *The shopping basket*. Chicago, IL: Childrens Press.

This classic picture book follows Steven in his adventure to the store. This book offers numerous opportunities to involve children in its reading, from remembering the items on the boy's shopping list to predicting the outcome of each of his encounters with the animals along the way. Concepts: money, problem solving.

Crews, D. (1968). *Ten black dots*. New York, NY: Scholastic, Inc.

This children's book asks the question, "What can you do with ten black dots? " A simple yet powerful question can be answered with a world of possibilities. Concepts: counting to 10, logical thinking, visual thinking.

McGrath, B. (1994). The m&m's counting book. Watertown, MA: Charlesbridge Publishing

This book teaches the numbers one to twelve, six colors, and three primary shapes: the circle, square, and triangle. At the end of the book, the children will have fun practicing subtraction. Concepts: addition, subtraction, counting, number sets, sorting.

Reid, M. (1990). *The button box*. New York, NY: Scholastic, Inc.

Grandma's button box holds much more than just buttons. There are favorites to sort and count, like and unlike to compare. Textures tell tales of where some buttons come from or the clothes they once adorned. This book is an excellent resource for introduction to sorting and classifying. Concepts: counting, sorting and classifying.

Shaw, N. (1991). *Sheep in a shop*. Boston, MASS: Houghton Mifflin.

Another adventure for these shopping sheep! As they hunt for a birthday present and reek havoc at the shop, they discover they are short of cash to make their purchase. Oh, what to do! The children can help to solve the problem. Concepts: money, problem solving.

Wells, R. (1997). *Bunny money*. New York, NY: Dial Books for Young Readers.

The latest in the Max and Ruby series, this book tells their story as they go on a birthday shopping trip for grandma. Their walletful of money diminishes with each step along the way---will they have enough left to buy the present? Concepts: money, problem solving.

Williams, R. (1995). *The crayola counting book.* Cypress, CA: Creative Teaching Press.

The children will enjoy reading this book and counting the crayons on each page. Concepts: counting by ones, twos, fives and tens, sorting by color, patterning, tallying, comparing size, place value.

Winthrop, E. (1986). *Shoes.* New York, NY: Harper & Row.

Shoes, shoes and more shoes are sorted by size, type and style in this adorable rhyming book. Children will enjoy the illustrations of little people sporting shoes for all the seasons as they explore classification. Concepts: classification, sorting, graphing.

Wright, A. (1997). *Alice in pastaland: A math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's *The Adventures Of Alice In Wonderland*, with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn into this new world by a White rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

Unit #5
Number Combinations
Constructing Number-Pair Relations

Dinner At The Panda Palace

Written by Stephanie Calmenson
Illustrated by Nadine Bernard Wescott
Published by Scholastic Inc.

The animals are coming to the Panda Palace for dinner. Mr. Panda's first guest, an elephant, requests, "I'm enormously hungry. My bag weighs a ton. I would like to sit down. Do you have a table for one?" Mr. Panda greets and seats each group of diners, from one hungry elephant, two royal lions, three pigs, and four proud peacocks, to mother hen and her nine chicks that fill a table for ten. The illustrations are lively and humorous: the pigs are eating corn; the bears have honeycombs; Mrs. Hen and her chicks are perched on chairs. As dinner closes, various guests are seen with bags carrying extras inside.

Concepts that could be taught using this book are:

* counting
* addition
* number-pair relations

ACTIVITY 1:

Objective: The students will make a "Dinner At The Panda Palace" addition page with two different animals at the restaurant. The students will draw the restaurant and use two different animal stamps. They will write the addition equation on the paper.

1. Read the book to the class. Have the students name the animals in the book and show them the animal stamps they are going to use. Explain that they are going to make a page for a class book. The page will show the restaurant and there will be two different kinds of animals eating together which will be the addition problem (example: 2 bears and three elephants equals 5 animals). The teacher may want to assign the students the addition problem so that most of the pages are different. Hand out the "Dinner At The Panda Palace" paper (p. 62), stamps and the stamp pads . After

the students are finished , let them share their page and then bind the pages together for a class book. NCTM goals 1,2, 3, 4, 5; EALRs 1.1, 2.3)

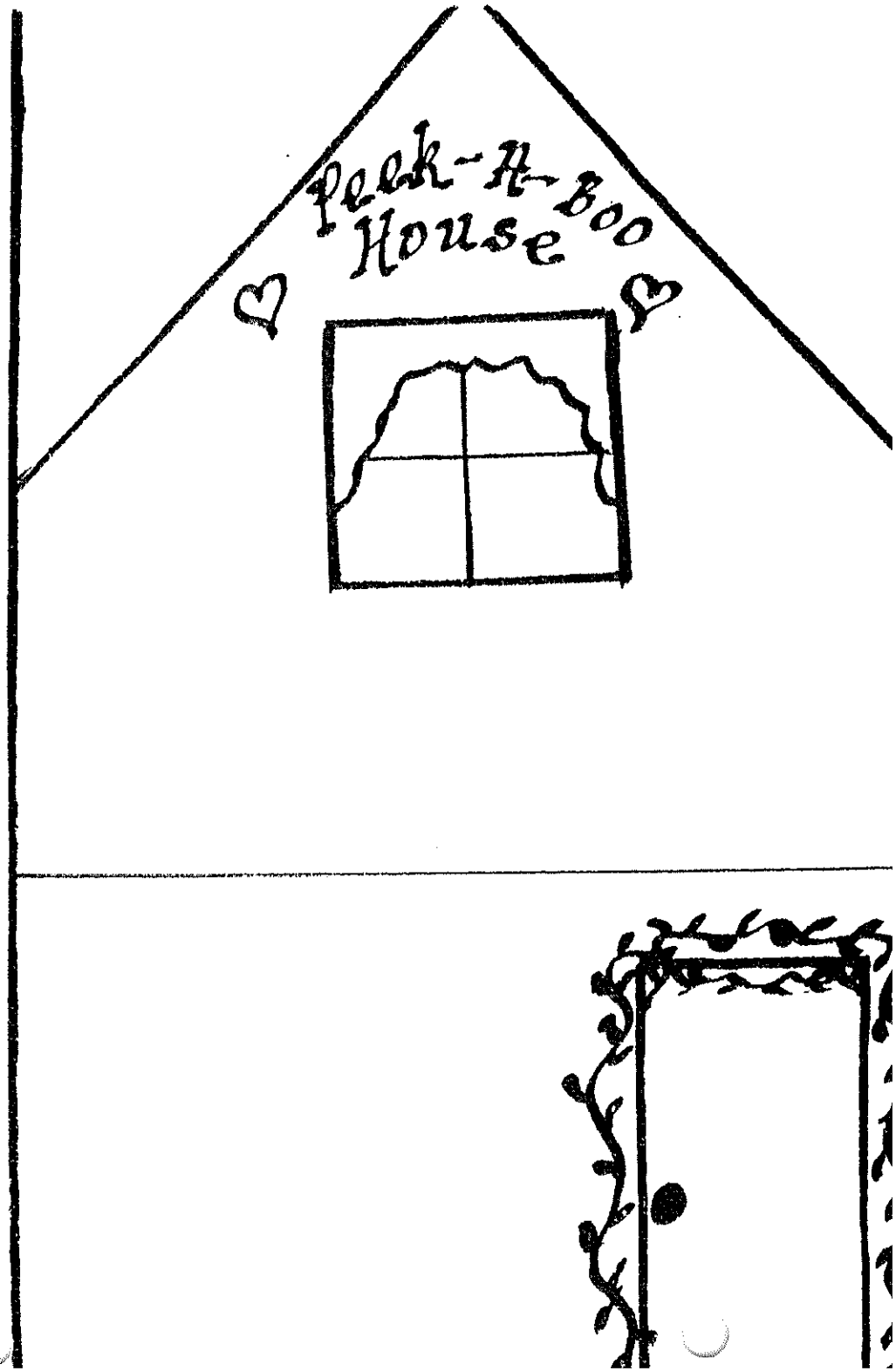
ACTIVITY 2:

Objective: The students will make "Peek-A-Boo House" books using various animal stamps for the combinations of the number 8, (example: 8 and 0, 7 and 1, 6 and 2, 5 and 3, 4 and 4, and the opposites 0 and 8, 1 and 7, 2 and 6, and 3 and 5). Some of the animals will be upstairs and some will be downstairs.

2. The students will make a house for each combination of 8 (or any number(s) you'd like). Show the students the "Peek-A-Boo" paper (p. 63) and explain that they need to fold it in half, cut the upper left and right corners (through both layers) along the black line and write the number 8 on the front door. Next they cut through the single top paper on the black line that divides the house into an upstairs and a downstairs. Then they are to use the animal stamps and make 9 pages with the various number combinations of eight. Allow students to share one favorite page when they are finished and encourage them to share their pages at home. (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 2.1, 2.2, 2.3,

Dinner At The Panda Palace

by _____


Peek-A-Boo
House

UNIT #5
Number Combinations
Constructing Number-Pair Relations

Key Mathematical Ideas

- **Number pairs can be used to describe another number (for example, *4 and 2* is another way to say 6).**
- **If a number of a group of objects is known and some are hidden, the number of objects remaining can be used to determine how many are hidden.**

Bibliography of Children's Literature of Number Combinations

Anno, M. (1982). *Anno's math games II.* New York, NY: Philomel Books.

A sequel to Anno's Math Games book, this book uses whimsical elfish characters to challenge the readers thinking and observations of the world around him. Easy to read, Math Games II contains five chapters. Chapter one deals with relationships and the use of abstract symbols to represent real objects. Chapter two deals with comparison, chapter three deals with dots and coordinates-ordinates, chapter four number value, and in chapter five, measurement. Concepts: relationships, comparison, direction, number concepts, measurement.

Blumenthal, N. (1989). *Count-a-saures.* New York, NY: Scholastic, Inc..

Blumentahl uses the scientific names for ten kinds of dinosaurs to show numbers one through ten. Illustrations by Jay Kaufman. Concepts: numbers and counting one to ten.

Bogart, J. (1989). *10 for dinner.* New York, NY: Scholastic, Inc.

This book explores the different number combinations of 10. Margo describes the detail of her birthday party: 5 guests came at 5:00, 2 came at 5:10, 2 came at 5:15, but one guest arrived early. Concepts, counting, number combinations, time.

Boyton, S. (1977). *Hippos go beserk.* Boston, MA: Little, Brown and Company.

"One hippo all alone, two hippos on the phone..." It isn't long before the lonely hippo is overrun with hippo company. The hippos go beserk and party all night long. Concepts: numbers and counting one to nine, reverse counting.

Calmenson, S. (1991). *Dinner at the panda palace.* New York, NY: Harper Collins Publishers.

This children's counting book with entertaining illustrations describes in rhyme the animal customers who come to dine at the Panda Palace. Among the guests are two carsick lions, three pigs running from a wolf, and six roof painting giraffes. Fifty-five diners have stuffed the restaurant when one last guests, a mouse, comes through the door. Mr. Panda, the proprietor, must find a seat for this final guest. Concepts: counting, arithmetic.

Pluckrose, H. (1995) Math counts counting. Chicago, IL: Childrens Press.

This book encourages students to practice counting using interesting photographs. There is also thought provoking questions and colorful illustrations. Concepts: counting, larger numbers.

Pluckrose, H. (1995). *Math counts numbers.* Chicago, IL: Childrens Press.

The photographs and text in this book have been chosen to encourage talk about topics that are essentially mathematical. By talking, the young reader can explore some on the central concepts that support mathematics. Concept: numbers, combinations.

Ryan, P., Pallotta, J. (1996). *The crayon counting book.* Watertown, MA: Charlesbridge Publishing.

This picture book encourages children to count and read numbers from one to twenty-four. The book is divided into two parts with a page for each number. The first section covers the even numbers zero to twenty-four, counting by two's, accompanied by sentences using vocabulary important for developing number sense. The second section develops the odd numbers and uses descripitive words relating to the colors as the theme for the narrative. Concepts: counting from zero to twenty-four, odd and even numbers.

Slater, T. (1996). *Stay in line.* New York, NY: Scholastic Inc.

The children will observe in this book how one dozen children can be grouped in different ways. Seeing how to take apart a number and put it together in different ways helps children to develop and understanding for numbers. Concepts: counting to twelve, one dozen, number combinations.

Williams, R. (1995). *The crayola counting book.* Cypress, CA: Creative Teaching Press.

The children will enjoy reading this book and counting the crayons on each page. Concepts: counting by ones, twos, fives and tens, sorting by color, patterning, tallying, comparing size, place value.

Unit #6
Making Comparisons
Experiences With Length, Balance And Time

How Big Is A Foot?

Written by Rolf Myller
Illustrated by Rolf Myller
Published by Bantam Doubleday Dell Publishing Group, Inc.

As a surprise for the queen's birthday, the king decides to have a bed made for her. (Beds haven't been invented yet; so it will really be a surprise). The large king marks off the dimensions for the proposed bed with his feet. He gives the dimensions to the head carpenter who gives them to his little apprentice. When the bed is delivered, it is too small, and the apprentice is jailed. From his jail cell, the apprentice solves the problem, and everyone lives happily ever after.

Concepts that could be taught using this book are:

* measurement
* estimation
* counting

ACTIVITY 1:

Objective: The student partner groups (2 students) will look around the room and record on paper by writing or drawing various items that they estimate are a foot long. The student partner groups will then measure with the ruler or tape measure and record the actual length of each item. The students will share the actual length of one of the items with the class.

1. Read the book to the class. The teacher will introduce a tape measure and a ruler which will be used during this activity. The students will write down or draw a picture of various items that they estimate are a foot long (p. 68). They will measure each item with the ruler or tape measure and record the actual length on the paper. The students will share the actual length of one of the items with the class. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1, 1.2, 2.1, 2.3, 3.2, 4.3, 5.3)

ACTIVITY 2:

Objective: The students will estimate, measure and record the actual length of their own shoe. The students will then estimate, measure and record the length of a pair of size 17 basketball shoes (or any large shoes, size 11 or above).

2. The students will estimate the length of their own shoe and record their guess on paper. Next they will take their shoe off and trace around it on white construction paper. Then they will measure it and record the actual length on paper (p.69). The students will record their estimate of the length of the large shoes and the teacher will chart the estimations on paper. The teacher will trace around the size 17 shoes and the students will take turns measuring the shoe shape with their tape measure. The students will record their findings on paper. The class will discuss the findings and whose estimate was closest to the actual length. (NCTM goals 1, 2, 3, 4, 5; EALRs 1.1, 1.2, 2.1, 2.3, 3.2, 4.3, 5.3)

Name _____

Measurement

How Long Is A Foot?

item	estimate	actual
1._____	_____	_____
2._____	_____	_____
3._____	_____	_____
4._____	_____	_____
5._____	_____	_____
6._____	_____	_____

Name _____.

Length Of My Shoes

Estimate _____ Actual _____

Length Of Size 17 Shoes

Estimate _____ Actual _____

Math Counts Time

Written by Henry Pluckrose
Illustrated by Chris Firclough
Published by Childrens Press

Leaning over to turn off the alarm, the little boy wipes his sleepy eyes. The text asks, "What time do you get up in the morning? How can you tell time?" This introduction draws the reader into a photographically illustrated exploration of units of time measurement: seconds, minutes, hours, days, weeks, months, and years. The importance of timekeeping is constantly reinforced through questions and examples. Brilliantly colored photographs of children and adults of various races depict everyday references to time measurement and its use.

Concepts that could be taught using this book are:

* time
* counting
* estimation
* graphing

ACTIVITY 1:

Objective: The students will estimate the number of circles they can draw in one minute. The students will draw circles for one minute on paper, count the actual number and record the answer.

1. Read the book to the class. Discuss with the class things they can do in one minute. The teacher should model the approximate size of the circles to be drawn and choose several students to draw circles on the board. Discuss with students ways to draw circles on their paper, either randomly or in a pattern. Give the students "My One Minute Circle Paper" (p. 72) and have them estimate how many circles they can draw in one minute. Each student should

record this on their paper. Then set the timer for one minute and let the students draw. After the times rings, then each student is to count the circles and record their answer. Allow time for each student to share their paper with the class. After sharing, discuss with the class who was closest to their estimate. (NCTM goals 2, 4, 5; EALRs Math 1.1, 4.2)

ACTIVITY 2:

Objective: The students will write down on paper the time, draw the time on the clock, and what they do at that time of the day.

2. The teacher and class should discuss what things they do during the day, the time they do it, and the teacher should chart this on a large piece of paper. This is a good time to discuss the fact that not everyone gets up or goes to bed at the same time. After several students have shared what they do at a specified time, pass out "My Time Paper" (p. 73) and have the students fill in when they get up, eat breakfast, go to school, eat lunch, go home and eat dinner. book. (NCTM goals 1, 2, 4; EALRs Math 1.1, 1.2, 4.1, 4.3)

ACTIVITY 3:

Objective: The students will draw a picture of their favorite time of the day and write why they like that time of the day. The students will draw their favorite time on the clock face.

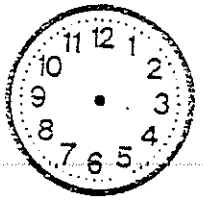
3. As a culminating activity have the students draw a picture on the "My Favorite Time Of The Day" paper (p. 74) and complete the sentence frame: My favorite time of the day is _____ because _____. The students will draw their favorite time on the clock face. Bind the students' pages into a class book and have each student share their own page. (NCTM goals 1, 2, 4; EALRs Math 1.1, 1.2)

Name _____

My One Minute Circle Paper

estimate _____ **actual** _____

My Time Paper



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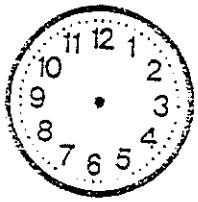

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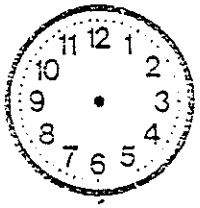

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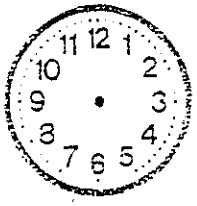

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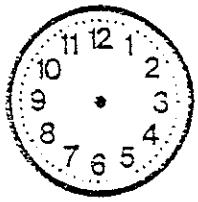
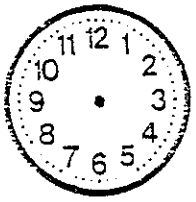


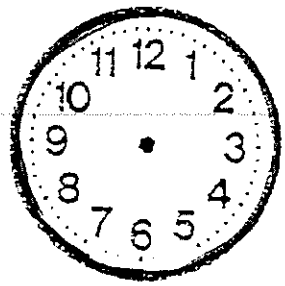
_____ _____



_____ _____

by _____

My Favorite Time Of The Day



_____

_____

_____

by _____

UNIT #6
Making Comparisons
Experiences With Length, Balance, And Time

Key Mathematical Ideas

- **Nonstandard units can be used to measure and compare lengths.**
- **A balance scale can be used to compare a mass of one object to other objects.**
- **Quantities of time can be compared and ordered.**

Bibliography of Children's Literature of Length, Balance and Time

Anno, M. (1982). *Anno's math games II.* New York, NY: Philomel Books.

A sequel to Anno's Math Games book, this book uses whimsical elfish characters to challenge the readers thinking and observations of the world around him. Easy to read, Math Games II contains five chapters. Chapter one deals with relationships and the use of abstract symbols to represent real objects. Chapter two deals with comparison, chapter three deals with dots and coordinates-ordinates, chapter four number value, and in chapter five, measurement. Concepts: relationships, comparison, direction, number concepts, measurement.

Axelrod, A. (1994). *Pigs on a blanket.* New York, NY: Simon & Schuster Books for Young Readers.

In the sequel, *Pigs Will Be Pigs*, Axelrod tells an instructive story about the Pig family, as they go to the beach. Ten minutes here, a half an hour there, and so they wonder where the time went! Concept: time.

Baker, A. (1991). *Raps & rhymes in math.* Portsmouth, NH: Heinemann Educational Books.

This resource book is filled with rhymes, songs, riddles and finger plays that all have to do with mathematics. This book is geared toward use with primary age children. Concepts: counting, reverse counting, arithmetic, measuring, time, and probability.

Base, G. (1988). *The eleventh hour.* New York, NY: Harry N. Abrams.

When Horace turns eleven, he decides to host a party for his friends. He prepares for the party by creating eleven different sorts of food and planning eleven games. Everyone comes dressed in costumes and has a wonderful time playing games. When the eleventh hour strikes and it is time to eat the feast, they discover the birthday feast has disappeared! The fanciful pictures and the rhyming text will capture the attention of the reader. Concepts: counting to eleven, time.

Bogart, J. (1989). *10 for dinner.* New York, NY: Scholastic, Inc.

This book explores the different number combinations of 10. Margo describes the detail of her birthday party: 5 guests came at 5:00, 2 came at 5:10, 2 came at 5:15, but one guest arrived early. Concepts, counting, number combinations, time.

Briggs, R. (1970) *Jim and the beanstalk.* New York, NY: Scholastic Inc.

Revisit the famous giant from the story *Jack and the Beanstalk.* In this version the giant has aged and needs eyeglasses, false teeth and a wig. Jim has to measure him to make sure the items will fit. Concept: measurement.

Butler, C. (1988). *Too many eggs.* Boston, MA: David R. Godine, Publisher.

An interactive book where the reader is encouraged to place paper eggs into Mrs. Bear's mixing bowl as she mixes a cake for Mr. Bear's birthday surprise. But why does everyone run for cover? They know that bears can't count and that means disaster when it comes to baking! Illustrated by Meg Rutherford. Concepts: counting, measuring and arithmetic.

Carle, E. (1977). *The grouchy ladybug.* New York, NY: Scholastic Inc.

The grouchy ladybug wants to pick a fight with the other creatures in this book. She meets the other animals at 9:00, 10:00, 11:00, and so on. In the end she is very hungry and tired and meets a friendly ladybug. Concept: time to the hour.

Creighton, J. (1995). *8 o'cluck.* New York, NY: Scholastic Inc.

Mr. wolf is having the chickens next door over for dinner. What a nice new neighbor he is! He spends the day busily preparing his feast. And all day, the chickens are working busily, too. "What time is it, Mr. Wolf?" they ask every hour. Mr. Wolf answers politely. Too bad he doesn't think to answer a few questions of his own. Concept: time.

Hutchins, P. (1970). *Clocks and more clocks.* New York, NY: Scholastic Inc.

When all his clocks read different times, poor Mr. Higgins is in a quandary. What should he do? He can't tell which of his clocks tells the right time. He is in for a real surprise when the Clockmaster shows him that they are all correct. Concept: time.

Kalan, R. (1995). *Jump, frog, jump!* New York, NY: Greenwillow Books.

Jump into measurement and patterning with this cumulative tale for young listeners. Concepts: measurement and patterning.

Lionni, L. (1962). *Inch by inch.* New York, NY: Astor-Honor.

To avoid being eaten by the hungry bird, an inchworm demonstrates his usefulness as a measurement tool. this book will motivate students to create their own inchworms and measure everything under the sun! Concept: measurement.

Myller, R. (1990). *How big is a foot?* New York, NY: Bantam Doubleday Dell Books for Young Readers.

This easy-to-read text and simple illustrations of this humorous tale about a king helps students learn about the basic concepts of measurement and about how units of measure relate to the world. Concept: measurement.

Pluckrose, H. (1995). *Math counts time.* New York, NY: Childrens Press.

This book is a very nice overview of the concept of time. It does a good job of relating these difficult to understand concepts to a child's real world experience. The text is sprinkled with questions designed to spur discussions on time. Concept: time.

Schuett, S. (1995). *Somewhere in the world right now.* New York, NY: Dragonfly Books

Somewhere in the world right now, tomorrow is already here. Show your students that sunrise in China and nightfall in Mexico are simultaneous events. Splashes of culture and color mingle with splendid regional maps and melodious language in this book about time and around the world.
Concept: time.

Wright, A. (1997). *Alice in pastaland: A math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's *The Adventures Of Alice In Wonderland,* with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn into this new world by a White rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

Unit #7
Equations
Communication Mathematical Situations

Domino Addition

Written by Lynette Long, Ph. D.
Designed by Diane M. Earley
Published by Charlesbridge Publishing

A math game and counting book that takes advantage of the natural understanding of addition that children gain from a set of dominoes. First, students learn to use simple addition to find the total number of dots, zero to twelve on each domino. Then they see if they can find the dominoes with each total hidden in the picture. The final page summarizes domino addition facts for the sums zero through twelve.

Concepts that could be taught using this book are:

* counting
* addition

Activity 1:

Objective: The students will take turns and practice addition facts to twelve using dominoes and saying the addition problem and answer to their partner. The partner will check for the correct answer. After finishing the game, the students will write the addition problems on paper.

1. Read the book to the class. The teacher and students will examine the dominos and practice saying the problem and the answer. Choose two students to model the game of saying the problem and the answer. The partner will check the answer. Divide students into groups of two and hand out ten dominoes to each group. After each group has had time to play the game with all the dominoes, give the groups paper to write the addition problems from each domino. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1, 2.1, 2.3, 3.1)

Activity 2:

Objective: The students will make their own dominos of addition facts to twelve using black construction paper and white crayons.

1. Reread the book to the class. Explain to the students that they are going to make their own set of 28 dominoes to take home. Show the students the sheet in the back of the book that they will use to help them make their own set of dominos (p. 81). Give each student a copy of the back page in the book, 28 3 " x 4" black construction rectangles and a white crayon. Remind the children to check mark each domino on the paper as they make it. With younger children you may want to complete this activity over a two day period. After the students have completed their dominos, give them a zip lock bag to take them home in. Encourage them to play the "Domino Addition" game with their brother, sisters or their parents. (NCTM goals 1, 2, 4, 5; EALRs Math 1.1)

0 + 0 =

0

1 + 0 =

1

2 + 0 =

1 + 1 =

2

3 + 0 =

2 + 1 =

3

4 + 0 =

3 + 1 =

2 + 2 =

4

5 + 0 =

4 + 1 =

3 + 2 =

5

6 + 0 =

5 + 1 =

4 + 2 =

3 + 3 =

6 + 1 =

5 + 2 =

4 + 3 =

7

6 + 2 =

5 + 3 =

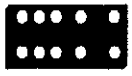
4 + 4 =

8

6 + 3 =

5 + 4 =

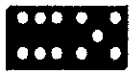
9



6 + 4 =

5 + 5 =

10

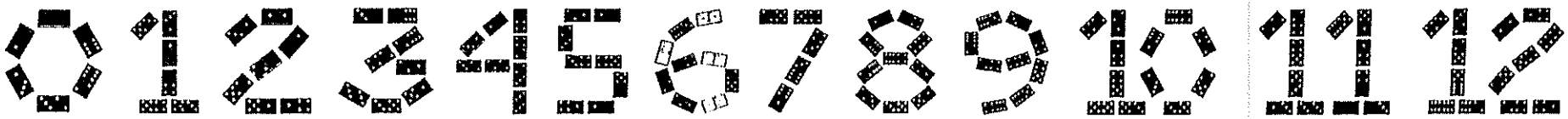


6 + 5 =

11

6 + 6 =

12



Merriam, E. (1996). *12 ways to get to 11.* New York, NY: Simon & Schuster Books.

This charming book illustrates different combinations of objects, people, and animals that can be added together to make eleven. It's great for introducing addition of three and four numbers. It will also encourage the children to look for things in their surroundings to count. Concepts: counting from one to eleven, addition.

Moncure, J. (1985). *My five book.* Chicago, IL: Childrens Press.

This book is about a boy named Five, Five has many adventures which involve finding five carrots in the garden, chasing rabbits, fishing and more. Children will enjoy relating to the boy's activities, and the arithmetic challenges put forth in the story line. Concepts: number concept of five, addition, subtraction.

Moncure, J. (1985). *My four book.* Chicago, IL: Childrens Press.

This book is about a boy named Four. Four visits the zoo and discovers all the animals are in groups of four. Concepts: number concept of four, addition, subtraction.

Moncure, J. (1985). *My one book.* Chicago, IL: Childrens Press.

This book is about a boy named One. One lives in a one room house that has one chair and one table. He has one of everything he owns, and everything he does, he does one time, giving the reader a lot of opportunity to explore the concept of one. Concepts: number concept of one, addition, subtraction.

Moniker, J. (1985). *My two book.* Chicago, IL: Childrens Press.

This book is about a girl named Two. Two lives in a two room house that has two windows. She goes for a walk and has lots of adventures discovering many things in groups of two. Concepts: number concept of two, addition, subtraction.

Murphy, S. (1996). *Give me half!* New York, NY: Scholastic Inc.

You split it in half. Read along as a brother and a sister share a yummy lunch, and learn about the simplest fraction: 1/2. Concepts: addition, fractions.

Pallotta, J. (1997). *The icky bug counting book.* Watertown, MA: Charlesbridge Publishing.

This book begins with zero, noting there are zero bugs on that page, and proceeds through twenty-six varieties of icky bugs. After readers have counted twenty-six army ants, they turn the page and learn that the book counts up to twenty-size, so there is one icky bug for each letter of the alphabet - backwards. Concepts: counting from one to twenty-six, addition, the alphabet.

Shaw, N. (1991). *Sheep in a shop*. Boston, MASS: Houghton Mifflin.

Another adventure for these shopping sheep! As they hunt for a birthday present and reek havoc at the shop, they discover they are short of cash to make their purchase. Oh, what to do! The children can help to solve the problem. Concepts: money, problem solving.

Viorst, J. (1978). *Alexander who used to be rich last sunday*. New York, NY: Scholastic Inc.

Alexander had hopes to save the dollar from his grandparents for a walkie-talkie. But then he bought some gum, lost a couple of bets with his brother, rented his friend's pet snake, and soon found he was no longer rich. Concept: money, subtraction.

Warren, C. (1983). *The ten-alarm camp-out*. New York, NY: Lothrop, Lee & Shepard Books.

Mama armadillo loves even numbers and a straight line. She also loves picnics and camp-outs, but the latest outings with her little ones causes a panic with the unsuspecting towns people. Concepts: counting from one to ten, opportunity for addition and subtraction.

Wells, R. (1997). *Bunny money*. New York, NY: Dial Books for Young Readers.

The latest in the Max and Ruby series, this book tells their story as they go on a birthday shopping trip for grandma. Their walletful of money diminishes with each step along the way—will they have enough left to buy the present? Concepts: money, problem solving.

Williams, V. (1982). *A chair for mother*. New York, NY: Greenwillow Books.

A family saves change to buy a chair after a fire destroys their household belongings. Concepts: saving money, coins.

Wise, W. (1993). *Ten sly piranhas*. New York, NY: Scholastic Inc.

A counting in reverse and subtraction book about ten piranhas that eat one fish at a time. In the end, the old crocodile eats the last piranha. Concepts: Counting in reverse from ten to one, subtraction.

Wright, A. (1997). *Alice in pastaland: A math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's *The Adventures Of Alice In Wonderland*, with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn into this new world by a White rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

UNIT #7
Equations
Communicating Mathematical Situations

Key Mathematical Ideas

- **Equations are one way to summarize a story about objects.**
- **In a true equation, when one number is hidden the other numbers can be used to know it.**

Bibliography of Children's Literature of Equations (addition, subtraction and money)

Axelrod, A. (1994). *Pigs will be pigs.* New York, NY: Simon & Schuster Books for Young Readers.

Perplexing pig problems! Join the hungry Pig family as they turn the house upside down looking for enough money to buy dinner at the local restaurant, the Enchanted Enchilada. And then after they get there, help them figure out how much they spent and if they get any change back. Concepts: money, problem solving.

Baker, A. (1991). *Raps & rhymes in math.* Portsmouth, NH: Heinemann Educational Books.

This resource book is filled with rhymes, songs, riddles and finger plays that all have to do with mathematics. This book is geared toward use with primary age children. Concepts: counting, reverse counting, arithmetic, measuring, time, and probability.

Barabas, K. (1997). *Let's find out about money.* New York, NY: Scholastic Inc.

This book tells the story about how money is made, from the rock to the finished coin. Concepts: money.

Brisson, P. (1993). *Benny's pennies. New York, NY: Dell Books for Young Readers.*

Benny has five new pennies to spend, and each of his family members wants him to spend them on something special, just for them. Benny finds five simple but creative gifts to buy for one cent each. Concept: purchasing with money.

Burningham, J. (1980). *The shopping basket.* Chicago, IL: Childrens Press.

This classic picture book follows Steven in his adventure to the store. This book offers numerous opportunities to involve children in its reading, from remembering the items on the boy's shopping list to predicting the outcome of each of his encounters with the animals along the way. Concepts: money, problem solving.

Butler, C. (1988). *Too many eggs.* Boston, MA: David R. Godine, Publisher.

An interactive book where the reader is encouraged to place paper eggs into Mrs. Bear's mixing bowl as she mixes a cake for Mr. Bear's birthday surprise. But why does everyone run for cover? They know that bears can't count and that means disaster when it comes to baking! Illustrated by Meg Rutherford. Concepts: counting, measuring and arithmetic.

Charosh, M. (1974). *Number ideas through pictures.* New York, NY: Thomas Y. Crowell Company.

This book presents mathematics through play. It addresses odd and even numbers, and square and triangle numbers. Giulio Maestro provides the illustrations for this text. Concepts: odd and even numbers, triangular numbers, addition, subtraction.

Christilow, E. (1991). *Five little monkeys sitting in a tree.* New York, NY: Clarion Books.

Five little monkeys go on a picnic with their mother. While she naps, the monkeys have fun teasing the crocodile. One by one the monkeys disappear after each attempt of the crocodile to snatch them off a tree branch. Concepts: reverse counting from five, subtraction.

Edens, C. (1994). *How many bears?* New York, NY: Macmillan Publishing Company.

The reader is invited to explore the little shops in Little Animal Town with the challenge to figure out how many bears it takes to run a bakery. Each shop gives a mathematical clue to the puzzle. There is plenty of opportunity to count, add subtract, multiply and divide. Concepts: problem solving with arithmetic, and counting one to thirty-two.

Enderle, J. R.., & Tessler, S. G. (1994) *Six snowy sheep.* New York, NY: Scholastic Inc.

This children's book is about six sheep playing in the snow. One by one, the sheep have an accident until only one sheep is left. Concepts: numbers, counting to six, reverse counting, subtraction.

Giganti, P. (1992) *Each orange has 8 slices.* New York, NY: Scholastic Inc.

By asking readers to count sets and subsets of delightfully illustrated animals and objects, this book has children doing repeated addition, a fundamental step towards understanding multiplication. Concepts: numbers, sets of numbers, addition, multiplication.

Gill, S. (1997). *Count Alaska's colors.* Homer, AK: Paws IV Publishing.

This brightly illustrated book illustrates addition, subtraction, and the colors for young readers. each page displays the number of Alaskan animals or plants of the numeral found on the preceding page. The page also includes an additional animal or plant mostly hidden or smaller on the page's corner and/or in the surrounding foliage or terrain. The mostly hidden or smaller animal or plant illustrated addition or subtraction. The color of the highlighted animal or plant is featured in the first sentence. The second sentence draws the readers attention to an additional animal on the page. The arithmetic expression is also printed on the page. Concepts: addition, subtraction, color, counting.

Hoban, T. (1987). *26 letters and 99 cents.* New York, NY: Scholastic, Inc.

This book introduces money and letters. It shows different coin combinations for 5, 10, 15 20 and 25 cents. Then it shows the money value from 30 to 50 at 5 cent intervals and from 50 to 99 at 10 cent intervals. Concepts: numeral value, counting from 1 to 30 by ones, counting from 30 to 50 by fives, counting from 50 to 99 by tens, beginning letters sounds.

Holtzman, C. (1995). *A quarter from the tooth fairy.* New York, NY: Scholastic, Inc.

A little boy gets a quarter from the tooth fairy. He is not sure what he wants to spend it on and actually buys several things. The book introduces all the money combinations that equal twenty-five cents. Concept: money and the combinations of twenty-five cents.

Howard, K. (1979). *I can count to 100...can you?* New York, NY: Random House.

A little mouse teaches the reader how to count to one hundred by ones. Numbers one to twenty are counted by objects. Twenty to thirty are demonstrated through addition establishing the pattern needed to count on to one hundred. Colorful pictures and easy text. Concepts: number concepts one to thirty, counting by ones from one to one hundred, addition.

Hulme, J. (1991). *Sea sums. New York, NY: Hyperion Books.*

This book is the sequel to Sea Squares. There is great representation of addition and subtraction sentences. Exciting underwater adventures present problems that increase in difficulty as the story progresses. Concepts: addition, subtraction.

Lewin, B. (1981). *Cat count.* New York, NY: Dodd, Mead & Company.

Lewin uses comical black and white drawings of cats to relay a rhyming account of all the cats she knows. Her brother has two cats, her sister has three, her uncle has four, and on it goes. A running tally is kept of how many cats there are altogether. Would you believe there are over fifty-five cats in this book? Concepts: counting one to ten, addition.

Long, L. (1997). *Domino addition.* New York, NY: Scholastic Inc.

A math game and counting book that takes advantage of the natural understanding of addition that children gain from a set of dominoes. First, students learn to use simple addition to find the total number of dots, zero to twelve on each domino. Then they see if they can find the dominoes with each total hidden in the picture. Concepts: counting, addition.

McGrath, B. (1994). *The m&m's counting book.* Watertown, MA: Charlesbridge Publishing.

This book teaches the numbers one to twelve, six colors, and three primary shapes: the circle, square, and triangle. At the end of the book, the children will have fun practicing subtraction. Concepts: addition, subtraction, counting one to twelve, number sets, sorting.

McMillan, B. (1996). *Jelly beans for sale.* New York, NY: Scholastic Inc.

A photo essay that shows how different combinations of pennies, nickels, dimes, and quarters can buy varying amounts of jelly beans. Concept: counting, money.

Medearis, A. (1993). *Picking peas for a penny.* New York, NY: Scholastic Inc.

Picking Peas for a Penny is a rhythmical, richly lyrical counting rhyme and a biographical poem filled with heartwarming memories about the author's mother Angeline, her uncle John, and life on their grandparents' farm during the Depression. Concepts: counting from one to ten, money.

Unit #8
Tens And Extras
Exploring Numbers to 100

The Cheerios Counting Book

Written by Barbara Barbieri McGrath
Illustrated by Ron Bolster and Frank Mazzola, Jr.
Published by Scholastic Inc.

This counting book starts with one cheerio and counts to ten cheerios. After ten cheerios there is a page showing just the numbers to nineteen. Then the book starts at twenty, and counts by groups of ten cheerios to one hundred. Each page is very colorful with the numbers in colors, tan cheerios and different fruits around the outside border of each page. The students will enjoy counting as they eat a healthy cheerio snack.

Concepts that could be taught using this book:
* counting by ones to 19
* counting by tens to 100
* place value

ACTIVITY 1:

Objective: The students will count cheerios in groups of ten and place each group of ten into a small paper cup. They will practice counting by tens to one hundred. The students will place the proper number of cheerios on their construction paper mat when the teacher says the number.

1. Read the book to the class. Explain that they are going to do as the book says with cheerios as you read it again. Give each student ten small paper containers, cheerios and a place value sheet (p. 91). As you are reading each page for the second time, be sure and give the students enough time to count the ten cheerios for each number. The students will count cheerios in groups of ten and place each group of ten into a small paper cup. The students will place the correct number of containers on the mat when the

teacher says, "10, 20, 30, 40, 50, 60, 70, 80, 90 and 100. (NCTM goals 1, 2, 3, 4, 5; EALRs 1.1, 2.1)

ACTIVITY 2:

Objective: The students will place the containers of cheerios on the hundreds board when the teacher says the number (from 1 to 100).

2. Reread the book. Explain to the students that today we are going to practice place value with our small containers of cheerios. Also provide the students will extra cheerios to sample and to place in the ones column as needed. Give the students the place value paper (p. 91). The teachers will say a number (ex: 45) and the student will place the correct number of small containers in the tens column (4) and five individual cheerios in the ones column. Continue with this activity so the students gets a lot of practice. Monitor to check for each student's success and call on students to share with the class the hundred, tens, and ones for the specific number. (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 1.5, 2.3, 3.3)

Hundreds

Tens

Ones

UNIT #8
Tens And Extras
Exploring Numbers To 100

Key Mathematical Ideas

- **Putting objects into groups of ten makes it easier to know *how many* without counting one by one.**
- **There is a system to the way numbers are written.**

Bibliography of Children's Literature of numbers to 100

Appelt, K. (1996) *Bat jamboree*. New York, NY: Scholastic Books.

In this book a bat jamboree takes place every year. Children will start counting the bats from one to ten. Then the bats line up to make a pyramid of 55 bats. Concepts: number sense, counting to ten, and then to 55.

Cole, N. (1994)). *Blast off! : A space counting book*. Watertown, MA: Charlesbridge Publishing.

This picture book is a counting book for those who dare to count where no one has gone before. The rhyming text begins with zero, then invites the children to count one, two, buckle your astronaut shoe. Three, four, close the spaceship door. They also count six stars, seven rockets, and eight moons. When they reach twenty, the book helps children count to 100 by tens, and then to one trillion by thousands, millions and billions. Finally the children count backwards to return to zero. Concepts: counting to twenty, counting to one hundred, large numbers.

Calmenson, S. (1991). *Dinner at the panda palace*. New York, NY: HarperCollins Publishers.

This children's counting book with entertaining illustrations describes in rhyme the animal customers who come to dine at the Panda Palace. Among the guests are two carsick lions, three pigs running from a wolf, and six roof painting giraffes. Fifty-five diners have stuffed the restaurant when one last guest, a mouse, comes through the door. Mr. Panda, the proprieter, must find a seat for this final guest. Concepts: counting, arithmetic.

Edens, C. (1994). *How many bears?* New York, NY: Macmillan Publishing Company.

The reader is invited to explore the little shops in Little Animal Town with the challenge to figure out how many bears it takes to run a bakery. Each shop gives a mathematical clue to the puzzle. There is plenty of opportunity to count, add subtract, multiply and divide. Concepts: problem solving with arithmetic, and c counting one to thirty-two.

Fleming, D. (1992) *Count!* New York, NY: Henry Holt and Company.

Bold and colorful, this book illustrates numbers one to fifty through the animal theme. Fleming's use of brilliant colors against a contrasting background practically makes his painting jump off the page! Concepts: numbers, counting to ten, counting ten to fifty by tens.

Friedman, A. (1994). *The king's commissioners*. New York, NY: Scholastic Inc.

The king has so many commissioners he has lost count of them all! He summons all the commissioners to come to the palace to be counted, but his advisors all come up with different sums because they count in different bases. Concepts: counting by twos, fives, and tens with place value.

Grover, M. (1988). *Amazing and incredible counting stories*. San Diego, CA: Browndeer Press.

Unbelievable newspaper headlines of a missing skyscraper, inflatable pickles, carrot icicles, and dancing refrigerators. The bright pictures and silly news stories are sure to delight students and keep them counting. Concepts: numbers and counting, 1 to 25, 50, 75 and 100.

Hoban, T. (1972). *Count and see*. New York, NY: Collier Books.

Black and white photographs of items are used to present number concepts and promote counting from one to fifteen, then twenty to fifty by tens. Concepts: counting, number concept.

Hoberman, M. (1973). *The looking book*. New York, NY: Alfred A. Knopf.

Ned has lost his cat and goes looking for him through the pages of this book. The story line is written in rhyming verse which adds interest to this text. Concept: counting one to twenty-eight.

Howard, K. (1979). *I can count to 100...can you?* New York, NY: Random House

A little mouse teaches the reader how to count to one hundred by ones. Numbers one to twenty are counted by objects. Twenty to thirty are demonstrated through addition establishing the pattern needed to count on to one hundred. Colorful pictures and easy text. Concepts: number concepts one to thirty, counting by ones from one to one hundred, addition.

Kasza, K. (1987). *The wolf's chicken stew.* New York, NY: Scholastic Inc.

A great introduction or culmination to the 100th Day of School celebrations, as the wolf fattens up the hen with 100 pancakes, 100 doughnuts, and a 100 pound cake only to find out things don't turn out as expected. Concept: the number 100.

Kitchen, B. (1987). *Animal numbers.* New York, NY: Dial Books.

Primarily a picture book of animals and numbers, the text takes numbers one through ten, illustrating each number concept with a mother animal and a correlating number of off spring. After the number ten, the examples jump to fifteen, twenty-five, fifty, seventy-five, and one hundred. Concepts: numbers one through ten, fifteen, twenty-five, fifty, seventy-five and one-hundred.

LeSieg, T. (1961). *Ten apples up on top.* New York, NY: Random House.

Three animals challenge each other to balancing apples on top of their heads. First one, then two and on until all are balancing ten apples up on top of their heads. The new challenge is to perform stunts without letting the apples drop. This is a humorous and action packed book. Concepts: counting one to ten, counting by tens to one hundred.

Mathews, L. (1978). *Bunches and bunches of bunnies.* New York, NY: Scholastic Inc.

This counting rhyme, illustrated with hundreds of bunnies, is a perfect first book of numbers and beginning multiplication. Concepts: counting from one to one hundred forty-four, multiplication from one to twelve.

McGrath, B. (1998). *The cheerios counting book.* New York, NY: Scholastic Inc.

This counting book starts with one cheerio and counts to ten cheerios. After ten cheerios there is a page showing just the numbers to nineteen. Then the book starts at twenty, and counts by groups of ten cheerios to one hundred. Each page is very colorful with the numbers in colors, tan cheerios and different fruits around the outside border of each page. Concepts: Counting by tens to one hundred, place value.

Medearis, A. (1996). *The 100th day of school.* New York, NY: Scholastic Inc.

The children learn 100 spelling words, plant 100 seeds, bake 100 cookies, and "do everything the 100 way" to celebrate this special way. Concepts: numbers, counting to one hundred.

Pinczes, E. (1993). *One hundred hungry ants.* New York, NY: Scholastic Inc.

One hundred hungry ants hurry to sample the delights of a nearby picnic, but marching single file four rows of 25.....and the division begins. Concept: counting to one hundred, multiplication, division.

Pluckrose, H. (1995). *Math counts: numbers.* Chicago, IL: Children's Press.

The photographs and text in this book have been chosen to encourage talk about topics that are essentially mathematical. By talking, the young reader can explore some on the central concepts that support mathematics. Concept: numbers.

Reiss, J. (1991). *Numbers.* Scarsdale, NY: Bradbury Press.

A brightly colored picture counting book that begins by sequencing numbers from one to twenty, then goes on to count by tens to one hundred. Concepts: counting from one to twenty, counting to one hundred by tens.

Ryan, P. (1994). *One hundred is a family.* New York, NY: Hyperion Books for Children.

This book explores the many different meanings of the word family. Colorful pictures by Benrei Huang, depict families from different cultures. Concepts: collecting data, numbers, counting from one to ten by ones, counting to one hundred by tens.

Scarry, R. (1975). *Richard Scarry's best counting book ever.* New York, NY: Random House.

Willy Bunny complains of nothing to do. His father suggests that Willy practice his counting, then share with his dad at dinner all the things he has counted during the day. Willy thinks this is a great idea and begins counting right away. The reader is encouraged to count along with Willy through the pages of the book. Willy counts all the way from one to one hundred. Concepts: counting to one hundred by ones, five's, and tens.

Schwartz, D. (1985). *How much is a million?* New York, NY: Lothrop, Lee & Shepard Books.

Marvelosissimo the Mathematical Magician takes the reader on a guided tour of large numbers: million, billion, and trillions. There is only one concrete example of over 100,000 stars that the reader can count in this book, but the concept of million, billion, and trillion are skillfully represented. The author provides end notes which give detailed explanation of how he made the calculations used in the book. Concepts: number sense, counting to million, billion and trillion.

Slater, T. (1999). *Ready or not, here I come!* New York, NY: Scholastic, Inc.

Emma and Maggie are playing hide and seek, but Emma doesn't think Maggie can count to 100. Some of the children count by fives and some by tens. Lulu counted by tens so fast that no one had a chance to hide. Then Emma counted by twenties to one hundred in one breath. Concepts: counting to 100 by ones, fives, tens, twenties .

Sloat, T. (1991). *From one to one hundred.* New York, NY: puffin Unicorn Books.

One to One Hundred is a picture book, but that doesn't mean it's a quick read. On each page are numerous opportunities to count, count, count! The detailed color pencil drawings depict a wide variety of subjects and characters of ethnic diversity. There are more that 2,500 items to count. Concepts: numbers, counting from one to one hundred.

Wild, R. (1978). *The bears' counting book.* New York, NY: Harper & Row Publishers.

A play on the classic *Goldie Locks and the Three Bears,* the three bears go for a walk and discover a farmhouse where no one is home. They try out the chairs, beds, and food, then move on to investigate other household items and personal belongings they find in the house. Each room has a different number of things to count. They even find things to count when their curiosity takes them outside. Concepts: counting by ones from one to ten, counting by tens from twenty to fifty.

Williams, R. (1995). *The crayola counting book.* Cypress, CA: Creative Teaching Press.

The children will enjoy reading this book and counting the crayons on each page. Concepts: counting by ones, twos, five's and tens, sorting by color, patterning, tallying, comparing size, place value.

Wright, A. (1997). *Alice in pastaland: A math adventure.* Watertown, MA: Charlesbridge Publishing.

This illustrated children's book is a retelling of Lewis Carroll's *The Adventures Of Alice In Wonderland,* with an emphasis on number concepts, basic operations, measurement, and problem solving. As in the original tale, Alice shrinks in size, enters a strange new world, and encounters a variety of characters. She is drawn into this new world by a White rabbit who is muttering about preparing pasta for 40 guests and wondering how much to prepare if each guest requires one quarter pound. While searching for the White Rabbit, Alice meets a Walrus who is busy selling pasta shells along a shore. Alice learns that White Rabbit has recently purchased ten dozen small shells. She inquires as to the weight of a dozen shells, determines that White Rabbit did not buy enough, and again runs off in search of him. Next, she encounters a group of boastful flowers that are busy comparing their heights in terms of spaghetti. The foxglove flower is proud to be ten spaghetti tall. Similar math adventures occur as Alice continues her quest. Concepts: arithmetic, number sense, measurement, problem solving.

Unit #9

Seeing Shapes

Explorations In Geometry And Visual Thinking

A Cloak For The Dreamer

Written by Aileen Friedman
Illustrated by Kim Howard
Published by Scholastic Inc.

The tailor's three sons each take a challenge of constructing a quilted cloak for the king. Of these three sons, only two prove themselves capable of joining their father in his work as a tailor to the Archduke. The third, Misha, is a dreamer who wants to travel the world. To fulfill a commission, Ivan designs for the Archduke a patchwork cloak made from rectangles; Alex uses squares for one cloak and triangles for another; Misha uses circles. The first three cloaks are sold to the Archduke, but the fourth one is unacceptable and is set aside because it is full of open spaces. A plan occurs to the tailor; by cutting each circle into a hexagon, the tailor and his two older sons are able to redesign the cloak into a magnificent one that will protect Misha from the wind. The altered cloak is given to Misha as a going-away present as he sets off to see the world and fulfill his dreams.

Concepts that can be taught using this book are:

* patterning
* geometric shapes - square, rectangle, triangle, hexagon

ACTIVITY 1:

Objective: The students will look for shapes in their world - in their house, supermarket, on walks and while riding on the bus or in a car and record the shapes on paper.

1. Read the book to the class. As a class discuss the various shapes and brainstorm places where we might see these shapes. The teacher should record the students' ideas on paper. Hand out the "Geometric Shapes" paper (p. 100) and encourage students to look for various shapes in the classroom. As a homework activity ask students to look for shapes in their house and other places they

might visit. They should record the place, and a picture of the shape on the paper. After the homework paper is returned allow students to share their paper with the class. (NCTM goals 1, 2, 4; EALRs 1.3, 2.1)

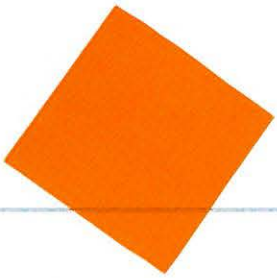
ACTIVITY 2:

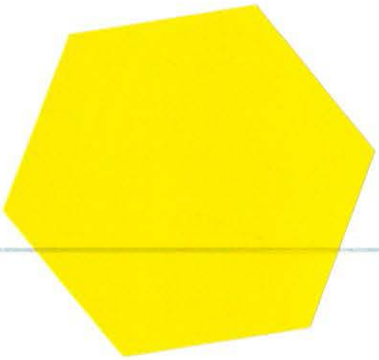
Objective: The students will choose a shape from the book, cut it out of different colors of construction paper, and create patterns by fitting the shapes together.

2. Reread the book to the class. Look in magazines and books for examples of patchwork and bring in any patchwork quilts or pillows you have and examine the patterns with the students. Provide students with tagboard patterns of the four shapes from the book (square, rectangle, triangle, and hexagon) and give the students construction paper, scissors and glue and have them choose one shape and create patterns by fitting them together. (Shape stickers would also work well.) (NCTM goals 1, 2; EALRs Math 1.3, 2.1)

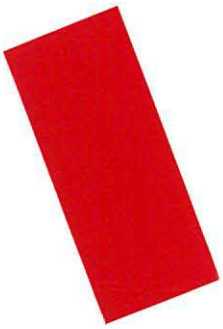
Name _____

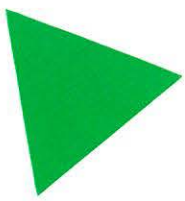
Geometric Shapes





	place	shape
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____





UNIT #9
Seeing Shapes
Explorations In Geometry And Visual Thinking

Key Mathematical Ideas

- **Two-dimensional shapes can be classified by number of sides.**
- **Three-sided shapes are triangles and four-sided shapes are quadrilaterals.**
- **Circles, triangles, and rectangles are found as faces of three-dimensional solids.**

Bibliography of Children's Literature of Geometry and Visual Thinking

Barner, B. (1995). *Space race.* New York, NY: Rooster Books.

Two robots have a race to build a structure to blast off to space using various shaped building materials. Written in rhyming verse with colorful, simple illustrations. The book deals with problem solving with geometrical shapes. Concepts: problem solving, geometrical shapes.

Burns, M. (1994). *The greedy triangle.* New York, NY: Scholastic, Inc.

The greedy triangle finds life a bit boring so he decides to visit the shapefitter so he can experience life from a new angle. So begins the progression of a polygon from a triangle to a many sided polygon which approaches a circle. This book introduces names of shapes from a triangle to a decagon. Colorful illustrations of geometrical shapes found in everyday experiences. The text contains a two page section which explains the underlying mathematics of a story and suggestions for ways to extend a child's learning. Concept: polygon.

Crews, D. (1968). *Ten black dots.* New York, NY: Scholastic, Inc.

This children's book asks the question, "What can you do with ten black dots? " A simple yet powerful question can be answered with a world of possibilities. Concepts: counting to 10, logical thinking, visual thinking.

Dunham, M. (1987). *Shapes: How do you say it?* New York, NY: Lothrop, Lee & Sheppard Books.

Simple illustrations of ten primary shapes are shown in this book. The text provides the names of each shape in English, Spanish, French and Italian with pronunciation helps provided. Concepts: basic shapes.

Ehlert, L. (1989). *Color zoo.* Philadelphia, PA: J. B.. Lippincott.

Color Zoo is an intriguing book of colors and shapes. Ehlert uses cutout shapes in overlays to create animal faces. This book will help children to see how various shapes can work together to convey an idea of an identifiable animal. Concepts: star, circle, square, triangle, rectangle, heart, oval, diamond, hexagon, octagon.

Friedman, A. (1994). A cloak for a dreamer. New York, NY: Scholastic, Inc.

The tailor's three sons each take a challenge of constructing a quilted cloak for the king. Each uses a different geometric shape to construct his cloak. Two of the sons find success in their strategy, but one son lacks basic understanding of geometry. Concepts: square, triangle, circle, hexagon, patterning.

Hoban, T. (1974). *Circles, triangles, and squares.* New York, NY: Macmillan Publishing Company.

Attractive black-and-white photographs of everyday scenes highlight the presence of circles, triangles, and squares in various sizes. Concepts: circles, triangles, and squares.

Hoban, T. (1974). *Round and round and round.* New York, NY: Greenwillow Books.

In this wordless picture book, Hoban's colorful photographs clearly capture the concepts of roundness. Concepts: circles, spheres, cylinders.

Hoban, T. (1986). *Shapes, shapes, shapes.* New York, NY: Greenwillow Books.

Arcs, circles, hearts, hexagons, ovals, parallelograms, rectangles, squares, stars, trapezoids, and triangles are the shapes to explore in this wordless book. Shapes are presented in colorful photographs. Concepts, various shapes found in the environment.

Maccarone, G. (1996). *The silly story of Goldie Locks and the three squares.* New York, NY: Scholastic Inc.

A version of *Goldie Locks and the Three Bears* only with geometric shapes instead. The children will enjoy looking for all the shapes. Concepts: patterning, geometric shapes.

Pluckrose, H. (1995). *Math counts shape.* New York, NY: Childrens Press.

This book encourages students to look closely as shape in their everyday surroundings. There is also thought provoking questions and very colorful photographs. Concept: geometric shapes.

Tompert, A. (1990). *Grandfather Tang's story*. New York, NY: Crown Publishers.

Tompert relays a story of two fairies foolish competition that required each to magically turn themselves into animals. They almost destroy their friendship when the natural instincts of the creatures they become threatens the life of the other. Throughout the story tangrams are used to illustrate the transformations of the character. Concepts: tangram configurations.

Unit #10
Take A Chance
Beginning Experiences With Probability

The Luckiest One Of All

Written by Bill Peet
Illustrated by Bill Peet
Published by Houghton Mifflin

The boy in Bill Peet's story is the luckiest, it seems, in a long list of animals and objects that would like a new life. The scowling steam shovel, the barn with the hay hair, and a tree-bearded mountain are only a few of the unforgettable characters given life on the pages of the book. Children will enjoy listening to the rhymed advantages and disadvantages given for each character. To point out again that there are two sides to everything, Bill Peet brings the end of the story back to the beginning.

Concepts that could be taught using this book are:
* probability
* graphing

ACTIVITY 1:

Objective: The students will create a page for a "Lucky-Unlucky" book by writing two sentences and illustrating their sentences.

1. Read the book to the class. The students will create a page for the "Lucky-Unlucky" book (p.106) by completing the sentence frames: Lucky is_____,
and Unlucky is _____,
and drawing pictures to go along with the sentences. The students can share their page and then bind it into a book and add it to the class library. (NCTM goals 2; EALRs 4.3, 5.1)

ACTIVITY 2:

Objective: The student partners (group of 2) will estimate the number of red, blue and green plastic bears in the bag and record their estimate on the graph. The partners will then count the red, blue, and green bears and record the actual count on the graph.

2. This game helps children to explore mathematical ideas about outcomes, data and its presentation, and probability. First the students will explore the bag of bears and color their estimate on the "What's in the Bag?" paper (p. 107). Then the students will count the bears and record the actual count on the same paper. Next the students interpret the information and write about it in the think and tell section. Provide time for the partner groups to share their results will the class. (adapted from Data, Chance & Probability, by Graham A. Jones and Carol A. Thornton, Learning Resources, Inc.) (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 1.4, 3.1, 3.3, 4.1, 4.2, 4.3)

ACTIVITY 3:

Objective: Each student partner (groups of 2) will decide which color bear (red, yellow, or green) will be picked the most during this game. The students will pick a bear from the bag 10 different times and record the color by making tally marks. The students will discuss the results with their partner.

3. The students will decide and write down which color bear they think will be picked most during this "Best Chance" game (p. 108). The students will then take turns picking a bear from the bag. They will record their five picks and their partner's five picks by making tally marks next to the bears. Next the partners will count their tally marks and determine which color bear was picked the most and record it on the paper. They will color the graph to show their results. Provide time for the partner groups to share their results will the class. The teacher can graph each group's results to determine the color most picked by the whole class. (adapted from Data, Chance & Probability, by Graham A. Jones and Carol A. Thornton, Learning Resources) (NCTM goals 1, 2, 3, 4, 5; EALRs Math 1.1, 1.4, 3.1, 3.3, 4.1, 4.2, 4.3)

Lucky is _____

_____.

Unlucky is _____

_____.

by _____

What's in the Bag?

Name_____

Look in the bag. About how many bears of each color are in the bag?

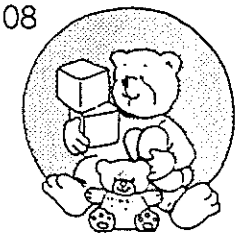
Color your estimate below.

Count the bears and color the graph to match.
Compare the graph with your estimate.

Red	my estimate							
	actual count							
Blue	my estimate							
	actual count							
Green	my estimate							
	actual count							

How do the colors in the graph compare?

Need: Bag of bears — 2 red, 4 green, 6 blue.



Best Chance

Name_____

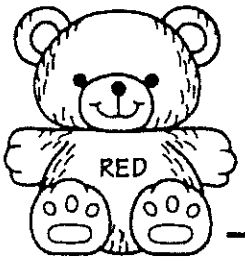
Shake the bag.

If you pick one bear, which color is most likely?

Try picking a bear 10 times to see which colors you pick.

Put the bear back and shake the bag each time.

Tally what you get.



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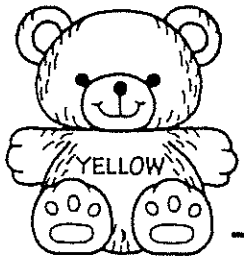

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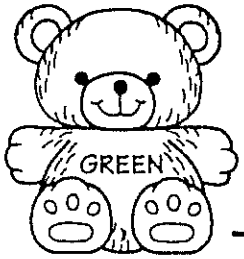

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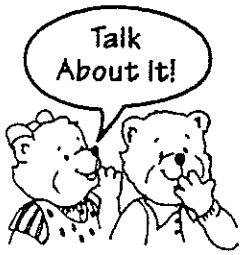
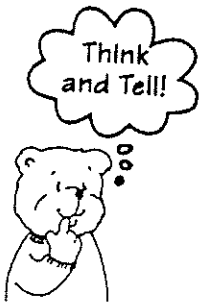


Did the color turn out as you said?

Red	my estimate							
	actual count							
Blue	my estimate							
	actual count							
Green	my estimate							
	actual count							



What does the graph say is the most likely color?

Need: Bag of bears — 2 red, 4 green, 6 blue.

UNIT #10
Take A Chance
Beginning Experiences with Probability

Key Mathematical Ideas

- **Concepts of chance can be used to describe and predict outcomes of games that involve spinners, coins, and dice.**
- **It is possible to predict whether something is likely or unlikely based on data collected.**

Bibliography of Children's Literature of Probability

Baker, A. (1991). *Raps & rhymes in math.* Portsmouth, NH: Heinemann Educational Books.

This resource book is filled with rhymes, songs, riddles and finger plays that all have to do with mathematics. This book is geared toward use with primary age children. Concepts: counting, reverse counting, arithmetic, measuring, time, and probability.

Cushman, J. (1991). *Do you wanna bet? Your chance to find out about probability.* New York, NY: Clarion Books.

Whether flipping coins to decide what television program to watch or analyzing which events are "certain", "impossible," or "maybe," Danny and Brian become involved in everyday situations, both in and out of school, that involve probability. When the weather forecaster predicts a 60 percent chance that there will be enough snow to close school tomorrow, should Brian do his homework tonight? When it doesn't snow, was the forecaster wrong? These questions lead to collecting data and looking for forecasting accuracy. Concepts: probability, collecting data,

Griffiths, R. (1994). *Facts & figures.* Milwaukee, WI: Gareth Stevens Publishing.

Guinea pigs introduce the topics of measurement and data collection. Tables, tallies, and graphs are used to collect and record information about voting for the pet's names, scheduling pet care, and deciding what foods the guinea pigs like best. Data on the pets' weights are collected from birth on; this comparison is extended to the reader's weight at birth compared with his or her current weight. Concepts: measurement, data collection, probability.

Linn, C. (1972). *Probability*. New York, NY: Thomas Y. Crowell Company.

Life is full of uncertainties. Nevertheless, people plan each day based on the probability that events and activities will go according as planned. Making predictions with confidence is an exercise in mathematics. This book introduces the reader to the probability theory. Though understanding probability may prove challenging to primary age students, they will enjoy doing the experiments and graphing their results. Concepts: probability, graphing.

Peet, B. (1982) *The luckiest one of all*. Boston, MASS: Houghton Mifflin.

The boy in Bill Peet's story is the luckiest, it seems, in a long list of animals and objects that would like a new life. The scowling steam shovel, the barn with the hay hair, and a tree-bearded mountain are only a few of the unforgettable characters given life on the pages of the book. Children will enjoy listening to the rhymed advantages and disadvantages given for each character. Concepts: probability, graphing.

Time-Life for Children Staff. (1993). *Play ball: Sports math*. Alexandria, VA: Time-Life for Children.

Measurement, Statistics, and probability are some of the topics encountered in the mathematics of sports. An opening story told in verse has Ellen and Hector, the elephant twins, at a ball game. Operations and fractions are encountered as they purchase and share food; data are analyzed as they make sense of the score chart. The black-and- white design of a soccer ball leads to an activity to determine which color a player would more likely touch at random; the geometric designs of pentagons and hexagons are also considered. Probability is the focus of deciding who starts the game with activities like tossing the bat or flipping a coin. Concepts: measurement, statistics, probability, time, estimation, counting.

CHAPTER FIVE
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

Legislators and educators throughout the nation and Washington State have been focusing on student achievement as well as better methods to teach our students. The adopted mathematics curriculum used in the author's school district was not consistent with the recommendations set forth by the National Council of Teachers of Mathematics (NCTM) and the Washington State Commission on Student Learning's (WSCSL) Essential Academic Learning Requirements (EALRs). This project was designed to integrate children's literature to supplement and enhance the MathLand curriculum currently being used in the author's school district. First, the author reviewed the recommendations and goals set forth by the NCTM and the WSCSL. Second, research was done to explore the benefits of integrating children's literature and mathematics. From this research, a purpose for the project was developed. Third, children's literature books were examined and various titles were chosen which would provide meaningful and stimulating learning experiences to strengthen students' mathematical problem solving, communication, reasoning, and connections skills. Next, mathematical activities and worksheets were developed from these titles and they were aligned with the National Council of Teachers of Mathematics recommendations and the Washington State Commission on Student Learning's EALRs. Also developed was an annotated bibliography of children's literature titles that could be used to supplement a primary mathematics curriculum.

Conclusion

The author has used most of the activities developed from the children's literature books in the classroom. Some of the activities were much more interesting to the students than others. First, it depended whether the students liked the literature book, and secondly, it seemed that the students wanted to take a paper home to share with their family. The mathematics curriculum used by the district is very hands on with many manipulatives, so the students were excited to do something on paper, and when it included writing they were even more excited. The students looked forward to math time and often asked, "Are you reading to us for math?", and then looked to see if there was a literature book out.

The author noticed a unique possessiveness with the literature books that had been read during the math lessons. During Sustained Silent Reading (S.S.R.) time there was usually a race to see who got the latest literature books. Many students would reread the books used during the math lessons several times. During writing time the students were observed writing mathematical problems in their stories. In a science unit on weather the students developed mathematical equations about the number of sunny and snowy days and added those together to get the total number of days. As a result of these activities, the author concludes that the integration of literature-based children's books and the developed activities are beneficial in supplementing and enhancing the school district's adopted mathematics curriculum.

Next year, not all the elementary schools in the author's district will be using the same mathematics curriculum. During the middle of this project, the author's school decided to adopt a new mathematics curriculum called Math Wings, which was developed at Johns Hopkins

University. This curriculum is very structured with specific time frames and requires usage of specific materials during the lessons. Representatives from the University visit schools adopting their program to make sure they are teaching it successfully and are not allowing extra materials. Therefore, at this point, the author does not see the freedom available to pick and choose children's literature books and activities to integrate in my math lessons. After reading the research, choosing books and developing activities, the author wants to use what she has learned. This is especially important after observing the students' excitement over these books and activities.

Recommendations

The author has several suggestions to enhance this project. The first would be to integrate a children's literature book in as many math lessons as possible. There are numerous children's literature books in which mathematical concepts are embedded in the stories that it would be possible to read a different book each day during a math lesson.

The author's second recommendation is to develop activities to enhance these literature titles, especially writing activities when appropriate. When students are able to communicate their thoughts in class, and then write them on paper to share at home, a partnership between teachers, students and parents is developed.

A final recommendation would be to purchase classroom sets of some of the literature-based mathematical stories and allow time in the day for students to read these books. Along with this a checkout system for students to take the book and the class activity home to share with their family would be worthwhile.

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