# *About*
# EVERYDAY MATHEMATICS

## *A Parent Resource Manual*

This resource manual is designed to be a reference throughout your child's K-6 school experience.

## ABOUT EVERYDAY MATHEMATICS: A Parent Handbook

Dear Parents,

The Mathematics Parent Handbook is designed to give you information about the mathematics curriculum taught in our schools. In the past, math instruction was focused on the teaching of arithmetic skills. However, in today's world, mathematics instruction must include problem solving, geometry, algebra, data collection, measurement, probability and statistics. The Garfield Heights School District's mathematics curriculum was written by our local Mathematics Writing Team to meet the standards of the State of Ohio Department of Education, the national level standards (The National Council of Teachers of Mathematics), and the standards of the SMART (Science and Mathematics Achievement Required for Tomorrow) Consortium. The goal is to provide for all children the quality instruction that makes the study of mathematics an engaging, enriching, and successful experience.

The emphasis on problem solving and higher level thinking skills is evident throughout the curriculum. To support this curriculum, the *Everyday Mathematics* program was selected as the adopted text. It was developed around several principles, including the following:

- Children begin school with a great deal of knowledge and intuition on which to build and are capable of handling a more challenging mathematics program.
- The curriculum should begin with children's experience and work to connect that experience with the discipline of mathematics.
- The mathematical experiences that children have in school should reflect the mathematics that they will need in a highly technological age.
- The mathematics that is investigated each year should build directly upon experience from previous years, with students studying topics in increasing depth.
- The curriculum should include practical routines to help build arithmetic skills and quick responses that are essential in a problem-rich environment.

As your child progresses through the *Everyday Mathematics* curriculum, you may have questions about the processes, procedures, and/or content used in the program. This manual is designed to assist you in understanding the mathematics that your child is experiencing, and to give you assistance and support as you help your child at home. Information on the concepts, processes and vocabulary of the program are included, as well as links to Garfield's Mathematics Course of Study and the Ohio Academic Content Standards in Mathematics.

The *Everyday Mathematics* program creates an environment that involves children in thinking, exploring, discovering, and doing mathematical tasks. You may observe your child using a different approach than you experienced as a child. Understanding the concepts *behind* facts and procedures is equally as important as mastering the basic facts. Encourage your child to explain the thinking that leads to the solution. You may find he/she is pretty sophisticated in problem solving.

Dr. Randy Continenza
Coordinator of Curriculum and Instruction

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## Ohio Mathematics Academic Content Standards


**Number, Number Sense and Operations Standard**
Students demonstrate number sense, including an understanding of number systems and operations and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods.

**Measurement Standard**
Students estimate and measure to a required degree of accuracy and precision by selecting and using appropriate units, tools and technologies.

**Geometry and Spatial Sense Standard**
Students identify, classify, compare and analyze characteristics, properties and relationships of one-, two- and three-dimensional geometric figures and objects. Students use spatial reasoning, properties of geometric objects, and transformations to analyze mathematical situations and solve problems.

**Patterns, Functions and Algebra Standard**
Students use patterns, relations and functions to model, represent and analyze problem situations that involve variable quantities. Students analyze, model and solve problems using various representations such as tables, graphs and equations.

**Data Analysis and Probability Standard**
Students pose questions and collect, organize, represent, interpret and analyze data to answer those questions. Students develop and evaluate inferences, predictions and arguments that are based on data.

**Mathematical Processes Standard**
Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas.

*Note: Mathematical processes are used in all content areas and should be incorporated within instruction and assessment of the content-specific standards, benchmarks and grade-level indicators.*

# Excerpts from Course of Study

## Mathematics Program Goals

The goals of the mathematics program are:

- Enable students to become mathematical problem solvers.
  - Provide students with a variety of problem-solving approaches.
  - Give students opportunities to investigate, understand, and interpret mathematical content through the problem-solving process.
  - Help students to apply problem-solving strategies within and outside mathematical contexts.
  - Support students in the development of practical and appropriate computational skills.
- Help students to learn to reason mathematically.
  - Provide students with opportunities to draw logical conclusions deductively and inductively.
  - Provide students with opportunities to use mathematics in making generalizations and drawing conclusions.
  - Encourage students to appreciate the use and power of mathematical reasoning.
  - Assist students in using technology to investigate and develop understanding of mathematical concepts.
- Develop in students the ability to communicate mathematically.
  - Enable students to understand and use the language and symbolism of mathematics.
  - Help students to understand, interpret, and express mathematical ideas orally, graphically, symbolically, and in writing.
  - Provide students with opportunities to collect and analyze data, formulate questions and make statements about mathematical ideas.
- Develop in students a confidence in their ability to do mathematics.
  - Help students to develop a positive attitude toward mathematics.
  - Help students to acquire skill in using basic mathematical processes.
  - Help students to develop their curiosity about mathematics through inquiry, exploration, and experimentation.
- Allow students to learn the value of mathematics in their lives and careers.
  - Enable students to understand the role mathematics plays in their education and daily lives.
  - Provide students with a mathematical foundation that allows them to pursue careers in a technological society.
  - Make students aware of the ways that mathematics can be used to enrich the quality of careers and lives in a changing society.
  - Present opportunities for students to apply mathematics in relevant problem-solving exercises.

# Math Program K – Grade 5

## Number and Operations

Kindergarten:
- Count, order and compare objects and numbers.

First Grade
- Understand the concept of place value, and the operations of addition and subtraction

Second Grade
- Add and subtract fluently with single digit numbers
- Apply strategies for the addition and subtraction of two-digit numbers
- Estimate quantities without knowing them exactly

Third Grade
- Add and subtract fluently with two- and three-digit numbers
- Represent multiplicative reasoning
- Understand that fractions are parts of a whole

Fourth Grade
- Multiply fluently
- Model, represent, and explain division
- Determine reasonableness of answers

Fifth Grade
- Compute fluently with whole numbers using all four operations
- Relate equivalent forms of commonly used fractions, decimals, and percents

## Algebra

Kindergarten:
- Sort objects according to an attribute

First Grade
- Recognize and extend patterns

Second Grade
- Generalize a pattern and determine a rule

Third Grade
- Describe, extend, and make generalizations about geometric and numeric patterns

Fourth Grade
- Use relationships in patterns to make predictions by using tables, charts, physical objects and symbols

Fifth Grade
- Validate a given solution for a simple equation or inequality
- Use symbolic algebra to represent and explain mathematical relationships

## Measurement

Kindergarten
- Recognize intervals of time on a calendar

First Grade
- Use nonstandard units to measure

Second Grade
- Use units of time
- Use appropriate units of measurement

Third Grade
- Understand reasons for standard units of measurement

Fourth Grade
- Convert whole number measurements within each system
- Define and determine perimeter

Fifth Grade
- Define and determine area

## Geometry

Kindergarten
- Identify and describe common shapes

First Grade
- Identify and compare two-dimensional shapes

Second Grade
- Identify and compare two- and three-dimensional shapes

Third Grade
- Identify, compare, and analyze attributes of two- and three-dimensional shapes

Fourth Grade
- Use appropriate vocabulary to describe geometric properties and relationships

Fifth Grade
- Identify and determine relationships among the radius, diameter, center and circumference of a circle
- Describe and classify fundamental relationships among shapes

## Data Analysis and Probability

Kindergarten
- Represent data by sorting and classifying objects according to attributes

First Grade
- Collect, sort, and analyze data

Second Grade
- Read and interpret graphs and charts
- Verify or justify conclusions drawn from data

Third Grade
- Translate information among charts, tables, and graphs
- Describe the likelihood of an event

Fourth Grade
- Appropriately represent and interpret data
- Relate basic probability concepts to realistic situations

Fifth Grade
- Use a sample to project the information for a larger population
- Understand probabilities from 0 to 1 inclusive

## The Integral Links – Mathematical Processes

A mathematics curriculum is more than a set of isolated content standards. The framework that connects the concepts consists of five equally important process standards that are interwoven and interdependent. The National Council of Teachers of Mathematics (NCTM) recognizes problem solving, reasoning and proof, communication, representations, and connections as the process standards that are vital to a comprehensive understanding of mathematics.

Problem solving, an essential tool for learning and applying mathematics, should be embedded in all aspects of the curriculum. Moreover, integration of content to other disciplines through problem solving gives meaning and purpose to the acquisition of mathematics skills. Flexibility in the application of problem solving skills enables various strategies to be applied to a single situation. Reflecting upon strategies used and reasonableness of solutions develops habits of self-assessment.

Reasoning and proof are indicative of logical thought and reflection among concepts and situations. It guides the learner on a journey through all of the facts, procedures, and concepts necessary to make sense of problems and their solutions. Questioning, hypothesizing, testing and analyzing conjectures contribute to the justification and communication of conclusions. Reasoning and proof lead to conclusions about general properties and relationships and encourage self-expression and self-assessment.

Communication of mathematical thought is vital in a society saturated with advanced technology. In order to share thinking, students have to organize and clarify their thought processes and learn to listen carefully and critically to others. It is important that mathematical language and vocabulary be emphasized at the developmentally appropriate time, leading to precise and formal explanations. Participation in discussions, analyzing multiple strategies and solutions, and providing written arguments will facilitate language development. The use of technology in the forms of calculators, computers, and the Internet will become increasingly important in the lives of today's students.

Representation is the key to understanding mathematics at all levels. As students progress through school, they acquire the ability to represent ideas developed over time by using physical models, informal representations, symbols, equations, charts, and graphs. As students communicate their thinking about mathematics to others, these representations serve as tools for thinking about and solving problems. "If mathematics is the 'science of patterns,' representations are the means by which those patterns are recorded and analyzed." (NCTM, 2000)

Connections among mathematical concepts occur when students link prior knowledge to new concepts across the curriculum. Although mathematics instruction is often partitioned, a curriculum that emphasizes the interrelatedness of the content standards empowers the learner with the utility of mathematics. The learning of mathematics should build upon previous experiences rather than repeat what has already been learned. School mathematics experiences at all grade levels should include learning opportunities for students to apply concepts to problems arising in contexts outside of mathematics.

A mathematics curriculum is the sum of all of its parts. The process standards are the glue that cement the content standards together. The process standards and the content standards converge to strengthen the underlying unity of the mathematics curriculum.

## Why Everyday Mathematics?

***Everyday Mathematics*** is the elementary component of the University of Chicago School Mathematics Project (UCSMP), which is a long-term project designed to improve mathematics at all grade levels. Garfield Heights is using the Third Edition, 2007 copyright.

International studies show that the U.S. students learn much less math than students in other countries. Several corporations and organizations including the Amoco Foundation, National Science Foundation, Ford Motor Company, General Electric, Citicorp, Exxon, and the Carnegie Foundation grouped together to fund UCSMP because they saw the need to improve mathematics instruction for today's world. The writers researched math instruction around the world, and then developed the program one grade level at a time, field-testing and refining it before continuing.

***Everyday Mathematics*** introduces students to all of the major domains – number sense, algebra, measurement, geometry, data analysis, and probability – beginning in kindergarten. The program emphasizes higher-order and critical-thinking skills using everyday, real-world problems and situations while also building and maintaining basic skills, such as fluency in fact recall. Calculators are used as tools for learning mathematics, not simply computation.

***Everyday Mathematics*** is written based on a spiral curriculum, meaning a specific concept is taught in different contexts at least five times in two years. This gives your child many opportunities to grasp the concept when developmentally ready to do so. Children are involved in sharing ideas through discussions that clarify and solidify their learning. They will explore, learn and practice mathematics individually, with partners, in small groups or whole class settings. They will learn to work cooperatively, collaboratively, and independently as they solve problems based on real-life situations. Students are taught to question and verify the reasonableness of their own and others' strategies and conclusions. The ultimate goal is that students really understand and are successful at mathematics.

This parent handbook has been compiled to answer some of your questions and assist you in helping your child at home. You are a very important part of your child's education. Thank you for your interest and support of quality mathematics.

## Everyday Mathematics Materials

*Everyday Mathematics* materials let children explore the full range of mathematics across all grade levels. Math activities are connected to past experiences and studied in a problem-rich environment with links to many areas both within mathematics and other subject areas. Each grade level includes content from the areas listed below.

**Numeration and Counting:** saying, reading, and writing numbers; counting patterns; place value; whole numbers, fractions and decimals

**Operations and Number Relations:** number facts; operation families; informal work with properties

**Problem Solving and Number Models:** mental and written arithmetic along with puzzles, brain teasers and real-life problems

**Measurement and Reference Frames:** Personal references and tools used in measures of length, width, area, weight, capacity, temperature and time; clocks; calendars; timelines; thermometers; ordinal numbers; area, perimeter and volume

**Exploring Data:** collecting and ordering data; creating, reading and interpreting tables, charts and graphs; exploring uncertainty; fairness; making predictions; probability

**Geometry:** exploring two- and three-dimensional shapes; coordinate grids

**Rules and Patterns:** functions, relations, attributes, patterns and sequences

**Algebra and Uses of Variables:** generalizing patterns, understanding and writing equations for number stories, exploring variables, solving equations

Children often work together with partners and small groups, sharing insights about math and building on each other's discoveries. Talking about math is an important part of thinking about math, and verbalizing helps clarify concepts. Cooperative grouping helps children work together as a team, develops good listening habits, and stimulates their learning.

People rarely learn something new the first time they experience it. For this reason, key ideas are repeated, usually in slightly different contexts, several times throughout the year. New material follows the 2/5 rule – that is, a concept is informally introduced for two years before it is formally studied, and once introduced, the concept is practiced in five or more different settings.

The materials that you see and hear about vary somewhat by grade level and are probably different than those that you remember from elementary school.

The **Student Reference Book** is a resource for students in grades 3-5. It consists of brief summaries of the major mathematical topics in each grade, a section on calculator usage, rules of some of the games (4-5), a glossary, project descriptions and reference materials.

The **journal** contains the problem material and pages on which the children record the results of their activities. It provides a record of their mathematical growth over time and is used in place of student worksheets, workbooks, and textbooks.

**Math boxes** are 4 to 6 short problems for review and practice. In the upper grades these are included as a part of the student journals.

**Mathematical games** are an important part of the *Everyday Mathematics* program. They reinforce math fact computation and provide an alternative form of practice. They build fact and operation skills, but also reinforce other skills: for example, calculator skills, money exchange and shopping skills, logic, geometric intuition, and probability and chance intuition. Games can be repeated without repeating the same problem since most games involve generating numbers randomly.

## Everyday Mathematics Materials *(continued)*

Rules can be altered to allow players to progress from easy to more challenging versions. Games are fun; families can play them at home to provide additional practice in an interesting way. Some games can be played by students across a variety of grade levels. Family letters contain summary versions of the game directions.

Evidence is growing that students' intelligent use of **calculators** enhances understanding and mastery of arithmetic and helps develop good number sense. Moreover, teacher experience and considerable research show that most children develop good judgment about when to use and when not to use calculators. Students learn how to decide when it is appropriate to solve an arithmetic problem by estimating or mentally calculating, by using paper and pencil, or by using a calculator.

Calculators are useful teaching tools. They make it possible for young children to display and read numbers before they are skilled at writing numbers. Calculators can be used to count by any number, forward and backward. They also allow children to solve interesting, everyday problems requiring calculations that might otherwise be too difficult for them to perform.

Please encourage children to use their calculators whenever they encounter interesting numbers or problems that may be easier to handle with calculators than without them. This includes numbers or problems that may come up outside of the mathematics period. Encourage them also to think about when not to use a calculator because it is easier and faster to solve a problem mentally.

**Explorations** are independent or small group activities that allow children to investigate and develop math concepts. These are a key part of the math program in the early grades and often involve manipulative materials.

Yearlong **projects** such as the World Tour in fourth grade or the fifth grade American Tour, link mathematics to social studies. Third grade children trace sunrise, sunset, and length of day, exploring and using the connections between math and science.

**Home Links/Study Links** provide an important connection between home and school. Most are activities that require interaction with parents, other adults, or another child. They are designed to provide follow-up, practice, and review of skills and concepts, and an extension of the material covered in the daily lessons. It is important for your child to bring the Home Link/Study Link back to class each day.

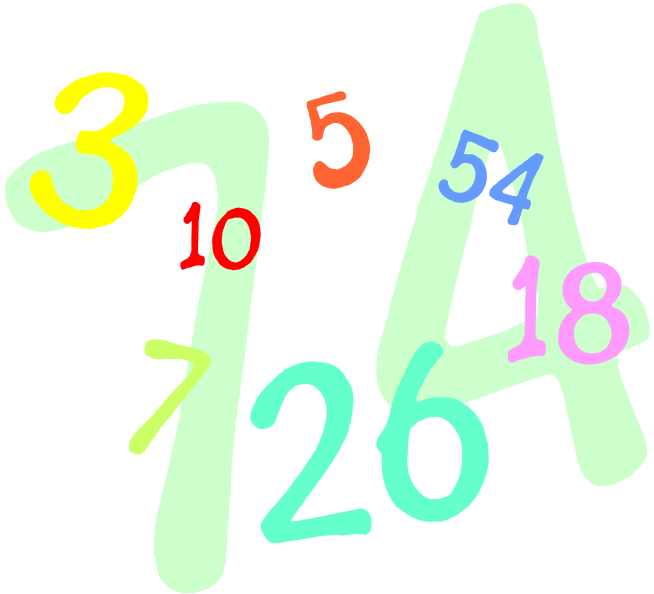
Students use a variety of math tools throughout the year. A ruler, tape measure, geometry template, counters, and money are among the items kept in the **math tool kit**. Children learn responsibility for their learning tools and have them available when needed.

## Computation in Everyday Mathematics

The treatment of computation in *Everyday Mathematics* involves three stages:

- In the early phases of learning an operation, children are encouraged to invent their own procedures. They are asked to solve non-routine problems involving the operations before they have developed or learned systematic procedures for solving such problems. This approach requires students to focus on the meaning of the operation. It also provides a meaningful context for developing accurate and efficient procedures.
- Later, when students thoroughly understand the concept of the operation, they examine several alternative algorithms. In this stage, students are encouraged to experiment with various algorithms and to become proficient with at least one.
- Finally, students are asked to demonstrate proficiency in at least one method. The program offers a focus algorithm for each operation to facilitate and support this phase of instruction. All students are expected to demonstrate proficiency with the focus algorithms, though they are not required to use them if they have alternatives they prefer. Focus algorithms provide a common language for further work, especially across grade levels and classrooms, and offer reliable alternatives for children who have not developed effective procedures on their own.

It is important that children have a chance to develop their own computation methods *before* they receive formal instruction in algorithms, especially standard algorithms. Learning standard algorithms too early may inhibit the development of their mathematical understanding and cause them to miss the rich experiences that come from developing their own methods. *Extensive research shows the main problem with teaching standard algorithms too early is that children then use the algorithms as substitutes for thinking and common sense.*



## Algorithms and Computation

**An algorithm is a set of rules for solving a math problem which, if done properly, will give a correct answer each time.**

Algorithms generally involve repeating a series of steps over and over as in the borrowing and carrying algorithms and in the long multiplication and division algorithms. The *Everyday Mathematics* program includes a variety of suggested algorithms for addition, subtraction, multiplication and division. Current research indicates a number of good reasons for this – primarily, that students learn more about numbers, operations, and place value when they explore math using different methods.

Arithmetic computations are generally performed in one of three ways: (1) mentally, (2) with paper and pencil, or (3) with a machine, e.g., calculator or abacus. The method chosen depends on the purpose of the calculation. If we need rapid, precise calculations, we would choose a machine. If we need a quick ballpark estimate or if the numbers are "easy," we would do a mental computation.

The learning of the algorithms of arithmetic has been, until recently, the core of mathematics programs in elementary schools. There were good reasons for this. It was necessary that students have reliable, accurate methods to do arithmetic by hand, for everyday life, business, and to support further study in mathematics and science. Today's society demands more from its citizens than knowledge of basic arithmetic skills. Our students are confronted with a world in which mathematical proficiency is essential for success. There is general agreement among mathematics educators that drill on paper/pencil algorithms should receive less emphasis and that more emphasis be placed on areas like geometry, measurement, data analysis, probability and problem solving, and that students be introduced to these subjects using realistic problem contexts. The use of technology, including calculators, does not diminish the need for basic knowledge, but does provide children with opportunities to explore and expand their problem solving capabilities.

### Sample Algorithms

Listed below and on the following pages are examples of a few procedures that have come from children's mental arithmetic efforts. As parents, you need to be accepting and encouraging when your children attempt these computational procedures. As they experiment and share their solutions strategies, please allow their ideas to flourish.

**Addition Algorithms**

1. Left to Right Algorithm:

A.
$$\begin{array}{r} 3\ 5\ 6 \\ +\ 5\ 8\ 5 \\ \hline 8\ 13\ 11 \\ 9\ \ 3\ 11 \\ \hline 9\ 4\ 1 \end{array}$$

1. Add.
2. Adjust 10s and 100s.
3. Adjust 1s and 10s.

B.
$$\begin{array}{r} 3\ 5\ 6 \\ +\ 5\ 8\ 5 \\ \hline 8^{1}\ 3^{1}\ 1 \\ \hline 9\ 4\ 1 \end{array}$$

1. Left to Right Algorithm
   A. Starting at the left, add column-by-column, and adjust the result.
   B. *Alternative procedure:* For some students the process becomes so routine that they start at the left and write the answer column by column, changing as they go without writing any additional steps. To explain, they might say, *"Well, 300 plus 500 is 800, but (looking at the next column) I need to adjust that, so write 9. Then, 50 and 80 is 130, but that needs adjusting, so write 4. Now, 8 and 3 is 11, no more to do, write 1."*

   Experiences with manipulatives, such as base-10 blocks and money, and exchange or trading games easily lead students to this procedure.

## Algorithms and Computation *(continued)*

2. Partial-Sums Algorithm:

```
  356
+ 585      1. Add 100s.
  800      2. Add 10s.
  130      3. Add 1s.
+  11      4. Add partial
  941         numbers.
```

2. Partial-Sums Algorithm
   Add the numbers in each column. Then add the partial sums. This algorithm is used by students who understand place value in addition.

3. Rename the first addend, and then the second.

```
356 →  (+4) →  360 →  (+40) →  400
+585 →  (–4) → +581 →  (–40) →+541
                          Add.   941
```

Explanation: Adjust by 4, and then by 40.

Rename the second addend, and then the first.

```
356 →  (–5) →  351 →  (–10) →  341
+585 →  (+5) → +590 →  (+10) →+600
                          Add.   941
```

Explanation: Adjust by 5, and then by 10.

3. Opposite – Change Rule Algorithm
   The purpose of this algorithm is to rename the addends so that one of the addends ends in zero. When an amount is added to one addend and subtracted from the other, the sum remains the same. Students show good number sense and some understanding of equivalent forms when they use this technique.

4. Counting-On Algorithm

356 + 585

356 + 5 one-hundreds:
356, 456, 556, 656, 756, 856

+ 8 tens:
856, 866, 876, 886, 896, 906, 916, 926, 936

+ 5 ones:
936, 937, 938, 939, 940, 941

4. Counting-On Algorithm
   Child "adds" by counting from a specified number.

### Subtraction Algorithms

1. Counting-Up Algorithm:

```
483  ↙ +   7
490  ↙ +  10
500  ↙ + 200
700  ↙ +  42
742
Add.    259
```

1. Counting-Up Algorithm
   Add up from the subtrahend (bottom number) to the minuend (top number).
   742
   - 483

   Using multiples of 10 and 100, students count up to the minuend. They may work mentally or use paper and pencil. This method is often used when making change.

2. Left-to-Right Algorithm

```
                  742
1. Subtract 100s  - 400
                  342
2. Subtract 10s   -  80
                  262
3. Subtract 1s    -   3
                  259
```

2. Left-to-Right Algorithm
   Starting at the left, subtract column by column. First subtract the 100s, then the 10s, and finally the 1s.
   742
   - 486

## Algorithms and Computation *(continued)*

3. Trade-First Algorithm.

| | 100s | 10s | 1s |
|---|---|---|---|
| Write the problem in place value columns. | 7 | 4 | 2 |
| | - 4 | 8 | 3 |
| | 6 | 14 | |
| Check tens column. Trade if necessary. | ~~7~~ | ~~4~~ | 2 |
| | - 4 | 8 | 3 |
| | | 13 | |
| Check ones column. Trade if necessary. | 6 | ~~14~~ | 12 |
| | ~~7~~ | ~~4~~ | ~~2~~ |
| | - 4 | 8 | 3 |
| Subtract | 2 | 5 | 9 |

3. Trade-First Algorithm

All regrouping is done before any subtracting is done. If any digit in the top number is less than the digit below it, adjust the top number by trading.

4. Partial Differences

| | | | |
|---|---|---|---|
| 7 | 4 | 2 | |
| - 4 | 8 | 3 | |
| + 3 | 0 | 0 | Subtract 100s |
| | - 4 | 0 | Subtract 10s |
| | | - 1 | Subtract 1s |
| 2 | 5 | 9 | Total (300-40-1) |

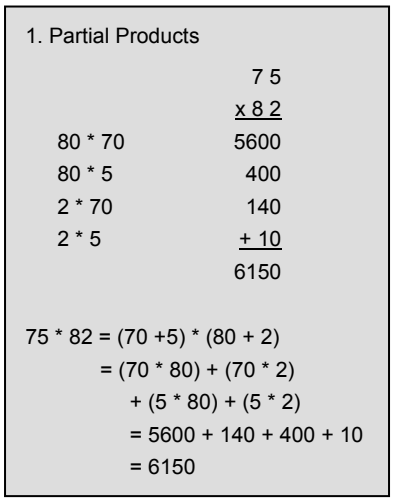
4. Partial Differences

This method invites the understanding of negative numbers. For example, 4 tens minus 8 tens equals negative 4 tens or -40. Students who easily use the number line will sometimes use this method.

## Algorithms and Computation ***(continued)***

### Multiplication Algorithms

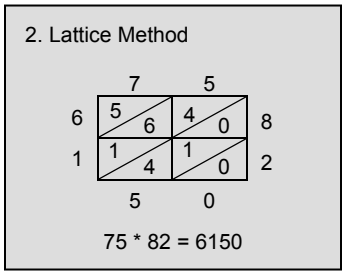
When multiplication models are introduced in grades 2 and 3, the x symbol is used. In grades 4 and 5, the * is used. The * is on computer keyboards and is frequently seen in print. It is not likely to be confused with the letter "*x*," the decimal point (as a "dot") or an addition sign. Eventually, children learn to indicate multiplication by writing symbols next to each other: (15)(23), 2a, A = *lw*.




1. Partial Products Algorithm

   Each factor is thought of in extended sums of ones, tens, hundreds, and so on. 75 is 70 + 5, 82 is 80 + 2. Then each part of one factor is multiplied by each part of the other factor, resulting in "partial products." The sum of these parts is the final product.

   The principles behind this algorithm develop the understanding for multiplying polynomials.




2. Lattice Method

   This method has been around for hundreds of years, with some historians tracing it to Hindu origins in India before 1100. Students practice basic multiplication facts while computing with large numbers.

Procedure:

1) Draw the lattice, making a box for each digit. Write the digits for the first number across the top, one for each box. Write the digits for the second number along the side, one for each box.
2) Draw a diagonal in each box. Multiply each digit across the top with the digits down the side. Place the ten's digit of the product above the diagonal and the one's digit below the diagonal.
3) Start in the lower right corner and add the digits along each diagonal. Write the sum(s) outside the box, carrying the tens digit to the next diagonal, if needed.
4) Read the answer beginning top left around to bottom right.

Note: Lattice multiplication works because each diagonal corresponds to place-value columns.

## Algorithms and Computation *(continued)*

### Division Algorithms

1. Partial Quotients

```
27) 648
   -540     20    (27 * 20)
    108
    108   + 4    (27 * 4)
      0     24
```

1. Partial-Quotients

In learning this method, students can acquire useful insights into the operation of division without undue costs in time, effort, and frustration.

Begin with the question, "How many 27s in 648?" Think of 10s or multiples of 10 for quick mental calculation (27 * 20 = 540). Next, "How many 27s in 108?" (4 * 27 = 108) Add the partial quotients (20 + 4) to get the answer of 24.

Students may not make the same series of partial quotients. For example, one student might have started with only 27 * 10, or might have used 27 * 2 instead of 4. The student would reach to same final answer, but complete more steps.

One advantage of this algorithm is that students can use numbers that are easy for them to work with. It can be extended to decimals as well. Estimation and mental math skills are practiced.

2. Column Division

```
    1   2   8 R3
  ------------
5) 6  /4  /3
  -5  14  43
  ---------
   1 -10 -40
  ---------
       4   3
```

2. Column Division

This method is a simplification of the traditional algorithm, as well as easier to learn. In column division, vertical lines separate the digits in the dividend, focusing on one place value at a time.

1) Think of the 6 as 600 to be divided by 5 people (or groups). Each person gets one 100. Write "1" in hundred's place. There is one 100 remaining.
2) Trade the 100 for 10 tens. Add to the 4 tens for a total of 14 tens. Share the 14 among the 5; each person gets 2 with 4 tens remaining.
3) Trade the 4 tens for 40 ones, add to the 3 ones for a total of 43 ones. Each of the five would receive 8 ones with 3 remaining.

Even those students whose basic facts and estimation skills are limited can be successful with this approach, and it greatly reduces errors.

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## Diagrams

One way to understand something is to examine how it is used. In *Everyday Mathematics* operations are approached by looking at how they are used. Diagrams are used to help sort out various kinds of problem situations and to organize the given information. It is important to remember, however, that diagrams are simply devices to help organize problem solving, not ends in themselves.

In a traditional curriculum much of the arithmetic is separated from everyday situation. Understanding arithmetic has been reduced to simply using the skills involved in getting a sum or product. In *Everyday Mathematics,* understanding an operation means much more than how to get a result. It also means learning to choose an operation that is right for a given situation.

One strategy for figuring out which operation may help solve a problem is based on the observation that each operation is used in different ways. For example, one use of multiplication is to calculate the area of an 8-ft. by 12-ft. wall. Area of a rectangle is length times width, so you multiply. This use of multiplication, however, is no help if you want to figure out how many miles you walk in 3 hours at 2 miles per hour.

To organize different uses of operations, *Everyday Mathematics* presents several **operations diagrams** that break down the major uses of each operation. The diagrams are templates to be filled in for particular problems. Diagrams first appear in second grade. Some children do not need to organize their thinking on paper, and to require them to do so would be counterproductive. For most students, however, diagrams lead to understanding.

### Addition and Subtraction Diagrams

The diagrams described below help students keep track of what is known, what is needed, and which operation to use to solve addition and subtraction problems.

1a. Parts & Total Diagram

| Total ? | | |
|---|---|---|
| 12 Part | 8 Part | 5 Part |

1b. Parts & Total Diagram

| Total 35 | |
|---|---|
| 20 Part | ? Part |

2a. Change Diagram

| Start | | End |
|---|---|---|
| 25 | +5 | ? |

2b. Change Diagram

| Start | | End |
|---|---|---|
| 35 | -6 | ? |

1. Parts and Total Diagrams. A parts and total diagram is used to represent problems in which two or more quantities (parts) are combined to form a total quantity.
   *Example 1a:* Twelve fourth graders, 8 third graders and 5 first graders are on a bus. How many children in all are on the bus? The parts are known. You are looking for the total. Possible number model: 12 + 8 + 5 = 25.
   *Solution:* There are 25 children on the bus.

   If you know the total but not all of the parts, then you could use subtraction instead of addition to find the unknown part.
   *Example 1b:* Thirty-five children are riding on the bus. Twenty of them are boys. How many girls are riding on the bus? One part and the total are known. You are looking for the other part.
   Possible number models: 20 + 15 = 35 35 – 20 = 15
   *Solution:* There are 15 girls on the bus.

2. Change Diagrams. Change diagrams are used to represent problems in which a given quantity (start) is increased or decreased.
   *Example 2a:* Twenty-five children are riding on the bus. At the next stop, 5 more children get on. How many children are on the bus now? The number with which you started has been increased.
   Possible number model: 25 + 5 = 30
   *Soluti on:* There are 30 children on the bus now.
   *Example 2b:* A bus leaves school with 35 children. At the first stop, 6 children get off. How many children are left on the bus?
   The number with which you started has been decreased.
   Possible number models: 35 – 6 = 29 6 + 29 = 35
   *Solution:* There are 29 children left on the bus.

## Diagrams *(continued)*

3. Compare Diagram

| Quantity |
|---|
| 12 |

| Quantity | Difference |
|---|---|
| 8 | |

3. Compare Diagrams. Compare diagrams are used to represent problems in which two quantities are given and you try to find how much more or how much less one quantity is than the other (the difference).
*Example:* There are 12 fourth graders and 8 third graders. How many more fourth graders are there than third graders? You are comparing the number of fourth graders with the number of third graders.
Possible number models: $12 - 8 = 4$ $8 + 4 = 12$ (for children who count up, or add, to find differences)
*Solution:* There are 4 more fourth graders than there are third graders. It is important to remember that diagrams are simply devices to help organize problem solving. They are not ends in themselves.

### Multiplication and Division Diagrams

There are three types of multiplication/division diagrams: rate, acting-across, and scaling. Note in the following examples for each diagram that there are three parts to each diagram. Two of the three are simple measure or counts. The third part is compound, meaning that it is either a product or a quotient of the two simple parts.

- In a **rate diagram**, the compound part is a quotient of two different units, such as miles per hour.
- In an **acting across diagram**, the compound part is a product of two units: Sometimes different, such as kilowatt-hours; and other times the same, such as square feet or $ft^2$.
- In a **scaling diagram**, the compound part is a ratio of the same units. In these diagrams the compound part has no unit.

### Rate Diagrams

1a. Rate Diagram

| Units | rows | chairs per row | chairs |
|---|---|---|---|
| **Numbers** | 6 | 4 | ? |

There are 24 chairs in all.

1a. In **rate multiplication** situations, the number of groups and the number of objects in each group are known. You need to find the total number of objects. These are sometimes called **array multiplication** situations.
*Example 1a:* There are 6 rows with 4 chairs in each row. How many chairs are there in all?
To find the total number of *chairs*, you can multiply. Possible number model: $6 * 4 = 24$ *Solution:* There are 24 chairs in all.

1b. Rate Diagram

| Units | children | cards per child | cards |
|---|---|---|---|
| **Numbers** | 4 | ? | 24 |

Each child gets 6 baseball cards.

1b. In **equal-sharing** situations, the number of groups and the total number of objects are known. You need to find the number of objects in each group.
*Example 1b:* Twenty-four baseball cards are shared equally by 4 children. How many cards does each child get? To find the number of cards per child, you can divide, or ask, "What times 4 is 24?"
Possible number models: $24 / 4 = 6$; $4 * 6 = 24$
*Solution:* Each child gets 6 **baseball** cards.

1c. Rate Diagrams

| Units | tables | chairs per table | chairs |
|---|---|---|---|
| **Numbers** | ? | 6 | 33 |

Five tables can have chairs.
There are 3 chairs left over.

1c. In **equal-grouping** situations, the number of objects per group and the total number of objects are known. You need to find the number of groups.
*Example 1c:* Each table must have 6 chairs. There are 33 chairs. How many tab*les can ha*ve 6 chairs? To find the number of tables, you can divide. Possible number model: $33 / 6 \rightarrow 5$ R3.
*Solution:* Five tables can have chairs. There are 3 chairs left over.

## Diagrams *(continued)*

### Acting-Across Diagrams

2a. Acting-Across Diagram

| Units | ft. | ft. | sq. ft. |
|---|---|---|---|
| **Numbers** | 3 | 6 | ? |

The area of the rug is 18 sq. ft. or 18 ft.

2a. In multiplication acting-across situations, quantities with different units are multiplied. The diagrams show that the product is expressed in compound units, such as square feet or people-hours.

*Example 2a:* What is the area of a 3-ft. by 6-ft. rug?
Possible model: 3 * 6 = 18
*Solution:* The area of the rug is 18 square feet.

2b. Acting-Across Diagram

| Units | people | people hours | hours |
|---|---|---|---|
| **Numbers** | 8 | 20 | ? |

Each person worked an average of 2.5 hours.

2b. In division acting-across situations, you know a quantity with a compound unit and a quantity with an associated simple unit. Division gives the other quantity with the other simple unit.

*Example 2b:* The 8 people on the pep squad worked a total of 20 people-hours on the assembly. What is the average number of hours each person worked?
Possible number model: 20/8 = 2.5
*Solution:* Each person worked an average of 2.5 hours.

### Scaling Diagrams

3a. Scaling Diagram

| Units | | lb. | lb. |
|---|---|---|---|
| **Numbers** | 3 | 6 | 18 |

Hector weighed 18 pounds at 15 months.

3a. In multiplication scaling situations, a quantity is multiplied by the ratio, which is called a scalar or scaling factor. The diagrams show that the scaling factor has no units. The unit of the product is the same as the unit of the other factor.

*Example 3a:* Hector weighed 6 lb. at birth. At 15 months, he weighed 3 times his birth weight. What was his weight at 15 months? The empty unit boxes in the diagrams show that the scalar has no unit.
Possible number model: 3 * 6 = 18
*Solution:* Hector weighed 18 pounds at 15 months.
Scalars may also be expressed as fractions or percents.

3b. Scaling Diagram

| Units | | $ | $ |
|---|---|---|---|
| **Numbers** | 1/2 | 30 | ? |

The sale price will be $15

*Example 3b:* A store has 1/2 off (or 50% off) sale. What will an item that regularly cost $30 cost during the sale?
Possible number model: 1/2 * 30 = 15
*Solution:* The sale price will be $15.

3c. Scaling Diagram

| Units | | lb. | lb. |
|---|---|---|---|
| **Numbers** | ? | 6 | 18 |

At 15 months, Hector weighed 3 times his birth weight.

There are two different division scaling situations. In one, two quantities are known and their ratio, the scaling factor, is found by division. In the other, a final quantity and the scaling factor are known; division gives the starting quantity.

*Example 3c:* If Hector weighed 6 lb. at birth and 18 lb. at 15 months, how many times his birth weight was his weight at 15 months?
*Solution:* At 15 months Hector weighed 3 times his birth weight.

## Diagrams *(continued)*

3d. Scaling Diagram

| Units | | $ | $ |
|---|---|---|---|
| **Num-bers** | 6 | ? | 18 |

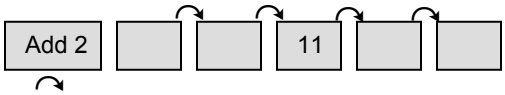
The shirt costs the shop owner $3.

*Example 3d:* If a shop owner sells a shirt for $18, and if this is 6 times her wholesale cost, what does the shirt cost her?
*Solution:* The shirt costs the shop owner $3.
Possible number model for both: 18 / 6 = 3

### Frames and Arrows Diagrams

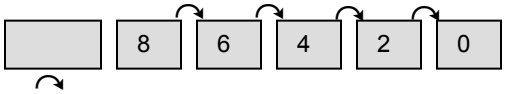
Frames and Arrows diagrams consist of frames connected by arrows to show the path for moving from one frame to another. Each frame contains a number in the sequence; each arrow represents a rule that determines what number goes in the next frame. Frames and Arrows diagrams are also called chains.

In Frames and Arrows problems, some of the information has been left out of the diagram. Children solve the problem by supplying the missing information. A few sample problems follow. The rule is given. Some of the frames are empty. Fill in the blank frames.



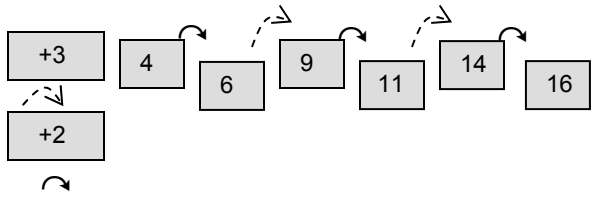

*Solution:* Write 7, 9, 13, and 15 in the blank frames.

The frames are filled in. The rule is missing. Find the rule.




*Solution:* The rule is subtract 2, minus 2, or -2.

A chain can have more than one arrow rule, but the arrow for each rule must look different. In the following example, two different arrows are used to distinguish between two different rules.



## Features, Procedures, Routines & Topics

### Explorations

In *Everyday Mathematics,* the term Explorations means "time set aside for independent, small-group activities." Besides providing the benefits of cooperative learning, small-group work lets everyone have a chance to use manipulatives (such as the pan balance and base-10 blocks). Exploration activities might include the following:

- play and familiarization with manipulatives
- concept development through the use of manipulatives and the recording of outcomes
- assignments with specific objectives, which are especially helpful linking manipulative-based activities to more abstract concepts
- data collecting; includes the use of measuring tools as well as classifying and ordering of data
- games and skill reviews
- problem solving using manipulatives and extending to more abstract levels
- teacher interactions with small groups, both for teaching and for assessment

### Fact Power

In the *Everyday Mathematics* glossary, fact power refers to the ability to recall basic number facts automatically without having to figure them out. Many scientists, in researching the brain and how it learns, have written about the importance of automaticity in complex tasks, and many mathematics educators emphasize the importance of number-fact reflexes.

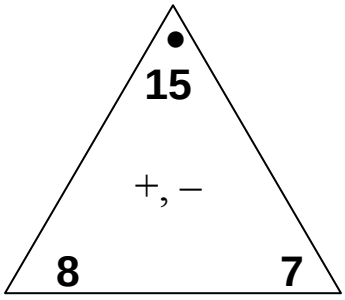
Fact power is developed from good fact habits. Addition and subtraction facts should be secure by the end of second grade. Students work on multiplication and division in grades 3 and 4.

To develop good fact habits, teachers use number games and choral drills. A primary resource, however, are Fact Triangles (see below).

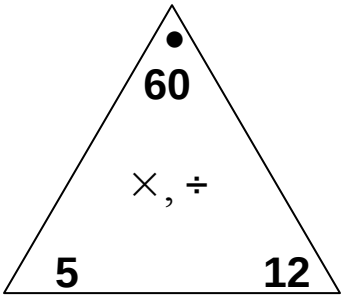
### Fact Triangles

In *Everyday Mathematics,* Fact Triangles are used to practice, and become fluent in, basic facts. Each triangle shows a fact family, or the inverse relationships between the numbers. For example, 7 + 8 = 15, 8 + 7 = 15, 15 – 7 = 8 and 15 – 8 = 7 make a fact family.

Fact Triangles are often recommended in Home Links, but should be used even more frequently for students to work on fluency of basic facts at home.




**Addition/Subtraction Fact Triangle**

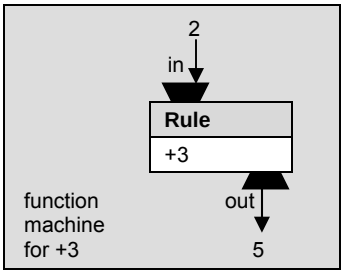



**Multiplication/Division Fact Triangle**

## Features, Procedures, Routines & Topics *(continued)*

### Function Machines

In *Everyday Mathematics,* a function machine is an imaginary machine to help students visualize how numbers are related, or paired, because of specific rule. A number (input) is put into the machine and is then transformed into a second number through the application of a rule.




| Rule +3 | |
|---|---|
| IN | OUT |
| 2 | 5 |
| 8 | 11 |
| 12 | 15 |

Pairings are then displayed in a table of values.

Students play a game called, "What's My Rule?" where 2 of the 3 parts are known (input, output and the rule) and the goal is to find the unknown part.

**Home Links (K-3)/Study Links (4-6)**

Dialog and discussion, as well as experimentation, are at the heart of *Everyday Mathematics*. Parents who have been accustomed to conventional mathematics programs may think that because children are not bringing home daily arithmetic sheets, they are not learning or doing mathematics. The Home Links and Study Links serve as reassurance that this is not the case. Additionally:

- They promote follow-up and provide enrichment, as well as a means of involving parents or guardians in their children's mathematics education.
- The assignments encourage children to take initiative and responsibility.
- The activities help reinforce newly learned skills and concepts.
- Many of the assignments relate what is learned in school to the children's lives outside of school. This helps tie mathematics to their everyday world.
- The assignments can serve as informal assessment tools.
- Most of the Home Links/Study Links are homework assignments that require your interaction. Also, be sure to read the Family Letters your child's teacher sends home throughout the year. Many of these accompany specific Home Links/Study Links in order to help further explain a given activity.

**Math Boxes**

Math Boxes, found in your child's Journal, are used to review material on a regular basis. *Everyday Mathematics* includes Math Boxes for almost every lesson. Math Boxes are divided into either 4 or 6 boxes, or cells. Some of these cells contain review problems to provide continuous practice of skills. Math Boxes are designed as independent activities. Children may work on their Math Boxes individually or with partners.

**Math Messages**

Many teachers begin each day with a Math Message to be completed by the children before the start of the lesson for that day. Math Messages consist of problems to solve, directions to follow, tasks to complete, notes to copy, sentences to complete or correct, or brief quizzes. Most are used as lead-in activities for the lessons of the day or as reviews of previously learned topics. Follow-ups to the Math Messages usually occur during the lesson itself.

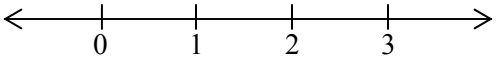
## Features, Procedures, Routines & Topics *(continued)*

### Name Collection Boxes

Name collection boxes offer a simple way for children to experience the idea that numbers can be expressed in many different ways.

| 16 | XVI |
|---|---|
| 10 less than 26 | |
| (2 * 5) + 6 | |
| sixteen | |
| 8 twos | |
| 4 + 4 + 4 + 4 | |

### Number Lines




A number line is a line with numbers marked on it. It extends in both directions and has numbers marked at regular intervals. Examples: ordinary rulers, map scales, radio dials, and growth charts.

### Number Grids

A number grid is a table in which consecutive whole numbers are arranged in rows, usually 10 columns per row.

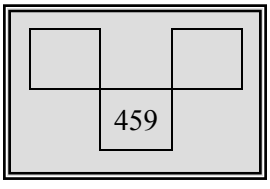
| | | | | | | | | | 0 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 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 |

By exploring the patterns in the digits in rows and columns, children discover that for any number on the number grid, the number that is:

- *1 more is* 1 square to its right;
- *1 less is* 1 square to its left;
- *10 more* is 1 square down;
- *10 less is* 1 square up.

This is true for any 10-across number grid consisting of a set of consecutive whole numbers.

Number-grid puzzles provide practice in number sense and place value concepts. Some, but not all, of the numbers in the grid are missing. For example, in this puzzle, the missing numbers are 448 and 450.




Number grids can be used to explore other number patterns. For example, as children count by 5s, they can color in the multiples of 5. They may discover that each multiple has a 0 or 5 in the one's place.

Number grids may also be extended to negative numbers. This is especially useful when illustrating the order of negative numbers or as an aid for finding differences.

| -19 | -18 | -17 | -16 | -15 | -14 | -13 | -12 | -11 | -10 |
|---|---|---|---|---|---|---|---|---|---|
| -9 | -8 | -7 | -6 | -5 | -4 | -3 | -2 | -1 | -0 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

## Features, Procedures, Routines & Topics *(continued)*

### Double-nine Dominoes

Dominoes help students visualize basic facts as well as develop an understanding of the meanings of addition and subtraction and the relationship between the two operations. They show the vertical and horizontal forms of facts as well as equivalent names of numbers.

### Games

*Everyday Mathematics* sees games as enjoyable ways for children to practice skills and develop problem-solving strategies. They are designed to help students develop good fact power, as numbers in most games are generated randomly to provide continual challenges. Rules can be altered to allow players to progress at their own pace. Games can be played competitively or modified to be cooperative activities, and may span several grade levels.

Rules and directions for games sometimes appear on Family Letters, Home Links/Study Links and, in grades 3-5, in the back of the Student Reference Books. Most games require simple materials such as dice, coins, egg cartons, spinners, cards, and/or calculators, and can be played at home for additional practice.

Due to copyright restrictions, Garfield Heights Schools does not have permission to copy game directions on our website. However, they can be reviewed at the following site:

http://www.auburn.wednet.edu/everydaymath/evrydaymathhome.htm

If you do not have internet access, please contact your child's teacher for a copy of game directions.

You need a deck of number cards for many of the games. You can use an Everything Math Deck, a regular deck of cards, or make your own deck out of index cards.

An Everything Math Deck includes 54 cards. There are four cards each for the numbers 0-10 and there is one card for each of the numbers 11-20.

A deck of playing cards includes 54 cards (52 regular cards, plus 2 jokers). To create a deck of number cards from it, use a permanent marker to mark cards in the following way:

- Mark each of the four aces with the number 1.
- Mark each of the four queens with the number 0.
- Mark the four jacks and four kings with the numbers 11 through 18.
- Mark the two jokers with the numbers 19 and 20.

For some games you will have to make a game board, or a score sheet, or a set of cards that are not number cards. The instructions for doing this are included with the game directions.

## Answers to Frequently Asked Questions

### Basic Facts

**Q:** ***Will my child learn and practice basic facts?***

**A:** Absolutely. The basic facts will be practiced in many different contexts. Fact Triangles, which show fact families and stress the relationships between addition/subtraction and multiplication/division, will be used during class and sent home for additional practice. Games will reinforce the facts in a non-threatening and interesting way. Beginning in grade 4, students take timed tests that are used to identify facts that need more practice. Short, oral drills will be held during transitional times. Children will have multiple opportunities to practice fluency in basic facts.

### Computation

**Q:** ***Does my child have opportunities to learn, develop, and practice computation skills?***

**A:** Yes. Computational proficiency has always been, and will continue to be, an integral part of mathematics education. Children solve problems through number stories about real-life situations that require them to understand the need for computation, which operations to use, and how to use those operations. They often have opportunities to develop and explain their own strategies for solving problems. Mental arithmetic is practiced during Minute Math or 5-Minute Math. Children also frequently round or estimate numbers mentally.

### Algorithm Invention

**Q:** ***What exactly is algorithm invention? And why is it important for my child to invent her own?***

**A:** An algorithm is a series of steps used to solve a problem. Algorithm invention means your child creates and shares her own problem-solving methods before learning a set of prescribed standard algorithms. In other words, she becomes an active participant who must learn to think and reason about how to solve a problem rather than learning only to copy patterns. After the students have had plenty of opportunities to invent computational strategies, the teacher will discuss certain standard algorithms. There is no harm in giving a student a reliable algorithm if she becomes frustrated or resists the challenge of creating her own strategies. However, given a choice, most students do tend to prefer their own procedures. As your child invents her own algorithms, she begins to realize that she can reason about mathematics and solve problems in more than one way. She then becomes a motivated and independent problem-solver who is able to take risks, think logically, reason, create and extend ideas into new settings.

### Assessment

**Q:** ***How do you measure my child's progress? What can you show me that demonstrates what he has learned?***

**A:** Children are given many opportunities to demonstrate mathematical understanding. Teachers observe students in their daily work on slate activities and Math Boxes, and their interactions during group work and games. They evaluate written responses to Math Messages, unit reviews and Checking Progress pages.

Teachers may use a rubric, or a grading framework, for assessing student work. Rubrics may show different skill levels, such as Beginning, Developing, or Secure. This progress check may show area of need and/or challenge for the students.

## Mastery

**Q:** ***Why does my child have to move on to the next lesson if she hasn't mastered skills in the current lesson?***

**A:** Not everyone masters new knowledge at the same time. It depends on her learning and problem-solving styles. *Everyday Mathematics* has a spiral design that informally introduces topics for two years before formal study. The spiral, or repeated exposure, approach offers both consistent follow-up and a variety of experiences. Your child will have the opportunity to increase her understanding of a topic each time it is presented. She will regularly review and practice concepts by playing content-specific games and by completing written exercises and assessments. Your classroom teacher can give you a list of skills your child is expected to master this year.

## Addressing Individual Needs

**Q:** ***Everyday Mathematics seems too difficult for my child. Will he be able to succeed in the program? How can the program address his individual needs?***

**A:** If your child is having difficulty, continue to expose him to the program and give him a chance to meet its high expectations. *Everyday Mathematics* has many open-ended activities that will allow your child to succeed at his current skill level. While playing games, inventing algorithms, writing number stories, and solving problems in Minute Math and Math Boxes exercises, your child will develop his strengths and improve in his weak areas. Rest assured that he will receive repeated exposures to all concepts throughout the program. Furthermore, your child's teacher may group students to best suit their needs. For example, your child may be part of a small group working directly with the teacher or he may be paired with another student. The teacher may also modify or adjust program material according to student needs. Finally, we hope the resources in this handbook will help you work with your student.

## Games

**Q:** ***Why does my child play games in class?***

**A:** *Everyday Mathematics* games reinforce mathematics concepts in a valuable and enjoyable way. Basic facts, computational skills, and the development of increasingly sophisticated solution strategies are important outcomes from playing the games. Games are not seen as tedious drill to the children, but allow your child to carry play into serious practice of number skills. They offer the flexibility to practice more than fact and operation skills. She also could be practicing money exchange, logic, geometric intuition, shopping skills, probability or chance intuition. Because most games involve generating numbers randomly, they can be played over and over without repeating the same problems. This randomness increases the opportunity for her to practice all the facts, not just the ones she knows. Games provide kinesthetic (hands-on) opportunities for students, as well as opportunities to communicate mathematically. Students often ask to play games during free time, lunch, and even recess!

## Calculators

**Q:** ***Why is my child using a calculator? Will he become dependent on the calculator for solving problems?***

**A:** A calculator does not replace the need to learn basic facts, to compute mentally, or to do paper-and-pencil computation. It does, however, allow him to solve problems that involve larger numbers more quickly. He will learn when to use a calculator, and when mental math and/or estimation is actually faster and easier. The calculator is one technicalogical tool that is available to him.

## Standardized Tests

**Q:** ***How do you help your student prepare for standardized tests?***

**A:** The *Everyday Mathematics* curriculum covers concepts and skills students are expected to know for the Ohio Achievement Tests. Classroom teachers help students prepare for standardized mathematics tests by spending more time on the *Everyday Mathematics* games that reinforce basic facts. Teachers also review test-taking strategies, such as looking for reasonableness in an answer. Teachers may include problems in Math Boxes that require students to use these strategies.

## Parent Involvement

**Q:** ***How can I get involved? How can I reinforce my child's mathematics learning at home?***

**A:** Communication between home and school is so important. Take time to review the Family Letters that are sent home at the beginning of each Unit. Keep the letter handy so you can ask your child specific questions about his or her math class. Some teachers provide periodic newsletters to share classroom activities. Play the games and join with your child on the Home Links/Study Links procedures. You may want to volunteer to help in your child's classroom. Teachers usually welcome extra hands, especially during Math games. Work through math problems with your child, and avoid telling the answers. Above all, speak positively about mathematics and show interest and encouragement!

# Math at Home

## Glossary

Due to copyright restrictions, the glossary for *Everyday Mathematics* is not available at the Garfield Schools web site. Please go to the publisher's website below and click on "Everyday Mathematics Glossary."

http://everydaymath.uchicago.edu/parents/index.shtml/ws/1232.php

If you do not have internet access, your child's teacher can provide you with a copy of the Glossary.

## Family Letters

If you need an additional copy of your child's Family Letter, please go to the following website and select the appropriate grade level and unit.

http://www.wrightgrouphttp://everydaymath.uchicago.edu/parents/index.shtml.com/ws/1234.php

If you do not have internet access, your child's teacher can provide you with a copy of the Family Letters.

## Hints for Helping

Following are some suggestions that will enable you to share in your child's experiences in learning mathematics and help you to create an environment in your home that provides encouragement for your child.

- Ask your child to explain the concepts and relationships he/she is studying. Be concerned with the process as well as the end result. Explaining thoughts often helps children to clarify their thinking and their understanding.
- When your child has a question, try not to tell him/her how to solve the problem. Rather, ask questions that will help your child think about the problem in a different way, thus helping him/her to reach a solution.
- Encourage your child to draw diagrams, models, or sketches to help understand or explain a concept or problem.
- Provide a special time and place for study that will not be disrupted by other household activities.
- Play math games with your child. You might also ask your child to teach you a game that he/she learned at school.
- Show interest in your child's experiences in math class. Ask the child to tell about his/her class activities.
- Encourage your child to form study groups with other classmates to work on assignments. By discussing their views and approaches, students provide each other with rich insights about problems and concepts.
- Engage your child in home activities that use a variety of mathematical skills. Encourage your child to use appropriate games and puzzles and to make estimations and talk about math ideas at mealtime, while traveling, while shopping, etc.
- Make triangle flash cards with your child and encourage him/her to memorize the facts. It is important that your child has mastered basic addition/subtraction facts by the end of second grade and multiplication/division facts by the end of fourth grade.
- Take advantage of opportunities to visit your child's math class.

## Math at Home (continued)

| Websites for Students | |
|---|---|
| http://www.aaamath.com | |
| http://www.AIMSedu.org | http://www.math.com |
| http://www.aplusmath.com | http://www.mathcats.com |
| http://www.brainteasers.net | http://www.mathforum.com |
| http://www.eduplace.com/math/brain/ | http://www.puzzlemaker.com |
| http://www.fairlawnschools.org/math | http://www.visualfractions.com |
| http://www.funbrain.com/kidscenter.html | http://www.mathgoodies.com |
| | http://www.c3.lanl.gov/mega-math/index.html |
| http://www.figurethis.org | http://www.coolmath.com |
| http://www.gamequarium.com | http://matti.usu.edu/nlvm/nav/vlibrary.html |
| http://www.auntymath.com | http://www.everydaymath.org/trial.htm |

*some sites may be inactive*

| Websites for Parents | |
|---|---|
| http://www.aaamath.com | http://www.illuminations.nctm.org |
| http://www.AIMSedu.org | http://www.math.com |
| http://www.aplusmath.com | http://www.mathcats.com |
| http://www.brainteasers.net | http://www.mathematicallysane.com |
| http://www.eduplace.com/math/brain/ | http://www.mathforum.com |
| | http://www.nctm.org |
| http://coolmath.com | http://www.NewtonsWindow.com |
| http://www.funbrain.com | http://www.puzzlemaker.com |
| | |
| | http://matti.usu.edu/nlvm/nav/vlibrary.html |
| http://www.mathgoodies.com | http://www.figurethis.org |
| http://www.c3.lanl.gov/mega-math/index.html | http://www.gamequarium.com |
| http://www.everydaymath.org/trial.htm | http://www.everydaymath.org |
| | www.fairlawnschools.org/math |

## Literature List K-3: These trade books contain mathematics content.

### Algebra

Bourke, Linda. *Eye Spy: A Mysterious Alphabet*. San Francisco: Chronicle Books, 1991
Freeman, Don. *Corduroy*. New York: Viking Press, 1968
Hong, Lily Toy. *Two of Everything.* Morton Grove, IL: Albert Whitman & Co., 1993
MacDonald, Suse. *Numblers*. New York: Dial Books, 1988
MacDonald, Suse. *Puzzlers*. New York: Dial Books, 1989

### Data and Chance

Barrett, Judi. *Cloudy with a Chance of Meatballs*. New York: Atheneum, 1978
Carlson, Nancy. *Harriet's Halloween Candy*. New York: Puffin Books, 1994
Munsch, Robert. *Moira's Birthday*. Toronto: Annick Press, 1989
Munsch, Robert. *Purple, Green and Yellow*. Toronto: Annick Press, 1992
Slobodkina, Ester. *Caps for Sale*. New York: Harper Collins, 1940.

### Geometry and Spatial Sense

Barker, Rosalie. *Linus the Magician*. California: Harbor House Publishers, 1993
Barner, Bob. *Space Race*. New York: Bantam Doubleday, 1995
Burns, Marilyn. *The Greedy Triangle*. New York: Scholastic, 1994
Carle, Eric. *The Secret Birthday Message*. New York: Harper Trophy, 1972
Charles, N.N. *What Am I?* New York: The Blue Sky Press, 1994
Coerr, Eleanor. *The Josefina Story Quilt*. Harper and Row, 1986
Cole, Barbara H. *Texas Star.* Orchard Books, 1990
Dodds, Dayle Ann. *The Shape of Things*. Massachusetts: Candlewick Press, 1996
Ehlert, Lois. *Color Farm*. New York: J. B. Lippincott, 1990
Ehlert, Lois. *Color Zoo*. New York: Harper Collins Publishers, 1989
Emberley, Ed. *Ed Emberley's Picture Pie.* Little, Brown and Company, 1984
Emberley, Ed. *The Wing on a Fles: A Book About Shapes.* Boston: Little, Brown, 1961
Ernst, Lisa. *Sam Johnson and the Blue Ribbon Quilt.* Lothrop, Lee & Shepard Books, 1983
Ernst, Lisa and Lee. *The Tangram Magician*. Harry N. Abrams, Inc., 1990
Falwell, Cathryn. *Shape Space*. New York: Clarion Books, 1992
Faulkner, Keith. *Shapes*. New York: Barnes and Noble, 1994
Flournoy, Valerie. *The Patchwork Quilt.* Dial Books, 1985
Freidman, Aileen. *A Cloak for a Dreamer*. New York: Scholastic, 1994
Hoban, Tana. *Over, Under and Through, and Other Spatial Concepts.* NY: Macmillan, 1973
Hoban, Tana. *Shapes, Shapes, Shapes*. New York: Greenwillow Books, 1986
Jonas, Ann. *Round Trip.* New York: Greenwillow, 1983
MacDonald, Suse. *Sea Shapes*. San Diego: Gulliver Books, 1994
Paul, Ann Whitford. *Eight Hands Round: A Patchwork Alphabet.* HarperCollins Publishers, 1991
Polacco, Patricia. *The Keeping Quilt.* Simon & Schuster, 1993
Rogers, Paul. *The Shapes Game.* Henry Holt and Co., 1990
Schutte, Sarah L. *Circles.* A+ Books, 2003
Tompert, Ann. *Grandfather Tang's Story*. New York: Crown Publishers, 1990
Wylie, Joanne and David. *Fishy Shape Story.* Children's Press, 1984

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### Measures and Measurement

Adams, Barbara Johnston. *The Go-Around Dollar*. New York: Four Winds Press, 1992
Allen, Pamela. *Mr. Archimedes' Bath*. New York: Harper Collins Publishers, 1994
Carle, Eric. *Pancakes, Pancakes*. New York: Scholastic, 1990
Carle, Eric. *Papa, Please Get the Moon for Me*. New York: Scholastic, 1986
Hutchins, Pat. *Happy Birthday, Sam.* New York: Greenwillow, 1978.
Lionni, Leo. *Inch by Inch*. New York: Scholastic, 1960
Mathis, Sharon Bell. *The Hundred Penny Box.* New York: Puffin, 1986
Medearis, Angela Shelf. *Picking Peas for a Penny*. New York: Scholastic, 1990
McMillan, Bruce. *Super, Super, Super Words!* New York: Lothrop, Lee & Shepard, 1989
Myller, Rolf. *How Big Is a Foot?* New York: Bantam Doubleday, 1990
Robbins, Ken. *A Flower Grows*. New York: Dial Books, 1990
Shepard, Aaron. *The Baker's Dozen*. New York: Atheneum Publishers, 1995
Schwartz, David. *If You Made a Million*. New York: Lothrop, Lee & Shepard, 1989
Viorst, Judith. *Alexander, Who Used to Be Rich Last Sunday*. New York: Atheneum, 1978
Williams, Vera. *A Chair for My Mother*. New York: Scholastic, 1982
Zimelman, Nathan. *How the 2nd Grade Got $8205.50*. Illinois: Albert Whitman & Co., 1992

### Numeration, Counting, and Order

Adler, David A. *Fraction Fun*. New York: Holiday House, 1996
Anno, Mitsumasa. *Anno's Counting Book*. New York: Harper & Row, 1977
Anno, Mitsumasa. *Anno's Counting House*. New York: Philomel, 1982
Anno, Mitsumasa. *The King's Flower.* New York: Collins, 1983
Bang, Molly. *Ten, Nine, Eight*. New York: Mulberry Books, 1983
Brisson, Pat. *Benny's Pennies*. New York: Bantam Doubleday, 1993
Carter, David A. *How Many Bugs in a Box?* New York: Scholastic, 1994
Cave, Catherine. *Out for the Count*. New York: Simon and Schuster, 1992
Crews, Donald. *Ten Black Dots*. New York: Scholastic, 1986
Dee, Ruby. *Two Ways to Count to Ten*. New York: Henry Holt and Co., 1990
Ehlert, Lois. *Fish Eyes*. New York: Harcourt Brace, 1990
Feelings, Tom. *Moja Means One*. New York: Dial Books, 1971
Giganti, Paul Jr. *How Many Snails? A Counting Book.* New York: Greenwillow, 1988
Giganti, Paul Jr. *Notorious Number*. California: Teaching Resource Center, 1993
Haskins, Jim. *Count Your Way Through Japan*. Minnesota: Carolrhoda Books, Inc., 1987
Haskins, Jim. *Count Your Way Through Korea*. Minnesota: Carolrhoda Books, Inc. 1989
Heinst, Marie. *My First Number Book*. New York: Dorling-Kindersley, 1992
Hoban, Tana. *Count and See.* New York: Macmillan, 1972
Hoban, Tana. *Is It Larger? Is It Smaller?* New York: Greenwillow, 1985
Hoban, Tana. *More, Fewer, Less.* New York: Greenwillow, 1998
Hoban, Tana. *26 Letters and 99 Cents.* Mulberry Books, 1995
Holtzman, Caren. *A Quarter from the Tooth Fairy.* New York: Scholastic, 1995
Hutchins, Pat. *The Doorbell Rang*. New York: Greenwillow, 1986.
Leedy, Loreen. *Fraction Action*. New York: Holiday House, 1994

## Literature List K-3

**Numeration, Counting, and Order (continued)**

Mahy, Margaret. *17 Kings and 42 Elephants*. New York: Dial Books, 1987
Mathis, Sharon Bell. *The Hundred Penny Box.* New York: Puffin, 1986
McMillan, Bruce. *Eating Fractions*. New York: Scholastic, 1991
Merriam, Eve. *12 Ways to Get to 11*. New York: Simon and Schuster, 1993
Micklethwait, Lucy. *I Spy Two Eyes: Numbers in Art*. New York: Greenwillow Books, 1993
Munsch, Robert. *Moira's Birthday*. Toronto: Annick Press, 1987
Philpo, Lorna and Graham. *Amazing Anthony Ant*. New York: Random House, 1994
Rees, Mary. *Ten in a Bed.* Boston: Little, Brown, 1988
Ryan, Pam Munoz. *The Crayon Counting Book.* Massachusetts: Charlesbridge Publishing, 1996
Schwartz, David. *How Much Is a Million?* New York: Lothrop, Lee & Shepard, 1985
Sharmat, Marjorie W. *The 329th Friend*. New York: Four Winds Press, 1992
Sheppard, Jeff. *The Right Number of Elephants*. New York: Scholastic, 1990
Sullivan, Charles. *Numbers at Play: A Counting Book*. New York: Rizzoli Intern'l Pub., 1992
Tildes, Phyllis. *Counting On Calico*. Massachusetts: Charlesbridge Publishing, 1994
Viorst, Judith. *Alexander, Who Used to Be Rich Last Sunday.* Aladdin Paperbacks, 1988
Walsh, Ellen Stoll. *Mouse Count*. New York: Voyager Books, 1991
Walton, Ray. *How Many How Many How Many*. Massachusetts: Candlewick, 1993
Williams, Vera. *A Chair for My Mother*. New York: Scholastic, 1982

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Adams, Pam. *There was an Old Lady Who Swallowed a Fly.* Viking, 1997
Aker, Suzanne. *What Comes in 2's, 3's and 4's?* Aladdin Paperbacks, 1990
Anno, Masaichiro. *Anno's Mysterious Multiplying Jar*. New York: Philomel Books, 1983
Asch, Frank. *The Last Puppy.* Aladdin Books, 1980
Axelrod, Amy. *Pigs Will Be Pigs.* Simon & Schuster Books for Young Readers, 1994
Birch, David. *The King's Chessboard*. New York: Dial Books, 1988
Buckless, Alicia. *Too Many Cooks.* Scholastic, 2000
Chorao, Kay. *Number One, Number Fun*. New York: Holiday House, 1995
de Regniers, Beatrice S. *So Many Cats!* New York: Clarion, 1985
Hamm, Diane J. *How Many Feet in the Bed?* Aladdin, 1994
Henkes, Kevin. *Chrysanthemum.* Greenwillow Books, 1991
Hulme, Joy N. *Sea Squares.* New York: Hyperion Paperbacks, 1991
Hutchins, Pat. *The Doorbell Rang.* Greenwillow Books, 1986
Lewin, Betsy. *Cat Count.* H. Holt, 2003
Mahy, Margaret. *17 Kings and 42 Elephants*. New York: Dial Books, 1987
Mathews, Louise. *Bunches and Bunches of Bunnies*. New York: Scholastic, 1978
McGrath, Barbara. *The M & M's Counting Book*. Massachusetts: Charlesbridge, 1994
Neushwander, Cindy. *Amanda Bean's Amazing Dream.* Scholastic, 1998
Pinczes, Elinor J. *One Hundred Hungry Ants*. Boston: Houston Mifflin Co., 1995
Pinczes, Elinor J. *A Remainder of One*. Boston: Houghton Mifflin Co., 1995
Slater, Teddy. *Ready or Not, Here I Come!* Scholastic, 1999
Wahl, John and Stacy. *I Can Count the Petals of a Flower.* Reston, VA: NCTM, 1976

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Williams, Vera B. *Something Specials for Me.* Mulberry Books, Morrow, 1986
Wood, Audrey. *The Napping House.* San Diego: Harcourt Brace Jovanovick, 1984

### Patterns, Functions and Sequences

Bulloch, Ivan. *Patterns*. New York: Thompson Learning, 1994
Ernst, Lisa Campbell. *Sam Johnson and the Blue Ribbon Quilt*. NY: Lothrop, Lee & Shepard, 1983
Flournoy, Valerie. *The Patchwork Quilt*. New York: Scholastic, 1985
Grossman, Virginai. *The Little Rabbits*. San Francisco: Chronicle Books, 1995
Kurtz, Shirley. *The Boy and the Quilt*. Pennsylvania: Good Books, 1991
Paul, Ann Whitford. *Eight Hands, Round: A Patchwork Alphabet*. NY: Harper Collins, 1991
Sharman, Lydia. *The Amazing Book of Shapes*. New York: Dorling-Kindersley, 1994

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Axelrod, Amy. Pig*s on a Blanket*. New York: Simon and Schuster, 1996
Hutchins, Pat. *Clocks and More Clocks*. New York: Aladdin Book, 1994
Lewis, Paul Owens. *P. Bear's New Year's Party*. Oregon: Beyond Words Publishing, 1989
Llewellyn, Claire. *My First Book of Time*. New York: Dorling-Kindersley, 1992
Sendak, Maurice. *Chicken Soup with Rice*. New York: Scholastic, 1962
Williams, Vera B. *Three Days on a River Canoe*. New York: Scholastic, 1982
Young, Ed. *Seven Blind Mice*. New York: Scholastic, 1993

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### Algebra

Barry, David. *The Rajah's Rice*. New York: W.H. Freeman & Co., 1985
Briggs, Raymond. *Jim and the Beanstalk.* Coward-McCann, Inc., 1970
Chwast, Seymour. *The Twelve Circus Rings.* Gulliver Books/Harcourt Brace Jovanovich, 1993
Pittman, Helena Clare. *A Grain of Rice*. New York: Hastings House, 1986
Rylant, Cynthia. *Mr. Griggs' Work.* Orchard Books, 1989

### Data and Chance

Buller, Laura and Taylor. *Calculation and Chance.* NY: Marshal Cavendish Corp., 1990
Cushman, Jean. *Do You Wanna Bet?* New York: Clarion Books, 1991
James, Elizabeth. *What Do You Mean by "Average"?* NY: Lothrop, Lee & Shepard, 1978
Mori, Tuyosi. *Socrates and the Three Little Pigs.* New York: Philomel Books, 1986
Rockwell, Thomas. *How to Get Fabulously Rich.* New York: Franklin Watts, 1990
Van Allsburg, Chris. *Jumanji*. Boston: Houghton Mifflin Co., 1981

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Anno, Mitsumasa. *Anno's Math Games III.* New York: Philomel Books, 1991
Burns, Marilyn. *The Greedy Triangle.* New York: Scholastic, Inc., 1994
Coerr, Eleanor. *The Josefina Story Quilt.* Harper & Row, 1986
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Friedman, Aileen. *A Cloak for the Dreamer.* New York: Scholastic, 1994
Jonas, Ann. *Round Trip*. New York: Greenwillow Books, 1983
Juster, Norton. *The Dot and the Line.* New York: Random House, 1963
Laithwaite, Eric. *Shape: The Purpose of Forms.* New York: Franklin Watts, 1986
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Polacco, Patricia. *The Keeping Quilt.* Simon & Schuster, 1993
Read, Ronald C. *Tangrams, 330 Puzzles.* New York: Dover, 1965
Small, David. *Paper John.* New York: Farrar, Straus, & Giroux, 1987
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Wadsworth, Ginger. *Julia Morgan, Architect of Dreams.* Minneapolis: Learner, 1990
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Adams, Barbara J. *The Go-Around Dollar.* New York: Four Winds Press, 1992
Anno, Mitsumasa. *Anno's Flea Market.* New York: Philomel Books, 1984
Axelrod, Amy. *Pigs Will Be Pigs.* New York: Four Winds Press, 1994
Clement, Rod. *Counting on Frank.* Gareth Stevens Publishing, 1991
Cole, Joanna. *The Magic School Bus Inside the Earth.* New York: Scholastic, 1987
Conford, Ellen. *What's Cooking, Jenny Archer?* Boston: Little, Brown, 1989
Dahl, Roald. *Esio Trot.* New York: Viking, 1990.
Lasky, Kathryn. *The Librarian Who Measured the Earth.* NY: Little, Brown & Co., 1994
Mathis, Sharon Bell. *The Hundred Penny Box.* New York: Puffin, 1986

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**Measures and Measurement (continued)**

Merrill, Jean. *The Toothpaste Millionaire.* Boston: Houghton Mifflin, 1972.
Norton, Mary. *The Borrowers.* New York: Harcourt Brace, and World, 1953
Schwartz, David M. *If You Made a Million.* New York: Lothrop, Lee & Shepard, 1989
Scieszka, Jon. *Math Curse*. New York: Viking 1995
Stewart, Sarah. *The Money Tree.* New York: Farrar, Straus, Giroux, 1991
Viorst, Judith. *Alexander, Who Used to Be Rich Last Sunday.* NY: Atheneum, 1978
Wells, Robert E. *Is a Blue Whale the Biggest Thing There is?* Ill: A. Whitman & Co., 1993
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Burns, Marilyn. T*he I Hate Mathematics! Book.* Little, Brown, 1975
Dilson, Jesse. *The abacus.* New York: St. Martin's, 1968
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Juster, Norton. *The Phantom Tollbooth.* New York: Random House, 1961
Leedy, Loreen. *Fraction Action.* New York: Holiday House, 1994
Martin, Bill, Jr., and J. Archambault. *Knots on a Counting Rope.* New York: Henry Holt, 1987
McKissack, Patricia C. *A Million Fish...More or Less.* Alfred A. Knopf, 1992
St. John, Glory. *How to Count Like a Martian.* New York: H.Z. Walck, 1975
Schwartz, David M. *How Much Is a Million?* New York: Lothrop, Lee & Shepard, 1985
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Dahl, Roald. *Matilda.* Penguin USA, 1998
Dee, Ruby. *Two Ways to Count to Ten.* Henry Holt, 1990
Giganti, Paul, Jr. *Each Orange Had 8 Slices.* Greenwillow Books, 1983
Hulme, Joy N. S*ea Squares* New York: Hyperion Paperbacks, 1991
Hutchins, Pat. *The Doorbell Rang.* Greenwillow Books, 1986
Leedy, Loreen. *2 x 2 = Boo!* New York: Holiday House, 1994
Mahy, Margaret. *17 Kings and 42 Elephants.* Dial Books for Young Readers, 1987
Mathews, Louise. *Bunches and Bunches of Bunnies.* New York: Scholastic, 1978
McCloskey, Robert. *Homer Price.* New York: Viking, 1943
Nolan, Helen. *How Much, How Many, How Far, How Heavy, How Long, How Tall is 1000?* Kids Can Press, 1995
Pinczes, Elinor J. *One Hundred Hungry Ants.* Boston: Houghton Mifflin Co., 1993

Pinczes, Elinor J. *A Remainder of One.* Boston: Houghton Mifflin Co., 1995

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**Operations (continued)**

Pittman, Helena C. *A Grain of Rice.* New York: Hastings House, 1986.
Tahan, Malba. *The Man Who Counted: A Collection of Mathematical Adventures.* W. W. Norton & Company, 1993
Virch, David. *The King's Chessboard.* New York: Dial Books, 1988

**Patterns, Functions and Frames**

Anno, Mitsumasa. *Anno's Magic Seeds*. Philomel Books, 1995
Cobb, Mary. *The Quilt-Block History of Pioneer Days.* Conn: The Millbrook Press, 1995
Ernst, Lisa and Lee. *The Tangram Magician.* Harry N. Abrams Inc., 1990
Flournoy, Valerie. *The Patchwork Quilt.* Dial Books, 1985
Dahl, Roald. *Esio Trot.* New York: Viking, 1990
McCurdy, Michael, Contributor. *The Seasons Sewn.* New York: Harcourt Brace, 1996
McKissack, Patricia C. *A Million Fish...More or Less.* New York: Random House, 1991
National Wildlife Federation. *Patterns in the Wild.* Washington, D.C.: National Wildlife Fed.
Paul, Ann Whitford. *Eight Hands Round.* New York: Harper Collins Publishers, 1991
Polacco, Patricia. *The Keeping Quilt.* Simon & Schuster, 1992
Thomson, Dr. David. *Visual Magic.* New York: Dial Books, 1991

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Anno, Mitsumasa. *All in a Day.* New York: Philomel Books, 1986
Axelrod, Amy. *Pigs on a Blanket*. New York: Simon and Schuster, 1996
Kitchen, Bert. *Somewhere Today.* Massachusetts: Candlewick Press, 1994
Oakley, Graham. *Diary of a Church Mouse.* New York: Atheneum, 1987
Paine, Penelope Colville. *Time for Horatio.* California: Advocacy Press, 1990
Verne, Jules. *Around the World in Eighty Days.* New York: William Morrow, 1988