

Lattice Method

Third Grade Everyday Mathematics introduces the lattice method of multiplication for several reasons: This algorithm is historically interesting; it provides practice with multiplication facts and addition of 1-digit numbers; and it is fun. Also, some children find it easier to use than other methods of multiplication.

Step 1 Write the factors on the outside of the lattice. Line up one factor with the column(s); the other with the row(s).

Step 2 Multiply each digit in one factor by each digit in the other factor.

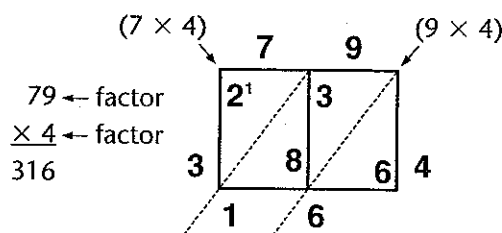
Step 3 Write each product in one small box; ones place digits in the bottom-right half; tens place digits in the upper-left half. When the product is a single-digit answer, write a zero in the upper-left half.

Step 4 Beginning on the right, add the numbers inside the lattice along each diagonal. If the sum on a diagonal exceeds 9, add the excess 10s in the next diagonal to the left.

The lattice method and the partial-products algorithm help prepare children for a division algorithm they will learn in fourth grade. Children will choose the algorithms that work best for them.

Also in this unit, children will...

- ◆ Write and solve multiplication and division number stories involving multiples of 10, 100, and 1,000.
- ◆ Solve division number stories and interpret the remainders.
- ◆ Increase their understanding of positive and negative numbers.

**Vocabulary**

Important terms in Unit 9:

algorithm A step-by-step set of instructions for doing something such as carrying out computation or solving a problem.

degree Celsius (°C) A unit for measuring temperature on the Celsius scale. 0°Celsius is the freezing point of water. 100°Celsius is the boiling point of water.

degree Fahrenheit (°F) A unit for measuring temperature on the Fahrenheit scale. 32°F is the freezing point of water. 212°F is the boiling point of water.

negative number A number less than or below zero; a number to the left of zero on a horizontal number line. The symbol $-$ may be used to write a

negative number. For example, negative 5 is usually written as -5 .

positive number A number that is greater than zero; a number to the right of zero on a horizontal number line. A positive number may be written using the $+$ symbol but it is usually written without it. For example, $+10 = 10$.

factor of a counting number n A counting number whose product with some other counting number equals n . For example, 2 and 3 are factors of 6 because $2 \times 3 = 6$. But 4 is not a factor of 6 because $4 \times 1.5 = 6$ and 1.5 is not a counting number.

Do-Anytime Activities

To work with your child on the concepts taught in this unit and in previous units, try these interesting and rewarding activities:

1. As the class proceeds through the unit, give your child multiplication problems related to the lessons covered, such as 9×23 , 3×345 , 20×65 , and 43×56 .
2. Continue to work on multiplication and division facts by using Fact Triangles and fact families, or by playing games.
3. Play *Baseball Multiplication*, *Factor Bingo*, and other games described in the *Student Reference Book*.
4. Write decimals for your child to read, such as 0.82 (eighty-two hundredths); 0.7 (seven tenths); 0.348 (three hundred forty-eight thousandths); and so on. Ask your child to identify digits in various places—the tenths place, hundredths place, thousandths place. Look for decimals in newspapers and on food containers.
5. Practice extended multiplication and division facts such as $3 \times 7 = ?$, $3 \times 70 = \underline{\quad}$, $3 \times 700 = \underline{\quad}$; $18 \div 6 = \underline{\quad}$, $180 \div 6 = \underline{\quad}$, and $1,800 \div 6 = \underline{\quad}$.

As You Help Your Child with Homework

As your child brings home assignments, you may want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Home Links.

Home Link 9•1

- | | | |
|--------------------|-------------|-------------------|
| 1. 31 | 2. 25 | 3. 22 |
| 4. 13 or 18 | 5. 12 or 24 | 6. 56; 560; 5,600 |
| 7. 20; 200; 20,000 | | |

Home Link 9•2

- | | | |
|--------------|-------------|-------|
| 1. a. 56; 56 | b. 560; 560 | c. 7 |
| d. 70 | e. 8 | f. 8 |
| 2. a. 63; 63 | b. 630; 630 | c. 7 |
| d. 70 | e. 9 | f. 9 |
| 3. a. 40; 40 | b. 400; 400 | c. 50 |
| d. 50 | e. 8 | f. 80 |

Home Link 9•3

- | | | |
|---------------|-----------|---------------------|
| 1. 7 raccoons | 2. 500 lb | 3. 100 arctic foxes |
| 4. 600 lb | 5. 400 lb | 6. 60 beluga whales |

Home Link 9•4

- | | | |
|--------|----------|--------|
| 1. 93 | 2. 375 | 3. 765 |
| 4. 258 | 5. 1,134 | |

Home Link 9•5

1. yes; estimate; $\$0.80 \times 7 = \5.60
2. \$12.72; calculate; $\$2.12 \times 6 = \12.72
3. \$0.90; Sample answer: calculate; 10 cards is \$6.00 times 2. Compare that with \$1.29 times 10. Then subtract to find the difference.

Home Link 9•6

- | | |
|-----------------------|-----------------------|
| 1 row: yes; 18 chairs | 7 rows: no |
| 2 rows: yes; 9 chairs | 8 rows: no |
| 3 rows: yes; 6 chairs | 9 rows: yes; 2 chairs |
| 4 rows: no | 10 rows: no |
| 5 rows: no | 18 rows: yes; 1 chair |
| 6 rows: yes; 3 chairs | 1; 18; 2; 9; 3; 6 |

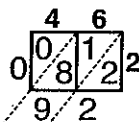
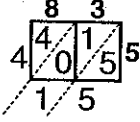
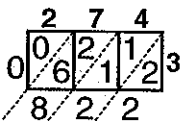
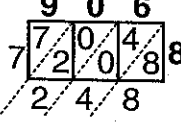
Home Link 9•7

1. a. 1 b. 9 c. 1 d. \$0.25
e. \$19.25 f. $\$77.00 \div 4 = \19.25
2. 42 3. 192 4. 315

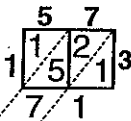
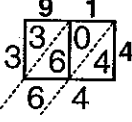
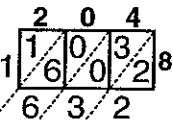
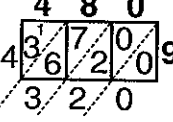
Home Link 9•8

1. 8 tables
2. 7 cartons
3. 10 packs
4. 116 5. 425 6. 768

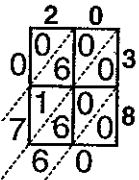
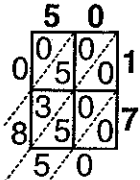
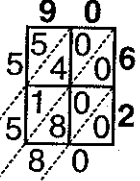
Home Link 9•9

1. 92

 2. 415

 3. 822

 4. 7,248


Home Link 9•10

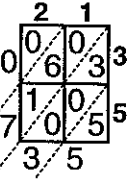
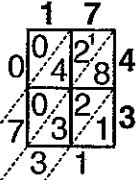
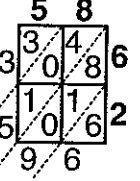
1. 171

 2. 364

 3. 1,632

 4. 4,320


Home Link 9•11

1. 760

 2. 850

 3. 5,580


4. 1,120 5. 2,100

Home Link 9•12

1. 735

 2. 731

 3. 3,596


4. 2,695 5. 3,003

Home Link 9•13

1. -40°F ; -40°C 2. 220°F ; 104°C
 3. 10°C 4. 18° colder
 5. yes; no; It would be about 86°F outside.
 6. yes; no; Water freezes at 0°C , so it would be cold enough to ice-skate.

Unit 10: Family Letter**Measurement and Data**

This unit has three main objectives:

- ◆ To review and extend previous work with measures of length, weight, and capacity by providing a variety of hands-on activities and applications. These activities will provide children with experience using U.S. customary and metric units of measurement.
- ◆ To extend previous work with the median and mode of a set of data and to introduce the mean (average) of a set of data.
- ◆ To introduce two new topics: finding the volume of rectangular prisms and using ordered pairs to locate points on a coordinate grid.

Children will repeat the personal measurements they made earlier in the year so that they may record their own growth. They will display these data in graphs and tables and find typical values for the class by finding the median, mean, and mode of the data.

They will begin to work with volumes of rectangular boxes, which have regular shapes, and will also compare the volumes of several irregular objects and investigate whether there is a relationship between the weight of these objects and their volumes.

Tables of Measures

Length	1 kilometer = 1,000 meters 1 meter = 100 centimeters 1 centimeter = 10 millimeters 1 mile = 1,760 yards 1 yard = 3 feet 1 foot = 12 inches
Weight	1 kilogram = 1,000 grams 1 gram = 1,000 milligrams 1 ton = 2,000 pounds 1 pound = 16 ounces
Volume & Capacity	1 liter = 1,000 milliliters 1 gallon = 4 quarts 1 quart = 2 pints 1 pint = 2 cups 1 cubic yard = 27 cubic feet 1 cubic foot = 1,728 cubic inches

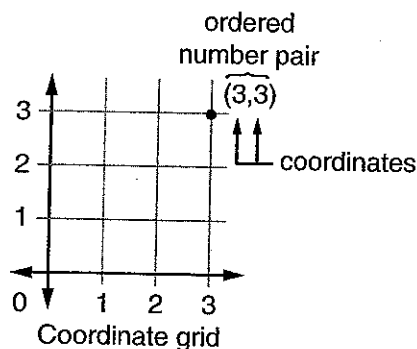


Please keep this Family Letter for reference as your child works through Unit 10.

Vocabulary

Important terms in Unit 10:

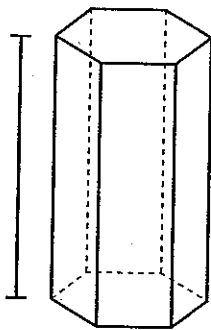
coordinate grid A reference frame for locating points in a plane by means of ordered pairs of numbers. A rectangular coordinate grid is formed by two number lines that intersect at right angles at their zero points.



coordinate A number used to locate a point on a number line; a point's distance from an origin.

ordered number pair A pair of numbers used to locate a point on a coordinate grid.

height of a prism The length of the shortest line segment from a base of a prism to the plane containing the opposite face. The height is perpendicular to the base.



volume The amount of space occupied by a 3-dimensional shape.

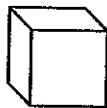
square centimeter (square cm, cm^2)

A unit to measure area. For example, a square centimeter is the area of a square with 1-cm long sides.



cubic centimeter (cubic cm, cm^3)

A metric unit of volume or capacity equal to the volume of a cube with 1cm edges.



weight A measure of how heavy something is; the force of gravity on an object.

capacity (of a scale) The maximum weight a scale can measure. For example, most infant scales have a capacity of about 25 pounds.

capacity (of a container) The amount a container can hold. Capacity is often measured in units such as quarts, gallons, cups, or liters.

frequency table A table in which data are tallied and organized, often as a first step toward making a frequency graph.

Waist-to-floor measurement (inches)	Frequency	
	Tallies	Number
27	//	2
28		0
29	###	5
30	### III	8
31	### II	7
32	////	4
Total = 26		

mode The value or values that occur most often in a set of data. For example, in the frequency table above, 30 inches is the mode.

mean The sum of a set of numbers divided by the number of numbers in the set. Often called the average value of the set.

Do-Anytime Activities

To work with your child on the concepts taught in this unit and in previous units, try these interesting and rewarding activities:

1. Review equivalent names for measurements. For example: *How many inches in 1 foot? How many pints in 3 quarts? How many centimeters in 1 meter? How many grams in 1 kilogram?*
2. Review multiplication facts. For example: *How much is 6 times 3? 7×8 ? 4 [5s]?*
3. Review division facts. For example: *How many 2s in 12? What number multiplied by 4 equals 12? How much is 18 divided by 2?*
4. Practice multiplication with multiples of 10, 100, and 1,000. For example: *How much are 10 [30s]? How much is 4×100 ? What number times 100 equals 4,000?*
5. Practice division with multiples of 10, 100, and 1,000. For example: *How much is $\frac{1}{10}$ of 300? How many 50s in 5,000? How much is 200 divided by 50?*

Building Skills through Games

In Unit 10, your child will practice mental-math skills by playing the following games:

Memory Addition/Subtraction

Partners agree on a target number. They take turns adding or subtracting any number from 1 to 5 into the memory of their calculators while keeping track of the sums or differences in their heads. Then they press the **MRC** key to see if the final memory sums match their initial target number.

Multiplication Top-It

Players turn over two cards and call out the product. The player with the higher product keeps all the cards. The player with more cards at the end wins! *You will receive more detailed directions for Multiplication Top-It when we begin to play it in class.*

As You Help Your Child with Homework

As your child brings home assignments, you may want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Home Links.

Home Link 10•1

1. 60; 96
2. 9; 12; 17
3. 33; 6; 12
4. 2; 4; 6
5. $\frac{1}{2}, \frac{1}{320}, \frac{1}{8}, \frac{1}{4}, \frac{1}{2}$
6. 90; 152; 117

Home Link 10•2

1. Boxes B, C, and D
2. Answers vary.
3. Answers vary.

Home Link 10•3

1. 2,052
2. 3,854

Home Link 10•5

1. inch
2. gram
3. square yard
4. centimeter
5. inch
6. quart
7. 1 Liter
8. 140
9. 186
10. 864

Home Link 10•6

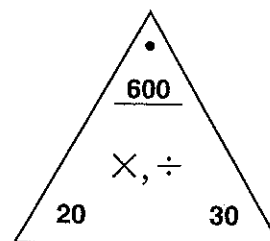
4. 3

Home Link 10•7

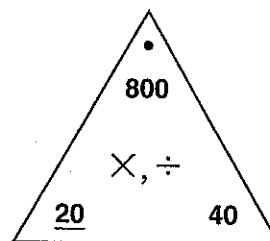
1. 60.3
2. 12.8

Home Link 10•8

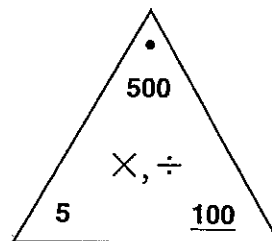
1. $20 \times 30 = 600$
 $30 \times 20 = 600$
 $600 \div 30 = 20$
 $600 \div 20 = 30$



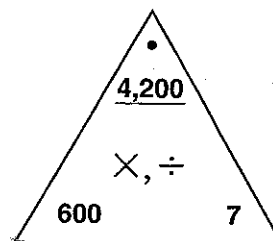
2. $40 \times 20 = 800$
 $20 \times 40 = 800$
 $800 \div 40 = 20$
 $800 \div 20 = 40$



3. $100 \times 5 = 500$
 $5 \times 100 = 500$
 $500 \div 100 = 5$
 $500 \div 5 = 100$



4. $600 \times 7 = 4,200$
 $7 \times 600 = 4,200$
 $4,200 \div 600 = 7$
 $4,200 \div 7 = 600$



Home Link 10•10

1. (3,6) Algeria
2. (6,3) Tanzania
3. (5,5) Sudan
4. (4,5) Chad
5. (5,6) Egypt
6. (4,6) Libya

Unit 11: Family Letter



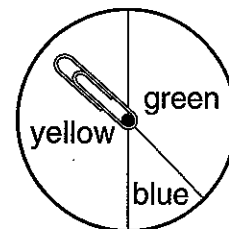
Probability; Year-Long Projects, Revisited

In this year's final unit, children will have the opportunity to bring closure to the yearlong data-collection projects about lengths of days and temperature changes. They will look at patterns in data and draw conclusions.

Unit 11 also contains informal spinner activities relating to chance and probability.

Some of these activities call for children to compare the likelihood of several possible outcomes of an event: why one thing is more likely to happen than another. For example, children will make predictions about where a paper clip on a spinner is more likely to land when the spinner is divided into unequal parts.

Other activities ask children to estimate the chance that something will happen. For example, children design a spinner so that a paper clip is twice as likely to land on one color as another.



Please keep this Family Letter for reference as your child works through Unit 11.

Vocabulary

Important terms in Unit 11:

equally likely outcomes Outcomes of a chance experiment or situation that have the same probability of happening. For example, any number 1–6 landing up are the equally likely outcomes of rolling a die.

winter solstice The shortest day of the year, when the sun is farthest south of the Earth's equator. The number of hours of daylight depends on your

latitude. In the Northern Hemisphere, the winter solstice occurs on or about December 21.

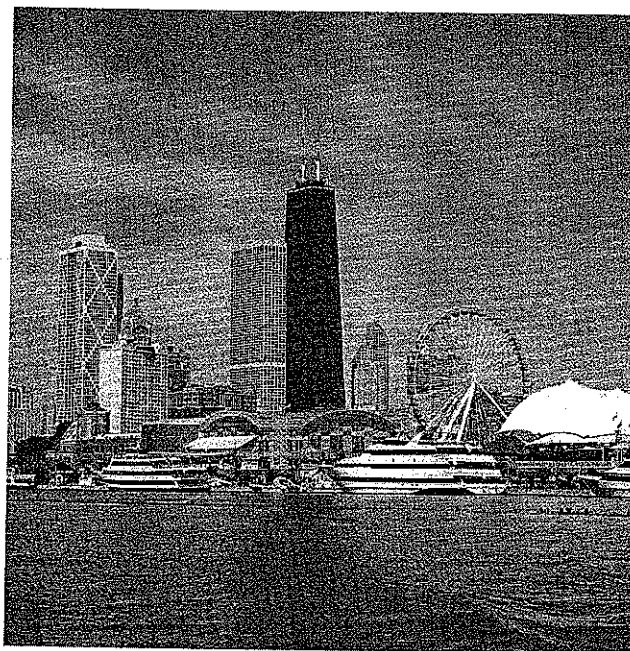
summer solstice The longest day of the year, when the sun is farthest north of the Earth's equator. The number of hours of daylight depends on your latitude. In the Northern Hemisphere, the summer solstice occurs on or about June 21.

Do-Anytime Activities

To work on the concepts taught in this unit and in previous units, try these interesting and rewarding activities:

1. When you are in the car or walking with your child, search for geometric figures. Identify them by name if possible and talk about their characteristics. For example, a stop sign is an octagon, which has 8 sides and 8 angles. Many skyscrapers are rectangular prisms; their faces are rectangles.
2. Draw name-collection boxes for various numbers and together with your child write five to ten equivalent names in each box. Include name-collection boxes for fractions and decimals. For example, a $\frac{1}{2}$ name-collection box might include $\frac{2}{4}$, $\frac{10}{20}$, 0.5, 0.50, and $\frac{500}{1,000}$ because these are also names for $\frac{1}{2}$. Then create name-collection boxes that include equivalent measures. For example, a 1 ft name-collection box might contain 12 in., $\frac{1}{3}$ yd, $\frac{1}{5,280}$ mile, $\frac{12}{36}$ yd, and so on.

1 ft	
12 in.	$\frac{1}{5,280}$ mile
$\frac{1}{3}$ yd	$\frac{12}{36}$ yd



3. Make predictions about the likelihood of pulling an item of one color out of a bag filled with the same items of different colors. Then check your predictions. For example, place 2 red blocks and 4 blue blocks in a bag. There are 4 out of 6 chances to pull a blue block.

Building Skills through Games

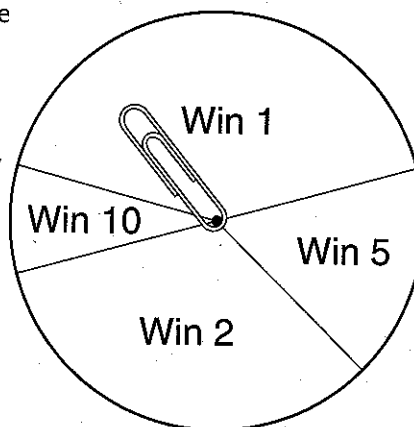
In Unit 11, your child will practice skills related to chance and probability by playing the following games. For detailed instructions, see the *Student Reference Book*.

Block Drawing Game

Without letting the other players see the blocks, a Director puts five blocks in a paper bag and tells the players how many blocks are in the bag. A player takes a block out of the bag. The Director records the color of the block for all players to see. The player replaces the block. At any time, a player may say *Stop!* and guess how many blocks of each color are in the bag. If a player guesses incorrectly, that player is out of the game. The first player to guess correctly wins the game.

Spinning to Win

Each player claims one section of the spinner. Players take turns spinning the spinner. If the spinner lands on a player's number, the player takes that number of pennies. The player with the most pennies after 12 spins wins the game.



As You Help Your Child with Homework

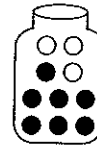
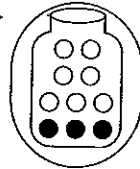
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Home Link 11•2

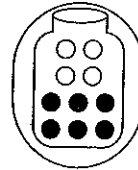
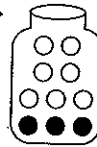
Numbers	Add	Subtract	Multiply	Divide
30 and 7	37	23	210	4R2
50 and 5	55	45	250	10
40 and 6	46	34	240	6 R4
150 and 3	153	147	450	50
3,000 and 50	3,050	2,950	150,000	60
12,000 and 60	12,060	11,940	720,000	200

Home Link 11•5

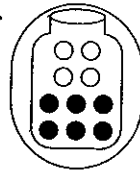
1.



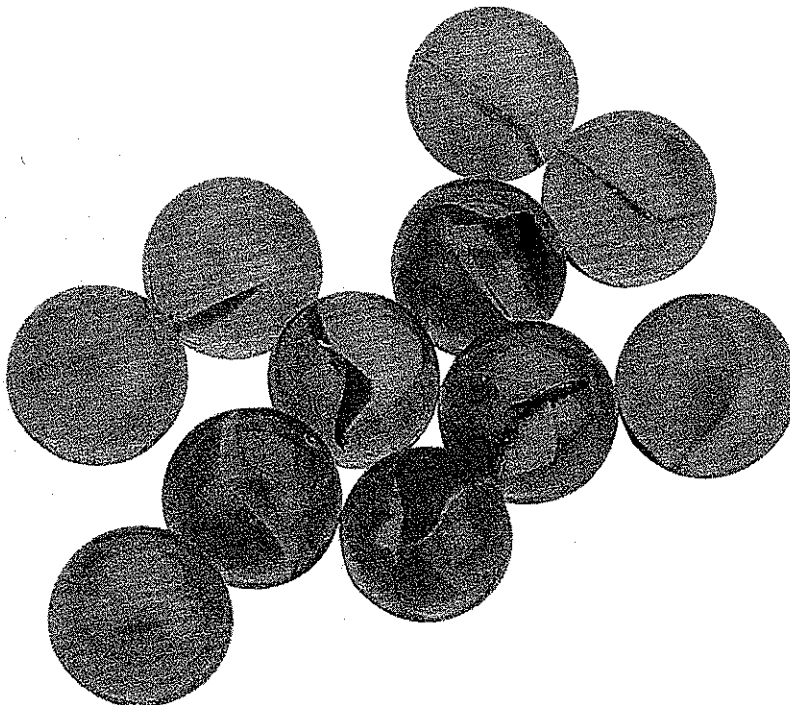
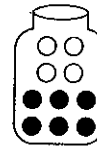
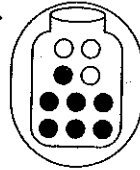
2.



3.



4.





Congratulations!

By completing *Third Grade Everyday Mathematics*, your child has accomplished a great deal. Thank you for all of your support!

This Family Letter is here for you to use as a resource throughout your child's summer vacation. It includes an extended list of Do-Anytime Activities, directions for games that can be played at home, a list of mathematics-related books to check out over vacation, and a sneak preview of what your child will be learning in *Fourth Grade Everyday Mathematics*. Enjoy your vacation!



Do-Anytime Activities

Mathematics means more when it is rooted in real-life situations. To help your child review many of the concepts he or she has learned in third grade, we suggest the following activities for you and your child to do together over vacation. These activities will help your child build on the skills he or she has learned this year and help prepare him or her for *Fourth Grade Everyday Mathematics*.

1. If you receive a daily newspaper, continue with the length-of-day project by recording the time of sunrise and sunset once a week. Draw conclusions about the length of a day during vacation months.
2. Over a period of time, have your child record the daily temperatures in the morning and in the evening. Keep track of the findings in chart or graph form. Ask questions about the data—for example, to find the differences in temperatures from morning to evening or from one day to the next.
3. As you are driving in the car or going on walks, search for geometric figures and identify them by name along with some of their characteristics. For example: A stop sign is an octagon, which has eight sides and eight angles; an orange construction cone is a cone, which has one flat surface that is shaped like a circle, a curved surface, and an apex; a brick is a rectangular prism in which all faces are rectangles.
4. Continue to practice addition, subtraction, multiplication, and division facts. Using short drill sessions with Fact Triangles, fact families, and games helps your child build on previous knowledge.
5. Provide multidigit addition and subtraction problems for your child to solve; encourage your child to write number stories to go along with the number models.

Building Skills through Games

The following section lists rules for games that can be played at home. The number cards used in some games can be made from 3" by 5" index cards.

Division Arrays

- Materials**
- ☐ number cards 6–18 (3 of each)
 - ☐ 18 counters, such as pennies
 - ☐ 1 regular die
 - ☐ scratch paper for each player



Players 2 to 4

Directions

Shuffle the cards and place the deck facedown on the playing surface.

At each turn, a player draws a card and takes the number of counters shown on the card. Next, the player rolls the die. The number on the die specifies the number of equal rows the player must have in the array he or she makes using the counters.

The player's score is the number of counters in each row. If there are no leftover counters, the player's score is double the number of counters in each row.

Players take turns. They keep track of their scores on scratch paper. The player with the highest total at the end of five rounds wins.

Three Addends

- Materials**
- ☐ paper and pencil (for each player)
 - ☐ number cards 1–20 (1 of each)

Players 2

Directions

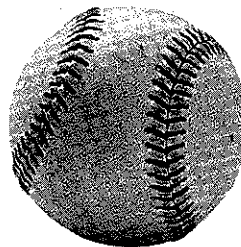
Shuffle the cards and place the deck facedown on the playing surface.

In turn, players draw three cards from the top of the deck. Both players write addition models using the three numbers on their sheets of paper. (The numbers can be written in whatever order they find easiest for solving the problem.) Players solve the problem and then compare answers.

Option: For a harder version, players take turns drawing four cards from the top of the deck. Players thus solve problems with four addends.

Baseball Multiplication

- Materials**
- ☐ 2 regular dice
 - ☐ 4 pennies
 - ☐ score sheet (see below)
 - ☐ calculator



Players 2

Directions

Draw a diamond and label *home plate*, *first base*, *second base*, and *third base*. Make a score sheet that looks like the one below.

SCORE SHEET

Innings	1	2	3	4	5	6	Total
Player 1 outs							
Runs							
Player 2 outs							
Runs							

1. Take turns being the pitcher and the batter.
2. At the start of the inning, the batter puts a penny on home plate.
3. The pitcher rolls the dice. The batter multiplies the two numbers that come up and tells the answer. The pitcher checks the answer with a calculator.
4. If it is correct, the batter looks up the product in the Hitting Table. The batter either makes an out or moves a penny along the diamond for a single, double, triple, or home run.
An incorrect solution is a strike, and another pitch (dice roll) is thrown. Three strikes make an out.
5. A run is scored each time a penny crosses home plate.
6. A player remains the batter for 3 outs. Then players switch roles. The inning is over when both players have made 3 outs.
7. After making the third out, a batter records the number of runs scored in that inning on the score sheet.
8. The player who has more runs at the end of six innings wins the game.

HITTING TABLE

- 36 = Home Run
- 26–35 = Triple
- 16–25 = Double
- 6–15 = Single
- 5 or less = Out

Vacation Reading with a Mathematical Twist

Books can contribute to children's learning by presenting mathematics in a combination of real-world and imaginary contexts. The titles listed below were recommended by teachers who use *Everyday Mathematics* in their classrooms. They are organized by mathematical topic. Visit your local library and check out these mathematics-related books with your child.

Geometry

A Cloak for the Dreamer by Aileen Friedman

Fractals, Googols, and Other Mathematical Tales by Theoni Pappas

Sir Cumference and the First Round Table: A Math Adventure by Wayne Geehan

Measurement

How Tall, How short, How Far Away by David Adler

Math Curse by Jon Scieszka

The Story of Money by Betsy Maestro

If You Made a Million by David Schwartz

Measuring on Penny by Loren Leedy

Numeration

Fraction Fun by David Adler

How Much Is a Million? by David Schwartz

Operations

The Grapes of Math by Gregory Tang

The King's Chessboard by David Birch

The I Hate Mathematics! Book by Marilyn Burns

A Remainder of One by Elinor J. Pinczes

Anno's Mysterious Multiplying Jar by Masqichiro Anno

Patterns, Functions, and Algebra

Eight Hands Round: A Patchwork Alphabet by Ann Whitford Paul

A Million Fish... More or Less by Patricia C. McKissack

Reference Frames

Pigs in a Blanket by Amy Axelrod

Three Days on a River in a Red Canoe by Vera B. Williams

Looking Ahead: Fourth Grade *Everyday Mathematics*

Next year, your child will ...

- ◆ go on a World Tour.
- ◆ continue to practice addition and subtraction skills.
- ◆ develop multiplication and division skills.
- ◆ investigate methods for solving problems using mathematics in everyday situations.
- ◆ work with number lines, coordinates, times, latitude and longitude, and dates.
- ◆ collect, organize, and interpret numerical data.
- ◆ continue to explore 3-dimensional objects and their properties, uses, and relationships.
- ◆ read, write, and use whole numbers, fractions, decimals, percents, and negative numbers.
- ◆ explore scientific notation.

Again, thank you for all of your support this year. Have fun continuing your child's mathematics experiences throughout the vacation!

