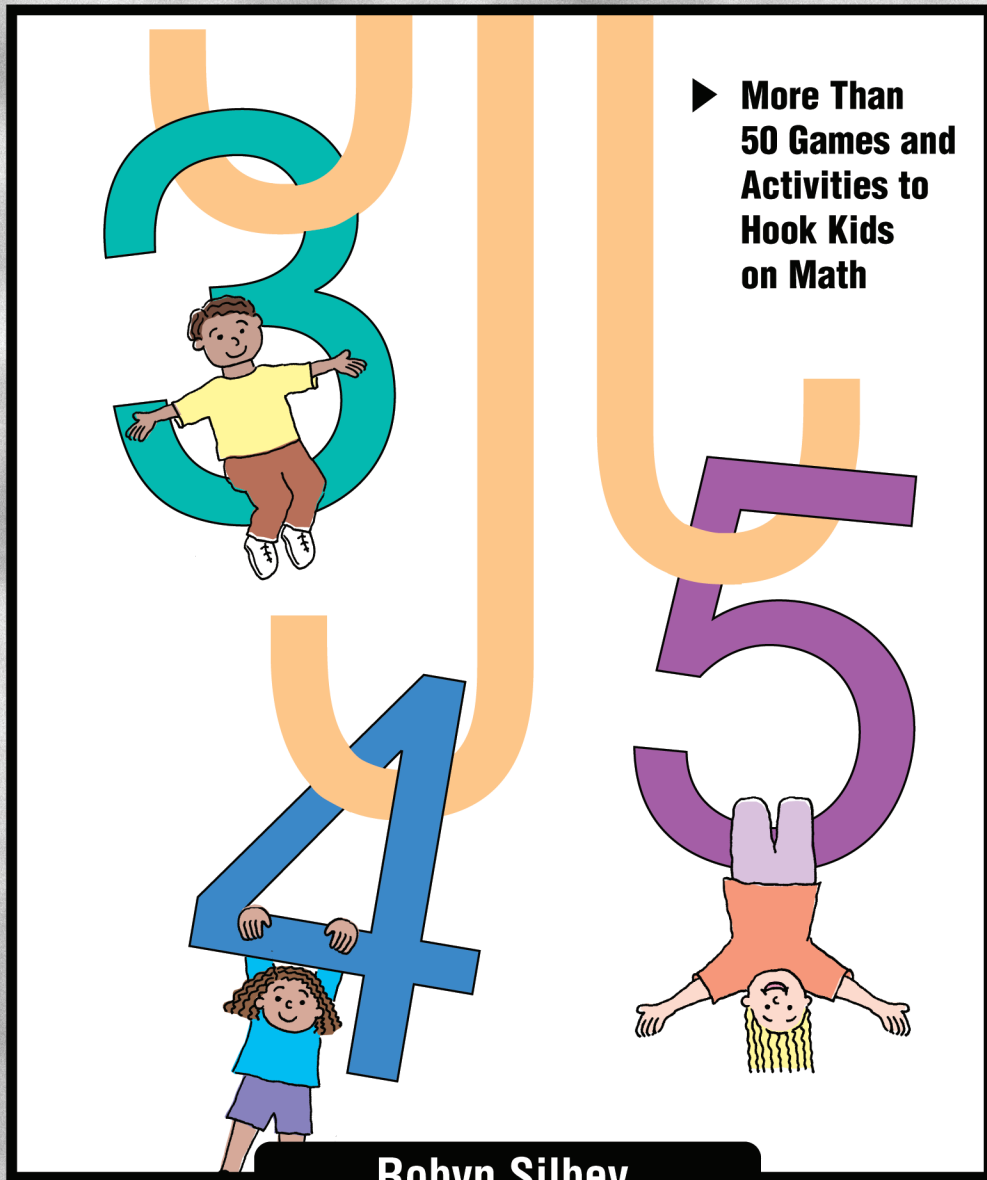


Math Hooks 2



Robyn Silbey

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Preface

Most parents are already active participants in their children’s reading or language arts education. They read to their children and have their children read to them. They write letters and thank-you notes. They read street signs and cereal boxes.

With *Math Hooks 2*, parents and children will be hooked into math education. Most of the activities in this book require little or no preparation. Some require nothing more than an awareness of everyday math problems that surround us.

You are using math when you . . .

-
- Calculate how much carpeting, tiling, wallpaper, or paint you need to redecorate a room;
 - Estimate the food amounts and costs when having a party; and
 - Decide when to leave the house to run a series of errands.
-

If math opportunities are discussed as they arise, children will begin to value math as a necessity for living. Understanding that math concepts are needed for everyday living will motivate your child to learn the concepts presented in school.

Math Hooks 2 presents opportunities to learn mathematics in fun, realistic, and casual ways. Some activities are *experiential* in nature—they can be completed during a ride in the car or a hunt through a junk drawer. Other activities are games that can be played with a parent or partner. All activities are geared to engage children in critical thinking and mindful discussion while having fun at the same time.

Enjoy the recipes that follow. Make mathematics your child’s favorite subject!

Robyn Silbey

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Introduction

Mathematics education at home should be an educationally and emotionally satisfying experience. Research shows that parents must be involved in order for their children to live up to their full potential in mathematics. Showing an interest in mathematics at home helps children in many ways:

It establishes a partnership between parents and teachers for the benefit of the child.

Parent involvement enhances children's understanding and boosts their achievement. A strong commitment at home sends a clear message to a child: Learning mathematics is important.

It reinforces how crucial mathematics is in the child's overall success. Mathematics is presented and taught differently today than it was two decades ago. Mathematics in today's classrooms opens the doors to the outside world. It involves real-life applications and experiences, especially highlighting those at home.

It enables children to achieve their maximum potential. A school's mathematics program actively involves children as they explore, investigate, question, predict, and analyze. Children are learning how to be critical thinkers, problem solvers, and decision makers. By encouraging children to use the same thought processes and skills at home, the most important concepts and skills learned in the classroom are being reinforced.



What Parents Can Do to Hook Children into Mathematics at Home

Math Hooks 2 provides you with ideas you can use to maximize your child's potential in mathematics in school and at home.

Here are just a few helpful hints:

Ask questions. Your child's responses to questions will give you an idea of what he or she knows, where gaps in understanding may lie, and how you can help clarify misconceptions he or she may have. Questions should be open-ended so that there is a wide range of correct responses. Be sure to give your child plenty of time to answer your questions. Your child may need to think, visualize objects he or she has used in the past, recall a lesson taught in school, or think about how to best respond to your inquiry. Many of the entries in this book include questions specific to the activity. The following questions can be asked with almost any math activity you do with your child.

- *What are you trying to find out?*
- *What is the first step in solving the problem?*
- *How did you know that?*
- *Is that always true? Why?*
- *Why did you choose the operation (or the numbers) you did to solve the problem?*
- *Show me the steps you used to find the answer.*
- *Can you think of another way to solve the problem?*
- *Does this make sense?*
- *How could you check the answer to make sure it makes sense?*
- *Do you see a pattern? If so, describe it.*

A simple, open-ended question such as “Tell me what you know about the coins you are holding” yields a much more comprehensive and revealing response than several questions such as “How much is this coin worth?” and “How many pennies make a nickel?” *Remember: Questioning can be an effective diagnostic tool and can also serve as a good conversation starter.*

Support and respect your child’s efforts. Learning at home should be a positive, pleasant, mutually rewarding experience. Comfort children first, then challenge them. Break a troublesome problem down into easy-to-understand parts. Review each part separately until your child says, “This is easy!” Put the parts together to form the easiest possible problem, and guide your child through the solution. Offer simple problems until your child can complete the process independently with success. Then move on to more difficult examples. Above all, be kind and patient throughout the process. *Remember: Your child wants to please you and feel successful.*

Turn your child’s errors into useful learning tools. Rather than telling your child that he or she has made a mistake, you may ask some probing questions. Ask, “How did you get [this part of] your answer? Does the answer make sense to you? How can you check to make sure the answer is correct?” It is important for children to be able to justify their thought processes and solutions. This helps them clarify their ideas for themselves and strengthens their ability to communicate mathematically. Asking open-ended questions to call attention to the incorrect part of the solution often results in the child’s self-correction of the error. If it doesn’t, you may wish to patiently and calmly clarify your child’s thinking. Assure your child that the right answers will come with more experience, observations, and questions. However, if a child seems to be having particular difficulty with a specific solution strategy or approach, ask him or her to try a different way to attack the problem. *Remember: The best way to solve the problem is the most efficient way that works every time for the problem solver. In other words, there are many “best ways” to solve a problem!*

Use real-world experiences. Take advantage of the opportunities that are available to you and your child at home and outside in your everyday world. Understanding that mathematics concepts and skills are part of almost every activity in daily life will encourage your child to want to learn. For example, children can predict the ending time of the soccer game if it starts at 3:00 and lasts about one hour. Your child should know that mathematics is needed and used when you . . .

-
- *Read and measure recipe ingredients*

 - *Decide into which container your leftovers will fit*

 - *Calculate coupon savings*

 - *Sort clothes, foods, and utensils*

 - *Keep track of dates on a calendar*

 - *Schedule pickup times for carpools*

 - *Find a new address using street numbers and their patterns*

 - *Check change given by a store clerk*

Talking with your child about these routine events can lead to all kinds of exciting discussions and conversations. *Remember: By making your child aware of the mathematics you use, you will encourage your child to value what he or she is learning from you and at school.*

Share experiences and solution strategies. It is imperative to talk to your child and verbalize your thought processes as you solve problems related to mathematics. For example, your gas tank may be almost empty. You know it holds about 12 gallons of gas. Do you mentally estimate the number of gallons or the total cost for a fill-up? You might share, “I need gas. The tank holds about 12 gallons of gas. It is almost empty. I will probably need about 10 gallons. At about \$1.50 per gallon, it will probably cost about \$15.”

Children will not always be mathematically ready or able to participate in every real-life mathematics opportunity that occurs during daily life. However, they can absorb the patterns and relationships that you convey during normal conversation. *Remember: As you share processes and solution strategies, children hear over and over again that mathematics skills and concepts are used continually and are crucial tools in everyday living.*

Call attention to real-world manipulatives as you use them. Authentic math manipulatives that are used at home are duplicated in school every day. These include:

- *Coins and bills*
- *Timepieces*
- *Calendars*
- *Timetables*
- *Catalogs*
- *Measuring cups*
- *Recipes*
- *Rulers*

Make sure your child recognizes the importance of each “tool” as well as the mathematics required to utilize it. *Remember: Calling attention to mathematics tools motivates children to learn how to use them.*

Our Nation's Goals in Mathematics

Most children in the United States are taught within the guidelines of a national program designed to improve children's understanding of mathematics. The Standards set forth by the National Council of Teachers of Mathematics suggest that:

-
- *Children will be engaged in discovering mathematics. Math Hooks 2 will involve children in games and activities that will help them discover patterns, concepts, and new ideas.*

 - *Children will see mathematics in daily life activities and experiences. Math Hooks 2 activities require children to integrate mathematics topics into every other aspect of their lives. They will see that they live math every moment of every day.*

 - *Children will explore and develop an understanding of mathematics concepts using materials they can touch and feel. With your help, children will be using authentic manipulatives as they use these activities to explore mathematics in the real world.*

 - *Children will have the opportunity to explore, investigate, estimate, question, predict, and test their ideas about mathematics concepts. Math Hooks activities involve probing, open-ended questions, and a wide variety of approaches.*

 - *Parents and teachers will guide children's learning, rather than insist on how it should be done. Most Math Hooks activities include an extensive communication component. Parents and children will be able to discuss and compare solution strategies, or talk about conceptual understanding, observations, and predictions based on their experiences.*

 - *Children will communicate ideas about mathematics using appropriate terms. Children should be able to discuss their solution strategies, describe their measurement techniques and tools, and convey their decision-making processes. A glossary is included so that you can enable children to use accurate terms in appropriate contexts. This glossary contains terms that children will hear in the course of their formal mathematics education. It is recommended that parents use the same mathematically correct terminology at home that is used in the classroom.*
-

Invite your child to explore core learning goals in mathematics that are age appropriate.

Conceptual understanding (the ability to discover and apply patterns and relationships, number sense, and estimation) and mental math techniques are ideas that emerge with exposure, experience, practice, and motivation. General benchmarks for elementary school age children are shown below. These benchmarks, or core learning goals, reflect the curriculum that is typically taught in elementary mathematics programs from third through sixth grade throughout the country. Although many mathematics concepts encompass a range of understandings, specific concepts within broad categories are shown.

Place Value, Numeration, and Number Sense

- *Understand numbers and place value*
 - *Compare and order numbers*
 - *Estimate numbers*
 - *Build and take apart numbers*
-

Whole Number Operations

- *Develop conceptual understanding of multiplication and division*
 - *Recall basic facts in multiplication and division*
 - *Recognize how operations are related*
 - *Add, subtract, multiply, and divide whole numbers*
 - *Estimate sums, differences, products, and quotients*
 - *Identify patterns in sums, differences, products, and quotients*
 - *Make generalizations about numbers and operations leading to an understanding of algebraic concepts*
-

Money and Time

- *Relate money concepts to real-life experiences*
 - *Make change*
 - *Add, subtract, multiply, and divide money amounts*
 - *Explore elapsed time*
 - *Estimate units of time*
 - *Develop “time” sense through schedules and time management*
-

Fractions

- *Construct models for fractional parts*
 - *Find fractional parts of regions and sets*
 - *Find a fraction of a number*
 - *Use fractions within real-life concepts*
 - *Add, subtract, multiply, and divide fractions and mixed numbers*
-

Geometry and Measurement

- *Apply concepts of congruence, symmetry, and transformations*
 - *Apply perimeter and area to real-life situations*
 - *Find perimeter and area of shapes*
 - *Develop spatial sense and visual reasoning*
 - *Explore solid and plane geometric figures*
-

Data

- *Read simple tables and graphs*
- *Organize data into simple tables and graphs*
- *Sort and compare everyday objects*
- *Copy and continue patterns*
- *Create original patterns*

Math Hooks 2 is organized by categories so that, as your child is focusing on a topic at school, it can be effectively discussed and reinforced at home. Modify the activities to meet the needs of your child. Encourage your child to “take risks” by accepting responses that may not be correct, but that offer a clear vision of his or her thought processes. Guide your child to think and discover. Help your child find the importance of mathematics in his or her daily life.



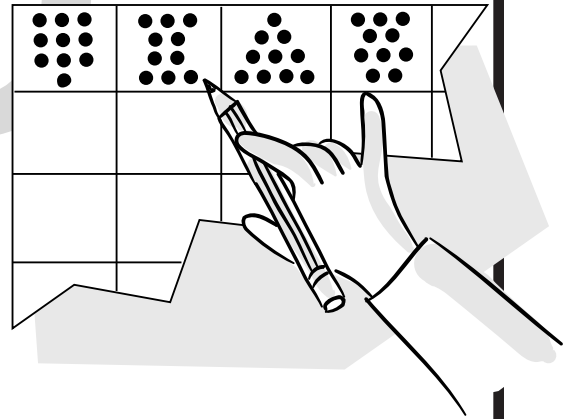


Place Value, Numeration, and Number Sense

Im-“pressed” with One Thousand

Your child may already know how to read and write one thousand. In this activity, he or she will learn more about the size of one thousand.

(Grades 3–4)



Categories: Numeration, Number Sense

Format: Activity

What you need: Ten-by-Ten Grid (p. 76), calculator

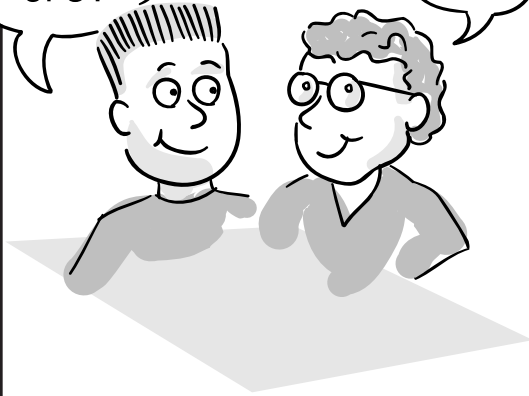
What to do:

- 1 Have your child trace or copy the grid on the Ten-by-Ten Grid. Then ask your child to draw ten dots in every square on the top row of the grid. Discuss how the total number of dots can be found by skip-counting by tens rather than counting each one. Then have your child find the total.
- 2 Ask, “How many dots would you have if you drew ten dots in every square of the grid?” Discuss the response and guide if necessary. (There would be 1,000 dots.)
- 3 Have your child use a calculator to check his or her work. Your child can begin by entering [1] [0] [0] [=] into the calculator.
- 4 Have your child enter [=] and tell what happens. Then ask your child to predict the number of times [=] will need to be entered to make 1,000. Have your child use the calculator to test his or her prediction. (10 repetitions of = will make 1,000.)

As an extension of this activity, have your child press [ON/C] to clear the screen and start over. This time, have him or her enter [1] [0] [=] into the calculator and predict the number of times [=] must be entered to reach 100, then 1,000. (10 times for 100, 100 times for 1,000.)

Twenty Questions

Is it a multiple of 3?



No.

This game reinforces place value skills and such number sense skills as *greater than*, *less than*, and *between*.

(Grades 3–5)

- Categories:** *Numeration, Number Sense*
- Format:** *Game*
- Who can play:** *2 or more people*
- What you need:** *Plain or lined paper, pencil or pen*

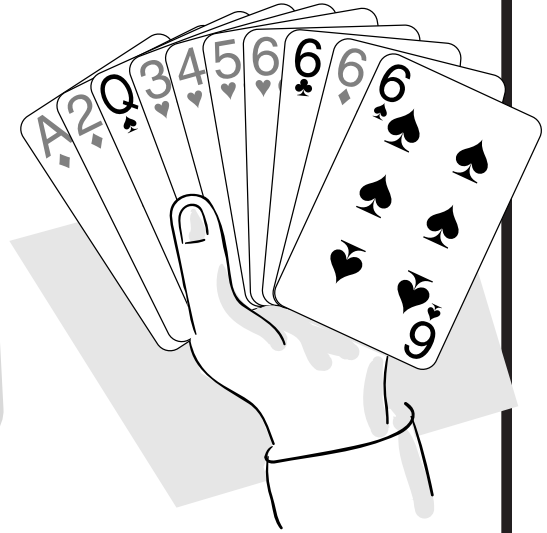
What to do:

- 1 One player thinks of a number between 1 and 1,000 and secretly records it on a piece of paper
- 2 Other player(s) try to guess the number by asking questions that can be answered with “yes” or “no.” Possible questions include “Is it less than 600? Is it greater than 350? Is it odd? Is it a multiple of 10?”
- 3 When the number has been guessed, discuss which clues were most helpful and which reasoning/problem-solving strategies were used to arrive at the number.
- 4 Have another player think of the next number and play again.
- 5 The game can be extended to include numbers from 1 to 10,000, fractions from 0 to 1, decimals from 1 to 10, or any other range that is suitable for your child’s skill level.

Gin Rummy

This well-known card game reinforces skills in counting by consecutive numbers and finding patterns. Players must arrange cards in consecutive runs or in like-numbered or like-faced cards.

(Grades 3–5)

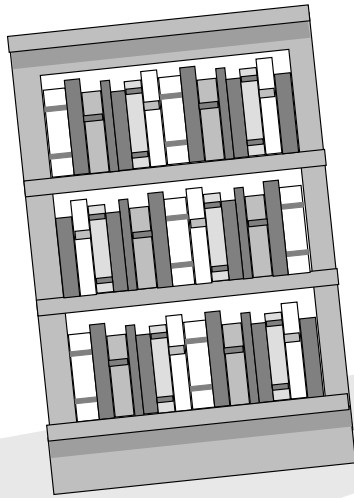


- Categories:** *Numeration, Number Sense*
- Vocabulary:** *Consecutive*
- Format:** *Game*
- Who can play:** *2 or more people*
- What you need:** *One deck of playing cards*

What to do:

- 1 The dealer deals ten cards to each player. Remaining cards are placed in a pile face down between players. The top card is turned faceup.
- 2 The player to the right of the dealer chooses to take the faceup card or pick the top card from the facedown pile. The player then discards a card, so that the total hand always consists of ten cards.
- 3 Players take turns choosing the opponent's discard or the top card from the facedown deck.
- 4 The first player with two three-card runs (3 consecutive cards) or spreads and one four-card run or spread calls "Gin" and wins the game.

Sensible Estimates



In this activity, your child can sharpen his or her estimation skills using objects around the house. Encourage your child to invent his or her own estimation and counting strategies to figure out the number of items in each collection or group.

(Grades 3–5)

Categories: *Numeration, Number Sense*

Vocabulary: *Estimate*

Format: *Activity*

What to do:

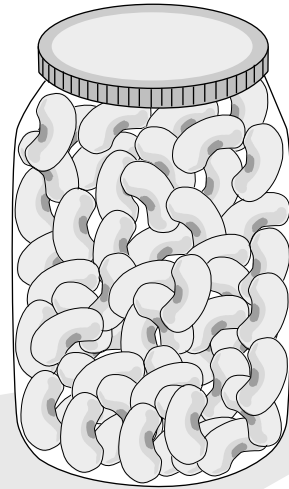
- 1 Have your child estimate the number of flowers on a specified area of wallpaper by counting out a small section of five or ten flowers. Then he or she can multiply by fives or tens to estimate the number in all.
- 2 Your child can estimate the number of books on a bookshelf at home or in a library by counting the number of books on a shelf and multiplying by the number of shelves.
- 3 Ask your child to suggest other opportunities he or she may encounter where an estimate, rather than an exact amount, is all that is necessary. Possible responses include estimating the amount of money needed for an afternoon at an amusement park or bowling alley, the number of servings in a large cake or ice cream pail, and the number of minutes it will take to get ready for school.

Estimation techniques will also develop an intuitive feeling about magnitude.

Estimate Jar

Your child can use his or her own techniques to estimate the number of items in a container. He or she will soon discover which technique is most effective for him or her.

(Grades 3–5)

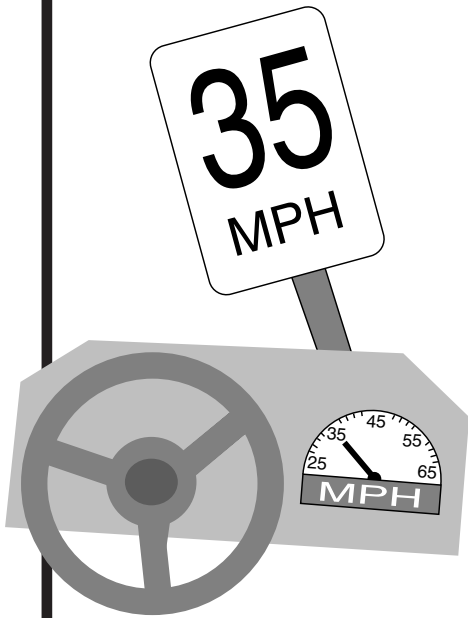


- Categories:** *Numeration, Number Sense*
- Vocabulary:** *Estimate*
- Format:** *Activity*
- What you need:** *Clear plastic container, pasta or beans*

What to do:

- 1 Fill a $\frac{1}{2}$ pint plastic jar or container with small pasta pieces or beans.
- 2 Have your child use two or more strategies for estimating the number of pieces in the container. Strategies may include those learned in school, such as chunking or sampling, or “invented” strategies created on the spot. Ask your child to record each estimate and then identify or create a name for the strategy used.
- 3 Have your child empty the container and count the pieces.
- 4 Ask your child to tell which estimate he or she thinks was closer and explain why he or she thinks so. Your child’s explanation will indicate his or her understanding of order and relationships between numbers. (*Hint: If this produces a problem, use a number line to plot each estimate along with the actual amount so your child can actually see which is closer.*)
- 5 Use a different container or a different type of pasta and repeat the activity. Your child will find that his or her estimates come closer to the actual counts and that a specific estimation technique seems to work best.

Travel Time and Numbers



In this activity, your child will use travel time for recognizing mathematics opportunities. Without any extra effort, your child will see that he or she needs basic mathematics concepts to drive, estimate the time of arrival to a faraway destination, and estimate the cost of gasoline for a tank fill-up.

(Grades 3–5)

Categories: *Numbers, Number Sense*

Format: *Activity*

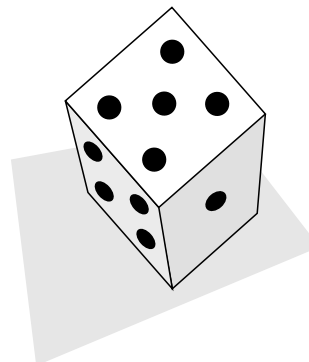
What to do:

- 1 Have your child focus on two-digit speed limit signs while riding in the car. Encourage him or her to read the numbers and compare them to the speed at which you are driving. Make sure your child can tell whether the speed shown on the speedometer is greater than, equal to, or less than the speed posted.
- 2 Your child may wish to estimate the amount of time it will take to get from one destination to another, given the “miles to . . .” sign and the speed limit. For example, if you are 200 miles from a destination and traveling at about 55 miles per hour, the estimated time of arrival is about four hours from the starting time.
- 3 Stopping for gas? Have your child estimate the total cost, given the cost per gallon and the approximate number of gallons needed to fill the tank.

Roll, Record, and Win

In this game, your child can use what he or she knows about numbers and place value to roll his or her way to a win!

(Grades 3–5)



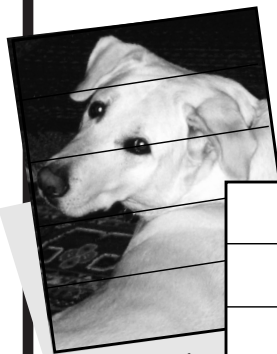
Category: *Place Value*
Format: *Game*
Who can play: *2 or more*
What you need: *1 die, paper, pencil*

hundred thousands	ten thousands	thousands	hundreds	tens	ones

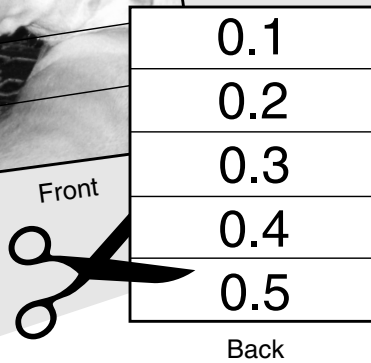
What to do:

- 1 Have each player make a score sheet like the one shown.
- 2 Players take turns rolling the die. After each roll, all players record the number in the place value of their choice, entering only one roll per column.
- 3 After a total of six rolls, players compare numbers. The player with the greatest number wins the round. Play several more rounds.
- 4 Discuss strategies with your child. Your child should have discovered that when a number such as a 1 or 2 is rolled, it should be recorded in the ones or tens place. When a 5 or 6 is rolled, it should be recorded in a place of greater value.
- 5 You may wish to vary the game by trying to construct the smallest possible number.

Puzzling Pictures



Magazine picture pasted on cardboard.



This activity provides a fun way to explore ordering amounts or numbers. Your child can check his or her own work by putting his or her puzzles back together after making them.

(Grades 3–4)

Categories: Numeration, Number Sense, Decimals

Format: Activity

What you need: Magazines, glue, cardboard or poster paper, scissors, straightedge

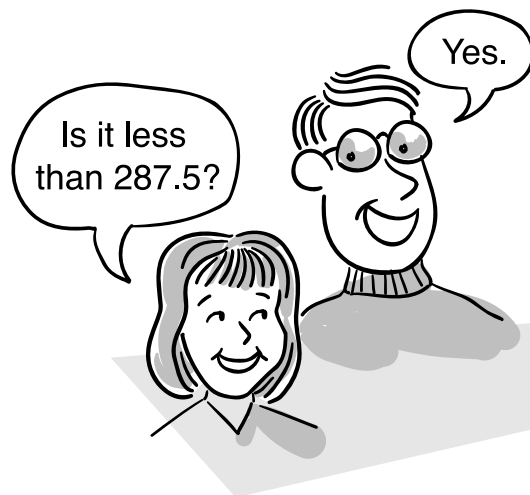
What to do:

- 1 Have your child cut out a picture from a magazine and glue it to a piece of cardboard. The picture should be about the size of a sheet of notebook paper.
- 2 Have your child use a straightedge to draw lines about an inch thick wide across the back of the cardboard or poster paper.
- 3 Have your child list and then order ten decimals, ten fractions, or a combination of ten decimals and fractions on a sheet of scrap paper.
- 4 Next, have your child write the smallest value in the top space, the next smallest value in the second space, and so on until every section is filled and ordered from least to greatest reading from top to bottom.
- 5 Have your child cut along the lines, then place the picture puzzle strips in a pile and mix.
- 6 The puzzle is ready to reassemble. Your child can use the decimals to order the pieces from top to bottom. Have your child turn the puzzle over, strip by strip, working from top to bottom. The magazine picture will reappear in its original form!
- 7 This activity may be modified for use in ordering large numbers, decimals through thousandths, money amounts, or fractions.

Decimal Guess

Play this game to reinforce your child's understanding of decimal place value.

(Grades 4–5)



Categories: Numeration, Number Sense, Decimals

Format: Activity

What to do:

- 1 Secretly record a decimal number, such as 287.46.
- 2 Tell your child that you are thinking of a decimal number. Give your child the two whole numbers between which the decimal number lies. (287 and 288)
- 3 Encourage your child to ask questions in order to identify the decimal. For example, your child might ask "yes/no" questions such as "Are there more than two decimal places? Is the value of the tenths place more than six tenths? Is the value of the decimal greater than 75 hundredths?" Make tally marks to keep track of the number of questions needed before your child identifies the decimal.
- 4 Play additional rounds, challenging your child to decrease the number of questions needed to guess the decimal.

$$15 \div 3 = 5$$

$$4 \times 9 = 36$$



Whole Number Operations

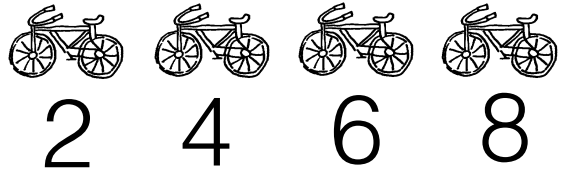
$$8 \div 2 = 4$$

$$2 \times 4 = 8$$

Same-Sized Groups

This simple multiplication and division application activity requires nothing but a “good eye” for the world around your child.

(Grades 3–4)



Categories: *Whole Number Operations, Number Sense*

Format: *Activity*

What you need: *Common household items*

What to do:

- 1 Help your child observe things that naturally come in equal groups: wheels on a car or bicycle, eggs, crayons, markers, chewing gum, and so on.
- 2 Have your child list each item found. Beside the item’s name, have your child write the number of items in one group. For example, he or she might write:

wheels on a car	4	wheels on a bicycle	2
eggs in a carton.....	12	crayons in a pack.....	8
markers in a pack.....	8	chewing gum in a pack....	5

- 3 Ask questions about the groups that are listed, such as “How many crayons would you expect to find in two boxes? How do you know? How could you find out? Tell as many different ways as you can.”
- 4 The same items can be used to explore division concepts by changing the questions you ask. Say, “If you need two eggs to make an omelet, how many omelets can you make with a full carton of eggs? How do you know?”

Cross-Out Chart

Blank Basic Facts Table

\times/\div	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

This activity focuses your child on what he or she already knows. It promotes a positive attitude and gives your child an idea of where he or she is with regard to memorizing one set of basic facts.

(Grades 3–5)

Categories:

Whole Number Operations, Patterns and Relationships

Format:

Activity

What you need:

Blank Basic Facts Table (p. 78), Multiplication Facts List (p. 77), or Basic Facts Table (p. 79)

What to do:

- 1 Work with your child to complete one row of the Blank Basic Facts Table at a time. You may wish to provide your child with a completed facts list or chart as a reference. Guide your child to seeing the skip-count patterns he or she creates upon completing each row. Actively involve your child by asking him or her to do all of the writing. Provide facts wherever needed—this sheet will be used later as a reference.
- 2 Once the entire table is completed, help your child decide which facts he or she already knows. Ask your child to use a pencil to lightly cross these facts off of the table. Make sure your child only crosses off facts he or she really knows since they will be eliminated from future activities.

Your child will find that, after he or she eliminates facts such as the “times zeros,” he or she has less to learn than supposed! Proceed with basic fact mastery using one of the several activities found in this section.

Multiplication Fact Patterns

In this activity, the goal is for your child to see and describe patterns in multiplication and division facts.

(Grades 3–5)

Basic Facts Table

\times/\div	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Categories: Whole Number Operations, Patterns and Relationships

Format: Activity

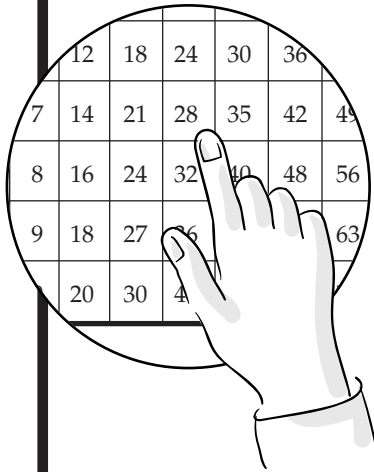
What you need: Basic Facts Table (p. 79)

What to do:

- 1 Provide your child with the Basic Facts Table.
- 2 Have your child slide his or her finger across or down the " \times/\div 0" row of the chart and describe the pattern he or she sees. Your child will probably notice that the numbers are all zeros. Make sure your child makes the connection that, when zero is multiplied with any number, the product is always zero.
- 3 Repeat the procedure described above with the " \times/\div 1" rows. Help your child make a generalization about the product of any number multiplied by 1.
- 4 Have your child discuss skip-counting patterns he or she finds in the chart. Ask questions to make sure that the generalizations your child suggests are mathematically sound.

Finding patterns on the Basic Facts Table enables your child to see patterns and relationships between multiplication and division.

Fact Hunt



In this activity, your child will learn how to use a multiplication and division facts table to find a product or quotient.

(Grades 3–5)

Categories:

Whole Number Operations, Patterns and Relationships

Format:

Activity

What you need:

Basic Facts Table (p. 79), or child-completed Blank Basic Facts Table (p. 78)

What to do:

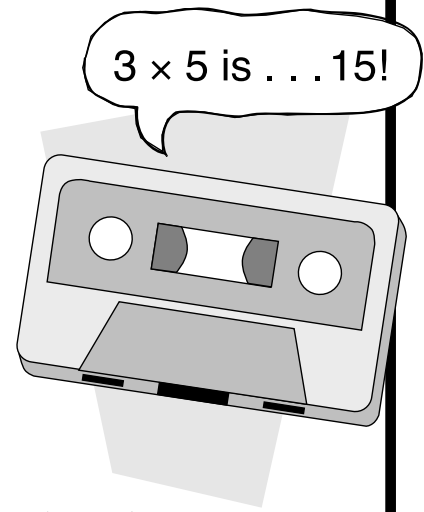
- 1 Help your child find the bold numbers across the top row and down the far left column of the Basic Facts Table. Explain that these are the numbers that will be used to find the products inside the table.
- 2 To find a product, guide your child to choose two factors, such as 4 and 7. Have your child place a finger on 4 in the top row and 7 in the left column. Show your child how to use his or her fingers to slide down the “4” column and across the “7” row to find their intersection. Make sure your child finds 28 as the correct intersecting number.
- 3 Repeat the process. This time, have your child place a finger on the 7 in the top row and the 4 in the left column. When your child finds the same product, ask him or her to predict whether or not that always happens.
- 4 Repeat steps 2 and 3 several times, using factor pairs such as 5 and 8, 4 and 9, 6 and 7, and so on. Your child will eventually notice that the factors can be combined in any order without changing the product.
- 5 When your child can find products comfortably, introduce the concept of using the table to find quotients. Start with a fact such as $54 \div 9$. Ask your child to slide along the “9” row until he or she finds the 54. Then have your child move up that column to the top of the table where the result will be 6. Repeat the process several times.

Your child will benefit from seeing the relationship between multiplication and division through the facts table.

Fast Facts on Tape

This activity is especially useful in helping your child master basic facts. You and your child will create an audiotape that can be played over and over to reinforce this skill.

(Grades 3–4)



Categories: *Whole Number Operations, Patterns and Relationships*

Format: *Activity*

What you need: *Multiplication Facts List (p. 77), cassette tape, recorder*

What to do:

- 1** With your child, practice preparing the audiotape together. Have the Multiplication Facts List in front of you. Point to and read aloud a basic fact for multiplication or division. Silently count out a three-second delay, then have your child read the answer. For example, you read, “3 times 5 is . . .” (wait three seconds). Your child responds by reading the answer, “15.”
- 2** When you have finished practicing, prepare the audiotape. Read the facts into the tape recorder one at a time. Be sure to read the facts out of order, and keep track of the facts you have recorded as you work through them.
- 3** Once the tape is completed, play it back. Challenge your child to say the answer before the tape supplies it. Even if your child cannot “beat the tape” to begin with, the answers are heard and provided by the tape. The beauty of the tape is that the facts can be practiced while your child is cleaning his or her room, taking a bath, or making lunch!

Note: It is important for the facts to be visible when making the tape. Your child will have a multisensory experience—he or she will see, read, say, and finally hear the basic facts. It almost guarantees success for any type of learner!

One-a-Day Facts

Today my fact
is $3 \times 4 = 12$.



This activity ensures that your child experiences success as he or she learns basic facts one day at a time.

(Grades 3–5)

Categories: *Whole Number Operations, Patterns and Relationships*

Format: *Activity*

What you need: *Basic Facts Table (p. 79) from "Cross-Out Chart" (page 23)*

What to do:

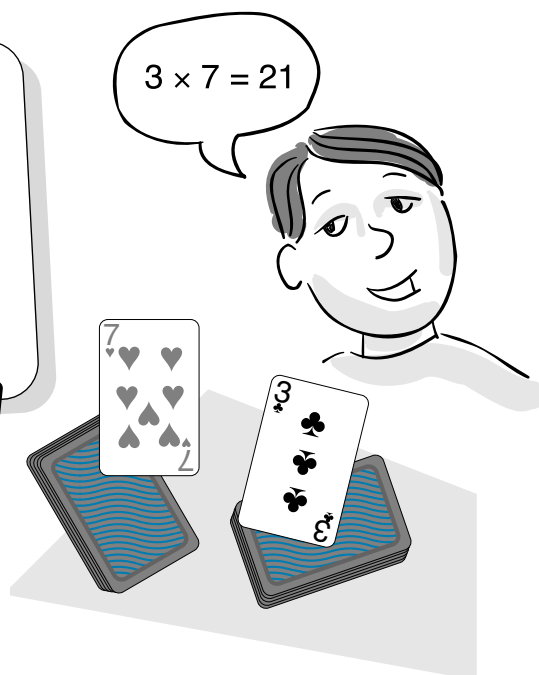
- 1 Ask your child to choose one fact not crossed off on his or her Basic Facts Table. This will become the daily fact for the day.
- 2 Have your child write, say, sing, chant, draw pictures, make an art project, or tell a story using the daily fact.
- 3 At the end of the day, ask your child to recite the daily fact one last time.
- 4 Try a new fact the next day. Repeat the procedure described in steps 1 and 2. You may wish to try a new fact each day during the week and use the weekends to review and reinforce.

As an added incentive, have your child cross off the facts he or she has mastered on the "Cross-Out Chart." This will give your child a feeling of accomplishment and serves as a built-in progress record.

Turnaround Time

In this game, your child will use the commutative property of multiplication to find related multiplication facts.

(Grades 3–5)



Categories: *Whole Number Operations, Number Sense, Patterns and Relationships*

Vocabulary: *Commutative property, related facts*

What you need: *Paper, playing cards: Ace–9 of two suits, small foodstuffs such as dry cereal or beans (optional), calculator*

What to do:

- 1 Separate the two suits of cards so that there are two piles, Ace–9 of one suit in each pile. Place both piles face down between you and your child. Tell your child that the Ace will represent 1 in this game.
- 2 Have your child turn over the top card from each pile and record the numbers as factors in a multiplication fact. For example, if a 3 and a 7 are turned over, your child writes $3 \times 7 = \underline{\quad}$.
- 3 Your child offers the product for the fact. (21) If the product is not yet rapidly recalled, you may encourage your child to model the multiplication problem using foodstuffs or enter the problem into the calculator.
- 4 Once the product has been supplied, you provide the turnaround fact. In this case, you would respond with $7 \times 3 = 21$.
- 5 Switch roles and repeat. Turn over the next card in each pile, record the sentence, and supply the product. Your child will then provide the turnaround fact.

Pattern Power

Basic Facts Table

\times/\div	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

This activity helps your child see relationships between different mathematics categories as well as mathematics cause-and-effect relationships.

(Grades 3–5)

Categories: Whole Number Operations, Number Sense, Patterns and Relationships

Format: Activity

What you need: Basic Facts Table (p. 79)

What to do:

- 1 Engage your child in a discussion about patterns seen on the multiplication chart.

You may ask questions such as the following:

- What happens to a product when one of the factors is 0?
- What happens to a product when one of the factors is 1?
- What happens to a quotient when the dividend and a divisor are equal?
- What happens to a quotient when the divisor is 1?
- What happens to a quotient when the divisor is 0?
- Compare the products of 6×6 and 5×7 . What do you find? Try it again with 7×7 and 6×8 . Try with 4×4 and 3×5 . Describe the pattern you see.

- 2 Have your child justify all of the above patterns with examples from the facts chart. If your child has learned multiplication with larger numbers, apply the patterns to those numbers. For example, is 16×16 one more than 15×17 ? Is $142 \div 142 = 1$?

The patterns your child identifies in this activity will help him or her with multiplication, division, and algebraic concepts for years to come.

Mystery Factor

This game helps your child learn his or her division facts as he or she solves missing factor sentences. The concept of finding a missing factor such as “8 times what equals 32” is a prerequisite skill to solving algebraic equations such as $8y = 32$.

(Grades 3–5)



Categories: Whole Number Operations, Number Sense, Pre-Algebra

Format: Game

Who can play: 2 people

What you need: Playing cards: Ace–10 of one suit

What to do:

- 1 The cards are shuffled and placed face down between players.
- 2 The first player thinks of a mystery factor between 1 and 10 and secretly records it.
- 3 The second player turns over the top card. Player One gives the product of the mystery factor and the overturned card. Cards are turned over one at a time, with Player One responding with the product of each overturned card.
- 4 When Player Two can identify the mystery factor, he or she says, “I know the mystery factor” and states it. If it is correct, the round is over. One point is scored for each product that is needed in order to identify the mystery factor.
- 5 Players switch roles and repeat the process. The player with the fewest points wins the round.

This game is motivating for children and helps them think of division in terms of multiplication.

Line Up

Line Up Game Board

Products

6	10	12	15	18
●	27	32	36	24
56	63	72	42	48
45	40	35	30	54
28	16	14	21	8

Factors

2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---

This game is fun to play and reinforces multiplication facts.

(Grades 3–4)

- Categories:** *Whole Number Operations, Number Sense, Pre-Algebra*
- Format:** *Game*
- Who can play:** *2 people*
- What you need:** *2 paper clips, 2 groups of markers of different colors, Line Up Game Board (p. 80)*

What to do:

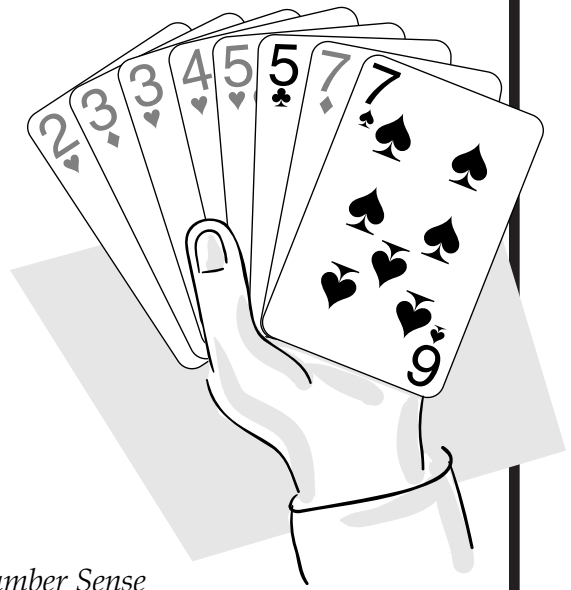
- 1 Have your child begin by placing two paper clips on the factor section of the game board. Your child then places his or her marker in the square showing the product. For example, if your child places clips on the 4 and the 5 in the factor section, a marker would be placed in the “20” box of the product section.
- 2 The second player may move only one of the clips to a new factor, then place a marker showing the new product.
- 3 Players take turns. At each turn, players may move only one clip, then place a marker on the corresponding product.
- 4 The first player to get three markers in a row wins the round.
- 5 You may wish to lengthen the game by making it necessary to get four or five markers in a row for a win.

This game involves mental math, fact recall, and logical reasoning strategies. However, you and your child will be having too much fun to notice!

Hit the Target

This game reviews place value as well as addition concepts. It also encourages your child to use critical thinking skills.

(Grades 3–6)



Categories: Whole Number Operations, Number Sense

Format: Game

Who can play: 2–3 people

What you need: Playing cards: Ace–8 of all suits

What to do:

- 1 Choose a dealer who will select a target number such as 100. Once the target number is selected, eight cards are dealt to each player.
- 2 Players create a hand, using each card as a number of tens or a number of ones. The goal is to form an addition sentence with a sum as close to the target number as possible. A deal of 2, 3, 3, 4, 5, 5, 7, 7 may be used to make a sum of 99 as shown: $45 + 37 + 7 + 5 + 3 + 2 = 99$.
- 3 Players who hit the target number exactly score 2 points. Players within 1 of the target score 1 point. Players more than 1 from the target score 0 points.
- 4 The dealer sets the new target before dealing cards for the next round.
- 5 The player with the most points after five rounds of the game wins.

After the game, stimulate discussion with your child by asking questions such as “How did you decide which numbers should be used as tens? As ones? How did you change your strategy when the target number was lower? Higher?”

“Sum” Palindromes

$$\begin{array}{r} 48 \\ +84 \\ \hline 132 \\ +231 \\ \hline 363 \end{array}$$

A palindrome is a number or a word that reads the same forward and backward. The numbers 353 and 2,442 are examples of number palindromes. In this activity, your child will learn how to change numbers into number palindromes.

(Grades 3–5)

Categories: *Whole Number Operations, Number Sense*

Format: *Activity*

What you need: *Calculator, paper, pencil*

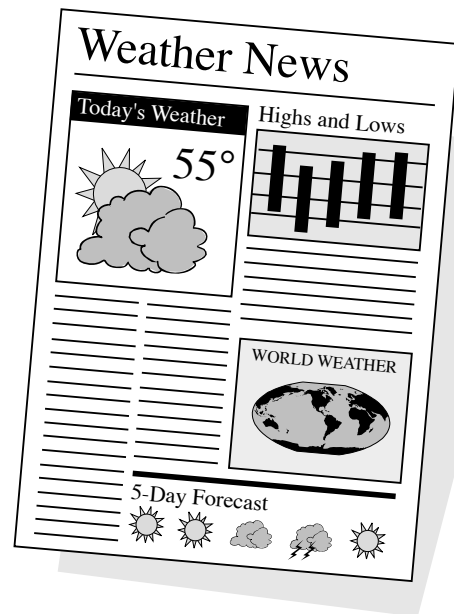
What to do:

- 1 Have your child choose any two-digit number and write it on a sheet of paper.
- 2 Have your child enter the number into a calculator. Then have your child use the calculator to add the reverse of the number. For example, if your child uses the number 48, your child will enter [4] [8] [+] [8] [4] [=].
- 3 Have your child keep adding the reverse of the number shown on the calculator display until a number palindrome is made. Have your child record the steps on a sheet of paper.
- 4 Have your child repeat the activity several times, recording the process each time.
- 5 Discuss the patterns with your child. Which numbers became palindromes in one step? two steps? three steps or more? Is there a pattern? If so, what is it?
- 6 You may wish to point out to your child that our language contains words that are palindromes. Examples include *madam*, *radar*, and the name *Otto*. Have fun with your child by brainstorming other word palindromes together.

Weather, Anyone?

This activity focuses on using subtraction to compare amounts.

(Grades 3–5)



Categories: Whole Number Operations, Number Sense, Patterns and Relationships

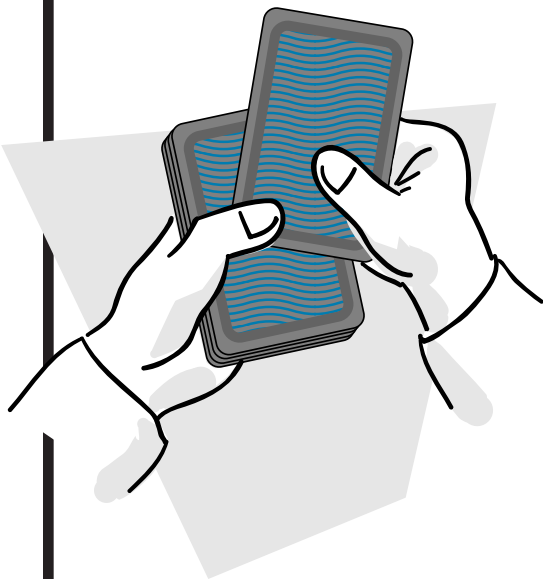
Format: Activity

What you need: Newspaper weather page, scissors

What to do:

- 1 Have your child locate and cut out the weather page from the daily newspaper.
- 2 Have your child use addition and/or subtraction to:
 - (a) compare the high and low temperature in your city
 - (b) compare the temperature in your city with that of the city of a relative
 - (c) compare the high and low temperatures of yesterday and today
- 3 Your child may be able to find the three-day average for the high and/or low temperatures using the newspaper headings *yesterday*, *today*, and *tomorrow*. Ask questions such as "How would you find the mean, or average, temperature of 3 days? 7 days? How would the procedure be the same? How would it be different?"
- 4 You may wish to have your child make a line graph showing the sunrise and/or the sunset for a week or longer. Then ask your child to use the graph to predict what will happen in future weeks. He or she will most likely be able to see the increase or decrease of daylight hours in a week's time.
- 5 A month-long data collection activity could be used to graph temperature highs and lows or observe precipitation patterns. Have your child use data and observations to predict future weather patterns.

Dealer's Choice



This simple pre-game activity takes only a moment to complete, but it reminds your child that division concepts can be found and utilized everywhere—even during a game!

(Grades 4–5)

Categories: *Whole Number Operations, Number Sense*

Format: *Activity*

What you need: *Deck of cards*

What to do:

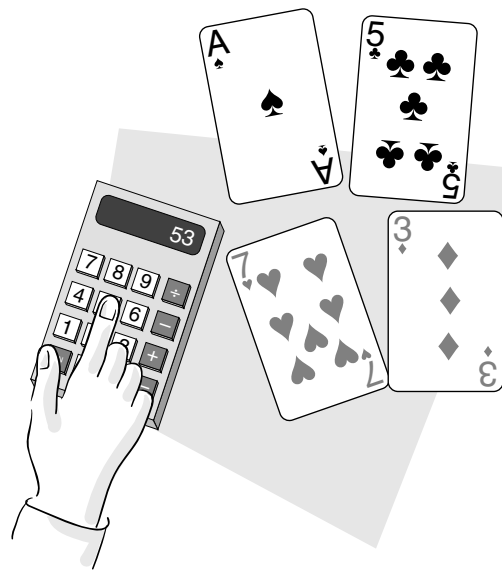
- 1 Use a standard, 52-card deck for this activity.
- 2 Your child deals out an entire deck of cards for a game involving two, three, four, or five players.
- 3 For each deal of the cards, have your child answer questions such as “Did all players get an equal number of cards? Why or why not? Suppose the leftover cards are placed in a separate pile. How many would be left in each case?”
- 4 Finally, have your child write and solve the division problem that could be used to check each deal of the cards. For example, a three-person deal would be represented by $52 \div 3 = 17$, remainder 1.

This simple activity relates division to an activity that is not ordinarily thought of as involving mathematics. It is important for your child to notice that math is intertwined in all sorts of games, activities, and daily occurrences.

Great Products and Small Quotients

This game helps your child reinforce number sense concepts as they estimate, then calculate products they create themselves.

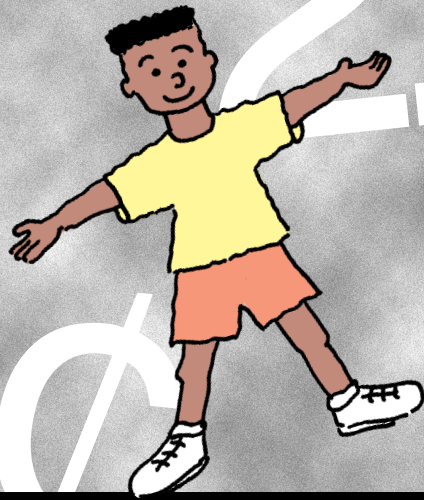
(Grade 4–5)



- Categories:** *Whole Number Operations, Number Sense, Estimation*
- Format:** *Game*
- Who can play:** *2–4 people*
- What you need:** *Deck of playing cards: Ace up to 9 of each suit, calculator*

What to do:

- 1 Shuffle the deck and deal four cards to each player. Remind your child to use the Ace as a 1.
- 2 Players use the four cards to create a multiplication problem with the largest possible product. A deal of 1, 3, 5, and 7 may be used to create such problems as 371×5 or 17×35 .
- 3 Players record their factor pairs and display them face up in front of themselves. Players use a calculator to check their products and record them to complete their multiplication sentences.
- 4 The player who makes a multiplication sentence with the greatest product wins the round and scores a point.
- 5 Play continues until all the cards in the deck have been used. The player with the most points wins the game.
- 6 Vary the game by having players create division problems. The player with the lowest quotient wins each round.



Money and Time

Cents-Off Coupons

Your child will learn the importance and value of clipping coupons, subtraction skills, and money sense as he or she works through this real-life activity.

(Grades 4–5)



Categories: Whole Number Operations, Money Sense

Format: Activity

What you need: Newspaper inserts, other coupon sources, scissors

What to do:

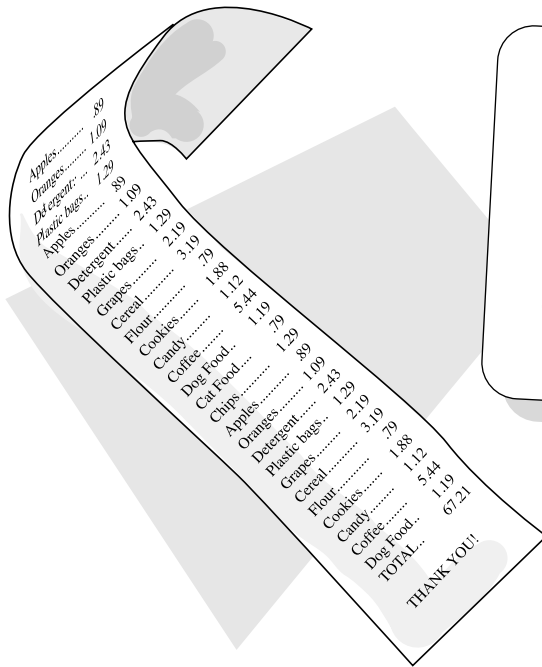
- 1 Clip coupons with your child. Sort them as you would for a shopping trip.
- 2 Help your child find each item in the grocery store.
- 3 Ask your child to estimate the cost of each item after the value of the coupon is subtracted from the advertised price. Encourage your child to round to the nearest half-dollar. For example, an item priced at \$3.39 with a 50¢ coupon will be about \$3.00.

Encouraging your child to round to the nearest half-dollar enables him or her to quickly calculate amounts mentally. After all, this is the skill most of us actually use when shopping!

Dollar Days

This activity will sharpen computation skills and help your child become aware of the cost of groceries.

(Grades 4–5)



Categories: *Whole Number Operations, Number Sense, Money Sense, Estimation*

Format: *Activity*

What you need: *Calculator (optional)*

What to do:

- 1 Save grocery receipts for one week. At the end of the week, ask your child to find the grand total amount for the receipts.
- 2 Have your child divide by the number of days to find the average cost of groceries per day. You may wish to have your child estimate the cost and use a calculator to divide the actual amount.
- 3 If you wish, have your child note the most expensive items and make a list of alternative purchases on future grocery store visits.

If your grocery bills are itemized, you may wish to have your child find the totals for food and nonfood items, then find the average daily cost of both.

Secret Coins

The object of this game is to guess the coins in the hidden collection, given the number of coins and the total amount.

(Grades 3–4)



Categories: *Number Sense, Money Sense*

Format: *Game*

Who can play: *2 or more people*

What you need: *5 quarters, 5 dimes, 5 nickels, 5 pennies*

What to do:

- 1 One player hides a collection of a few coins totaling less than 25¢. For example, the player may hide 1 dime, 2 nickels, and 1 penny.
- 2 The player supplies hints about the collection to the other players, for example, "My collection contains 4 coins and is worth 21¢. What are the secret coins?"
- 3 The player who identifies the exact collection first scores a point and gets to hide the next collection.
- 4 After two or three rounds, increase the maximum amount to 50¢, then 75¢, then \$1.00.

Shopping Spree



This activity shows your child the importance of mental math skills in daily life.

(Grade 3–5)

Categories: *Whole Number Operations, Number Sense, Money Sense*

Format: *Activity*

What you need: *A trip to the grocery store, paper, pencil*

What to do:

- 1 Begin by helping your child recall how to round the cost of an item to the nearest dollar. Remind him or her that an amount ending in up to \$0.50 rounds down to the dollar shown; an amount ending in \$0.50 or higher rounds up to the next dollar amount.
- 2 Help your child round to the nearest dollar the cost of each item that you put into the shopping cart. If the item amounts are not marked on packages, you may wish to have your child record the items' names and corresponding amounts as you go.
- 3 With your child, keep track of the estimated total amount by counting on as you place items on the checkout belt. For example, a group of items priced at \$0.89, \$2.39, \$0.99, and \$4.32 would be estimated as "\$1 + \$2 is \$3, plus \$1 is \$4, plus \$4 is \$8."
- 4 Work together to calculate an estimated total. Check your estimate against the actual total at the checkout. Were you within \$5?

Operation Shop

This activity focuses on estimation. It emphasizes to your child that mental math and estimation are a real part of daily life. For the most effective results, complete this activity while actually shopping.

(Grades 4–5)



Categories: *Whole Number Operations, Number Sense, Money Sense*

Format: *Activity*

What you need: *Products sold singly and in multipacks*

What to do:

- 1 Focus your child's attention on the use of addition, subtraction, multiplication, and division while he or she shops.
- 2 Ask questions that utilize subtraction skills, such as "Which pair of socks is less expensive? About how much less? About how much change from \$10 would we get if we bought two pairs of socks for \$2.99 each?"
- 3 Ask questions that highlight multiplication skills, such as "About how much would two pairs of socks cost if the cost of one pair is \$2.99? How many pairs of socks could we buy with a \$10 bill?"

Cook Up Some Elapsed Time



This activity is an application of skills involving addition and subtraction of time as well as elapsed time.

(Grades 3–5)

- Category:** *Time*
- Format:** *Activity*
- What you need:** *Clock (a “face” clock is better than a digital clock)*

What to do:

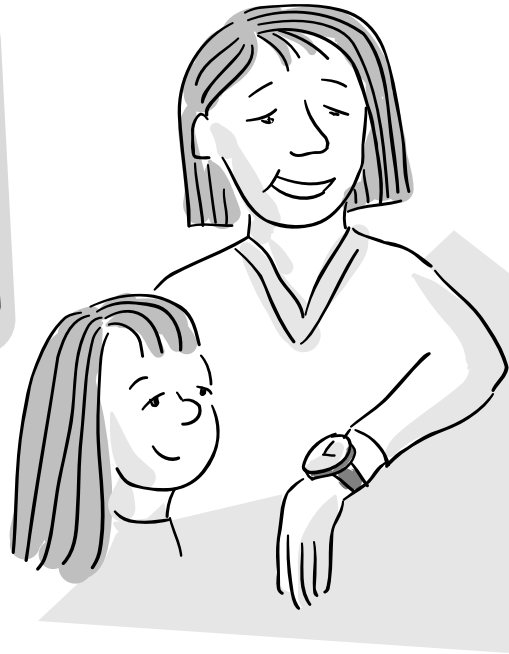
- 1 Have your child use a clock to estimate/calculate cooking times. For example, you might say, “If a recipe calls for a bake time of 30 minutes and you put it into the oven at 4:20, at what time will it be done?”
- 2 Add “what ifs” to reinforce and extend questioning. For example, for the above situation you might add, “What if you put the dish into the oven at 5:00? At 5:45? What if the cooking time was 45 minutes instead of 30 minutes? What if the cooking time was 2 hours and 15 minutes?”
- 3 For a more challenging extension, have your child work backwards. Say, for example, “Dinner should be ready at about 6:00 and the dish takes $2\frac{1}{2}$ hours to roast. At what time should the dish go into the oven?”

This activity takes seconds to complete and covers concepts crucial to everyday life. Extend it by asking your child to find elapsed time of other activities, such as soccer games and movies.

Schedule Madness

This activity includes a variety of concepts related to time and helps your child understand the necessity of being organized.

(Grades 4–5)



Category: Time

Format: Activity

What you need: Clock (a “face” clock is better than a digital clock)

What to do:

- 1 Think aloud as you make a schedule for the afternoon’s errands. “Let’s see,” you might begin. “I must be home to make dinner by 5:30. It takes 10 minutes to get home from the grocery store, so I must leave by ____ (5:20). I estimate that I need 30 minutes at the grocery store, so I should arrive there by about ____ (4:50). If it takes 10 minutes to get to the grocery store, then I’d better leave the house by about ____ (4:40).”
- 2 Your child will need to hear lots of examples before he or she can do this activity independently. It is crucial for them to hear how you do it.
- 3 For a variation, calculate elapsed time while in the car. Ask your child, “What time did we get into the car? What time did we reach the grocery store? How many minutes was the (one-way) trip? If we leave the grocery store now and it takes the same amount of time to get home, when can we expect to get there?”

MPH



The whole family will enjoy this experience during your next long car trip.

(Grades 4–5)

Category:	<i>Time</i>
Format:	<i>Activity/game</i>
Who can play:	<i>The whole family (car game)</i>
What you need:	<i>Clock, calculator, paper, pencil</i>

What to do:

- 1 When taking a long trip (several hours), record the departure time.
- 2 Exactly one hour later, write the number of miles traveled. Repeat for the second and third hours.
- 3 Help your child use this data to find the average miles per hour.
- 4 Next, use the average to estimate the time of arrival. With each passing hour, write the miles traveled and revise the average, if necessary.
- 5 In addition to the skills and concepts inherent in this activity, it empowers your child to estimate the estimated time of arrival—therefore eliminating “How long till we get there?” questions!
- 6 You may wish to have your child consider gas, rest, or meal stops. Ask, “Does this affect the total trip time? If so, how?”

One Million Minutes

In this activity, your child will learn the magnitude of one million.

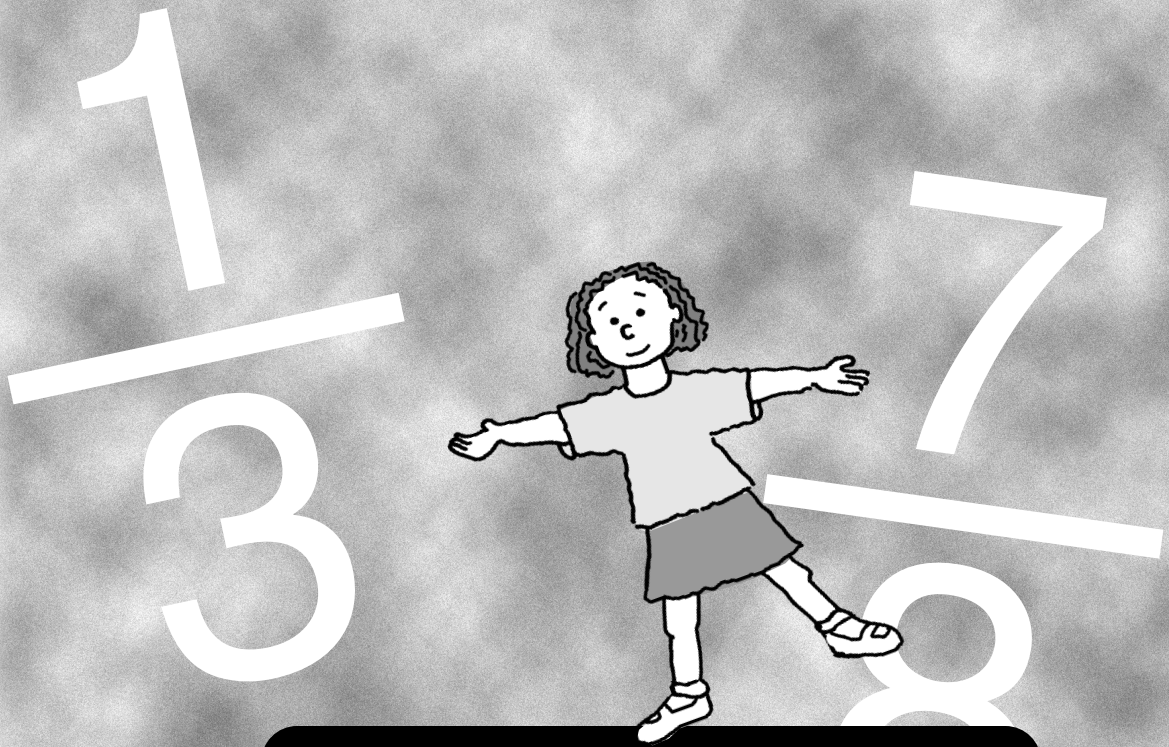
(Grades 4–5)



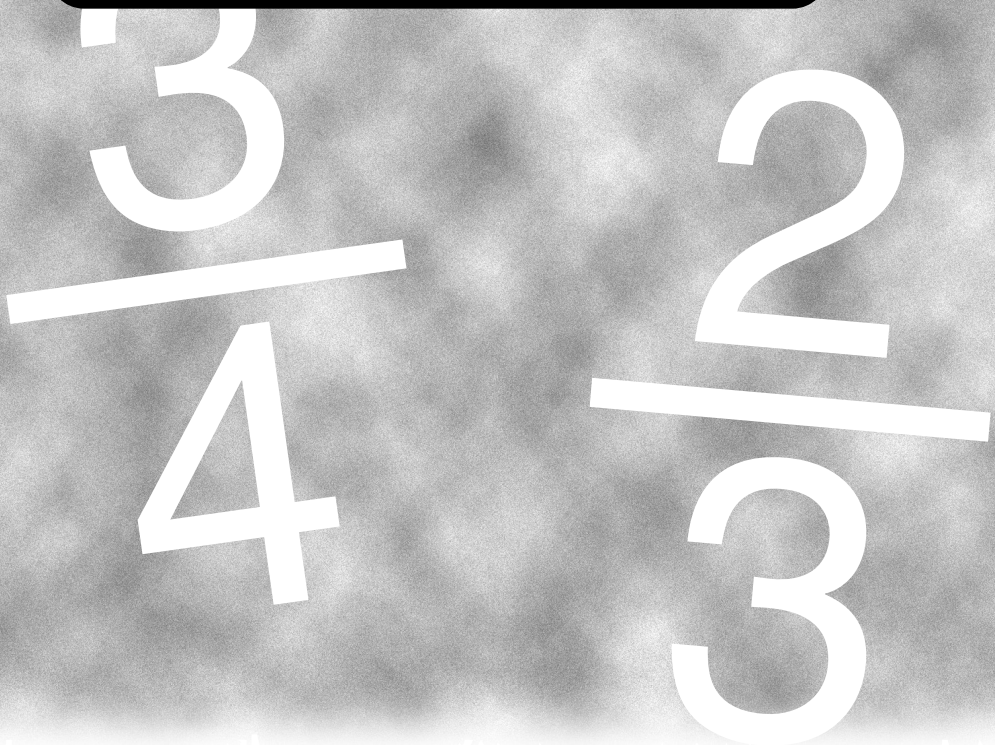
Categories: *Time, Number Sense*
Format: *Activity*
What you need: *Calendar, calculator, paper, pencil*

What to do:

- 1 Tell your child that, together, you can find his or her estimated age—to the minute!
- 2 Have your child record his or her age in years only.
- 3 Have your child use the calculator to multiply his or her age in years by 365—the number of days in each year. You may wish to add 2–3 additional days for 366-day leap years.
- 4 Have your child find his or her birthday on the calendar and count the number of days since his or her last birthday. This number should be added to the outcome of step 3.
- 5 Have your child multiply the outcome of step 4 by 24, the number of hours in a day.
- 6 Have your child multiply the outcome of step 5 by 60, the number of minutes in one hour.
- 7 Have your child add minutes (perhaps to the nearest hour) from midnight to the present time to find the total number of minutes alive.
- 8 Discuss the outcome. Was your child surprised?
- 9 As an extension, have your child predict your age in minutes. Then have him or her follow the steps above to check the prediction.



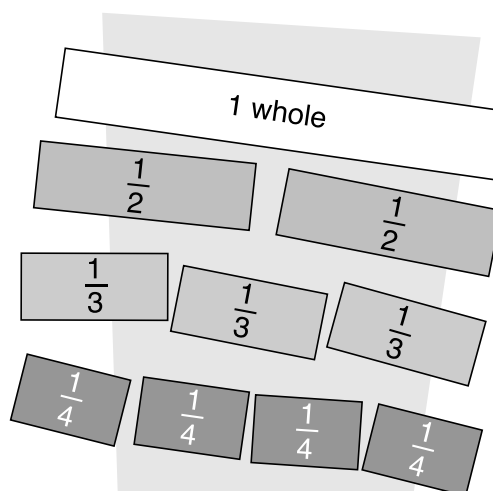
Fractions



Homemade Fraction Strips

In this activity, your child will learn how to compare and estimate fractional parts.

(Grades 3–4)



Categories: Fractions, Number Sense

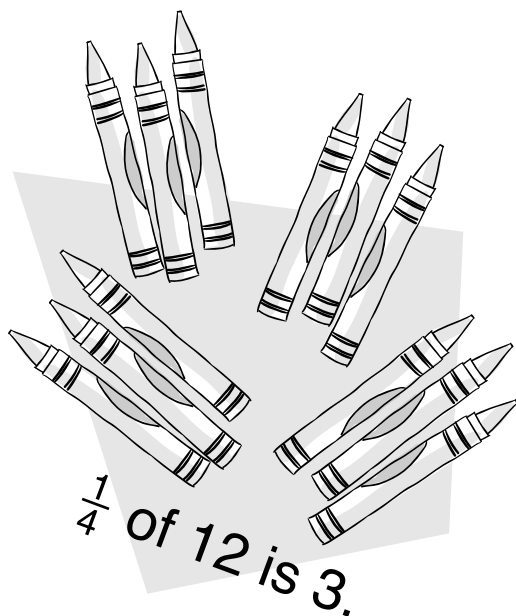
Format: Activity

What you need: Construction or plain white paper, scissors, crayons

What to do:

- 1 Have your child cut six 2-inch strips from different colors of construction paper or cut six 2-inch strips from two pieces of plain white paper. (Turn the paper sideways.)
- 2 Have your child keep one strip whole.
- 3 Have your child fold and cut one strip in half and label each piece by writing " $\frac{1}{2}$."
- 4 Have your child fold one strip in half, then in half again. Have your child identify each piece as $\frac{1}{4}$ and label it appropriately. Repeat the process for eighths by having your child fold the strip in half three consecutive times.
- 5 Have your child fold one strip into thirds and label. Then have your child fold another strip in thirds and then in half to form sixths. Again, have your child label each strip.
- 6 When the fraction set is complete, your child may use it for such activities as:
 - Make a whole by comparing a set of strips to the one whole strip. Write an addition sentence that shows what you did.
 - Find equivalent fractions by matching bar lengths of two strips. For example, show that $\frac{1}{2} = \frac{2}{4}$, then ask, "What other fractions are equivalent to $\frac{1}{2}$? What other equivalent fraction pairs can you find?"

Take Part



In this activity, your child will reinforce and review his or her skills for finding fractional parts of a set.

(Grades 4–5)

Category: *Fractions*

Format: *Activity*

What you need: *Crayons or any item of which you have 12 or more*

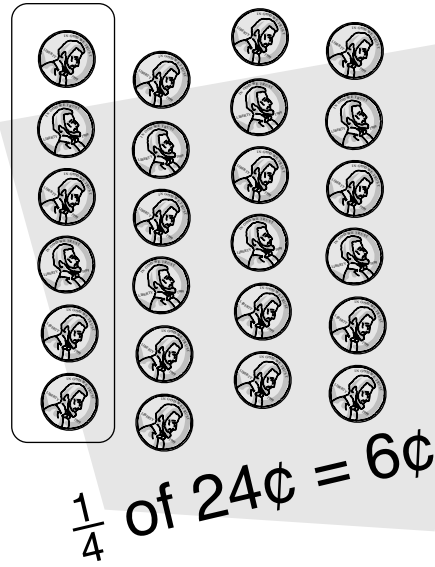
What to do:

- 1 Have your child remove 12 crayons from a box or container.
- 2 Tell your child to imagine that he or she can use $\frac{1}{4}$ of the crayons for an art project. Ask your child how to find out how many crayons to use.
- 3 Your child should use the crayons to help model and solve the problem. Invite your child to think aloud as he or she works through the problem. Ask questions such as “Into how many groups will you separate the crayons? How many of those groups will you be able to use?”
- 4 When your child is comfortable with finding a “unit” fraction ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$), challenge him or her to find $\frac{2}{3}$ or $\frac{3}{4}$ of a set. Then ask, “How is finding $\frac{2}{3}$ the same as finding $\frac{1}{3}$? How is it different?”

Penny Fractions

In this activity, your child discovers that, as the number of parts grows, the size of each part becomes smaller.

(Grades 3–5)



Category: Fractions

Format: Activity

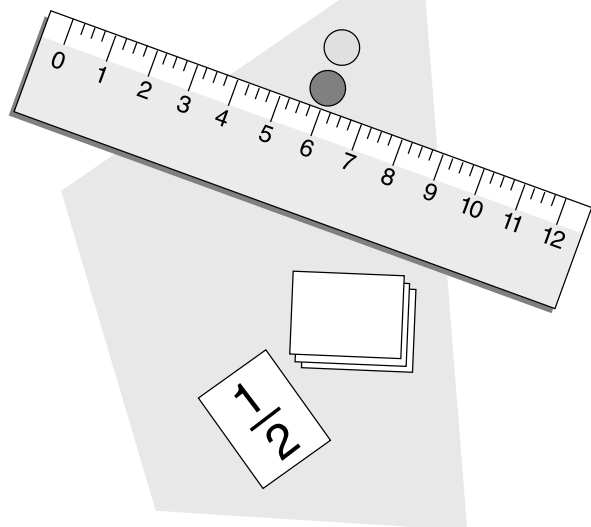
What you need: 120 pennies (up to 30 pennies for each of 4 arrangements)

What to do:

- 1 To begin with, have your child count out four groups of 24 pennies.
- 2 Ask your child to find
 - (a) $\frac{1}{2}$ of 24¢
 - (b) $\frac{1}{3}$ of 24¢
 - (c) $\frac{1}{4}$ of 24¢
 - (d) $\frac{1}{6}$ of 24¢
- 3 Ask questions such as “Which collection has the most pennies in each group?” “Which collection has the most groups?” “Does the collection with the most groups have the most pennies? Why or why not?” “What do you notice about the number of groups and the number in each group? Why is that?”
- 4 Repeat the activity, having your child use 30 pennies. He or she should find $\frac{1}{2}$ of 30¢, $\frac{1}{3}$ of 30¢, $\frac{1}{6}$ of 30¢, and so on.
- 5 Extend the activity by having your child find other fractional parts of 30¢. Say, “You know how to find $\frac{1}{6}$ of 30¢. How would you find $\frac{2}{6}$ of 30¢? $\frac{3}{6}$ of 30¢? $\frac{4}{6}$ of 30¢? $\frac{5}{6}$ of 30¢? $\frac{6}{6}$ of 30¢?” Then have your child find the fractional parts and explain what happens.

This activity is an easy way to reinforce the concepts of (a) the skip-counting effects of counting by fractional units, and (b) identifying $\frac{6}{6}$, or any other matching numerator and denominator, as an expression of one whole.

Hit the Mark



A player will win this game if he or she can get to the 10-inch mark first!

(Grades 4–5)

Categories: Fractions, Numeration, Number Sense

Format: Game

Who can play: 2 or more people

What you need: Different markers for each player, 3 sets of fraction cards labeled $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, an inch ruler

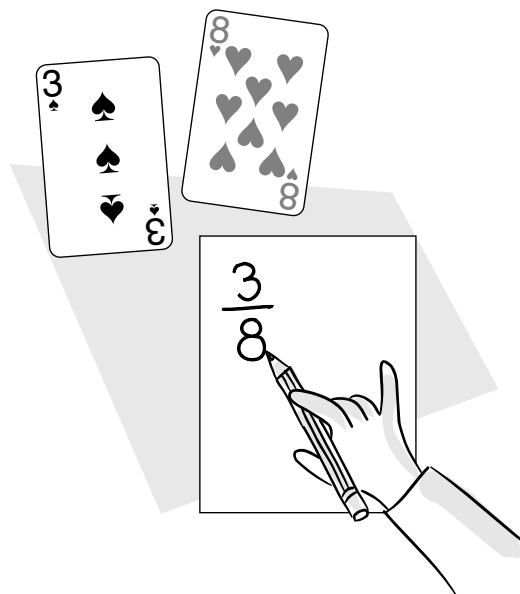
What to do:

- 1 Use an inch ruler as a game board. Each player chooses a marker and places it on the 6-inch mark on the ruler.
- 2 Taking turns, each player draws a fraction card and moves his or her marker the number of spaces forward or backward indicated by the number shown on the card.
- 3 The first player to land exactly on the 10-inch mark wins the round.
- 4 Play the game again using a new place to start or finish. For example, you may place markers on the 3-inch mark to begin and need to land exactly on the $8\frac{1}{2}$ -inch mark to win.
- 5 After several rounds of play, discuss game strategies. Ask questions such as “Which was more: a move of $\frac{3}{8}$ or $\frac{1}{2}$? What happened when your move went beyond the 10-inch mark? How did your strategy change?”

Fraction Card Game

This fun game reinforces many fraction concepts, including converting improper fractions to mixed numbers and adding fractions with like and unlike denominators.

(Grades 4–5)



Categories: *Fraction Concepts, Operations with Fractions*

Format: *Game*

Who can play: *2 or more people*

What you need: *Deck of cards: Ace–10 of all suits*

What to do:

- 1 Shuffle cards and place them face down between players. Set a target range, such as between 10 and 11.
- 2 Each player is dealt two cards. Players create fractions with the cards. For example, a draw of 3 and 8 may result in the fraction $\frac{3}{8}$ or the fraction $\frac{8}{3}$. The fraction for $\frac{8}{3}$ may be changed to the mixed number $2\frac{2}{3}$.
- 3 Each player records his or her fraction on paper.
- 4 During the next round, players record and add their new fraction or mixed number to their original and find the sum.
- 5 At each subsequent round, players add their new fractions and find the grand total.
- 6 Play continues until one player wins with a total sum between 10 and 11.
- 7 Change the target range and play again.

Recipe



Make an easy-to-measure cook-and-eat recipe.

(Grades 3–5)

Categories: *Fractions, Measurement*

Format: *Activity*

What you need: *See ingredients list below.*

What to do:

- 1 Write out the recipe for your child to read:

Seasoned Cereal Mix

- | | |
|---|---|
| <ul style="list-style-type: none">• $1\frac{1}{2}$ tablespoons barbecue sauce• 1 teaspoon garlic powder• $\frac{1}{2}$ cup butter or margarine• $1\frac{3}{4}$ cup nuts• $4\frac{1}{2}$ cup dry cereal (Life or Cheerios)• $2\frac{1}{4}$ cups pretzel sticks | <ul style="list-style-type: none">• Preheat oven to 250°.• Melt first 3 ingredients in large baking pan.• Mix last 3 ingredients in a large bowl. Pour into melted seasoning mixture.• Bake at 250° for $\frac{1}{2}$ hour. |
|---|---|

- 2 Work with your child to collect the ingredients.
- 3 Have your child carefully measure the first three ingredients. Be sure to check measurements!
- 4 Next, have your child measure the last three ingredients. Help him or her combine and mix these ingredients.
- 5 With your child, complete the directions listed in the recipe.
- 6 While the recipe is baking, ask questions such as:
 - *How many pounds of nuts, cereal, and pretzel sticks would the recipe make?*
 - *How many pounds of mix would there be if you doubled the recipe?*
 - *If you want to make $\frac{1}{2}$ -cup servings, how many would there be?*

Magic Tricks with Numbers

Can your child figure out why these magic number tricks work every time? This activity will sharpen skills and logical reasoning.

(Grades 4–5)

3

$$3 \times 4 = 12$$

$$12 \div 2 = 6$$

Categories: *Fractions, Whole Number Operations, Number Sense*

Format: *Activity*

What you need: *Paper, pencil*

What to do:

- 1 Have your child choose any whole number and do the following:
 - a. Multiply by 4
 - b. Divide by 2
 - c. Find $\frac{1}{2}$ of the result
 - d. Tell you the outcome

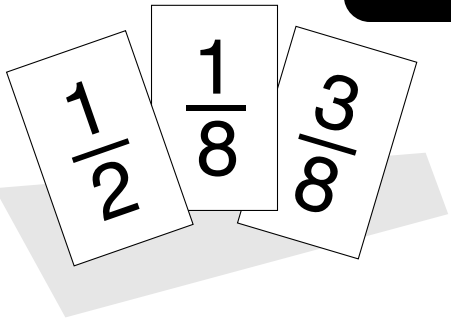
Have your child try the trick several times. Work together and try to determine why the trick works.

- 2 Have your child choose other whole numbers and do the following:
 - a. Add 8
 - b. Multiply by 6
 - c. Subtract 9
 - d. Find $\frac{1}{3}$ of the result
 - e. Subtract 13
 - f. Find $\frac{1}{2}$ of the result
 - g. Tell you the outcome

Have your child try the trick several times and try to determine why it works.

- 3 Once your child has discovered how the tricks work, you may wish to challenge him or her to write a new number trick. Tell your child to try out the number trick using several numbers, just to make sure it works. Then have your child try the number trick on other family members.

Make One



In this game, the object is to find a sum of 1.

(Grade 5)

Category: Fractions

Format: Game

Who can play: 2 or more people

What you need: Make One Playing Cards (p. 81), scissors, paper, pencil

What to do:

- 1 Have your child cut the cards from Make One Playing Cards or copy each fraction on an index card.
- 2 Shuffle the cards and have your child deal two cards to each player. The rest of the cards can be placed face down between players. Any player who is dealt a sum of 1 (two or more cards with an exact value of one whole) immediately places those cards face up in front of himself or herself.
- 3 Taking turns, each player picks the top card from the deck and tries to combine it with any of his or her other cards to make a sum of 1. If a player “makes one,” he or she places those cards face up in front of himself or herself.
- 4 The same player continues to draw cards from the deck until he or she can’t make any more ones.
- 5 Play continues until all the cards have been drawn. The player with the most sums of 1 after all the cards have been drawn wins the round. When you and your child have played several rounds, discuss the game.

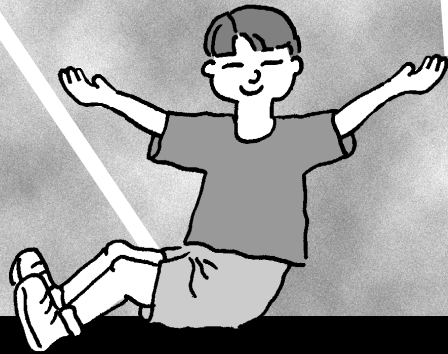
Ask questions such as “What strategies did you use to calculate the sums of the cards in your hand? Did you ever mentally convert fractions so they had like denominators? Why or why not?”

As extensions, the fraction cards may be used to create your own games.

Suggestions include:

- Order fraction cards.
- Compare pairs of fraction cards.
- Subtract pairs of fraction cards to find a difference of exactly $\frac{1}{2}$.
- Subtract pairs of fraction cards to find a difference greater than $\frac{1}{2}$ or less than $\frac{1}{4}$.

oz.



cm

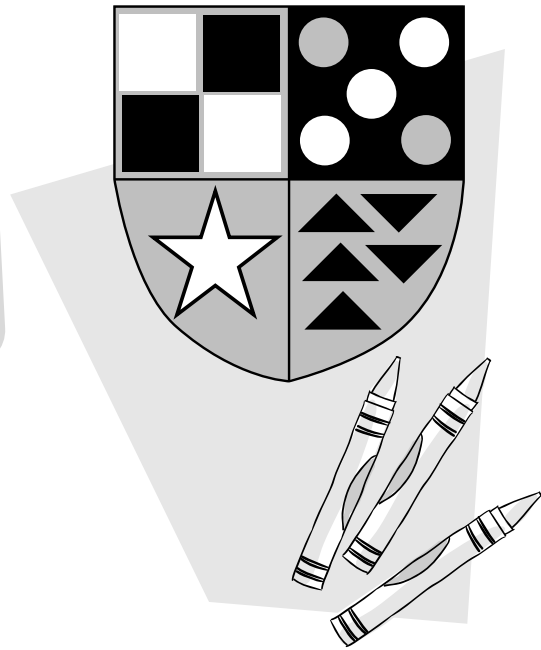
Geometry and Measurement

inch

Our Family Crest

In this activity, your child will use geometry concepts and spatial sense to design a family crest.

(Grades 3–5)



Categories: *Geometry, Measurement*

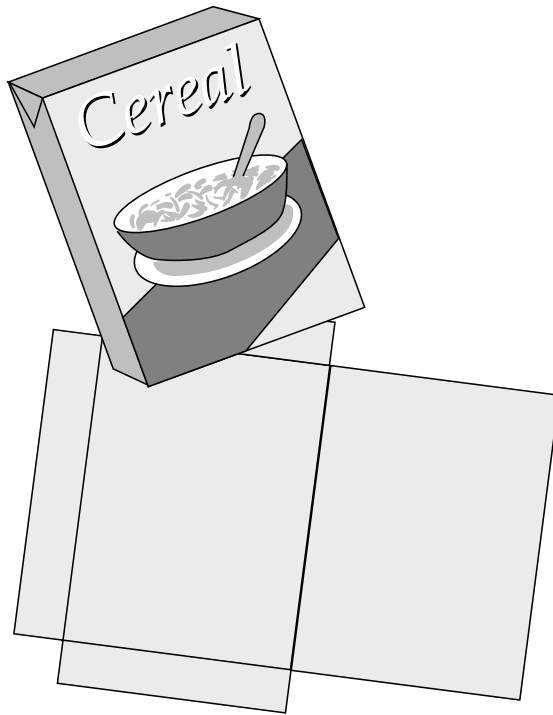
Format: *Activity*

What you need: *Scissors, cardboard, poster paper, crayons or markers*

What to do:

- 1 Tell your child that family crests are symbolic and tell about the family. Your child may choose to make a crest showing family members, family favorites, or family character traits. Help your child identify his or her focus for the actual design.
- 2 Have your child cut out pattern pieces from which to create tracing templates on a large piece of cardboard. Pattern pieces may be traced from objects such as soup cans or computer disks, or may be a design of your child's imagination.
- 3 Have your child trace the templates onto a piece of poster paper to create the family crest. Make sure your child can explain the meaning of each symbol represented on the crest.
- 4 Once the crest is complete, have your child estimate and find the perimeter and/or the area of the crest. Your child may wish to use customary or metric units of measure.

Boxes and Nets



In this activity, your child will experience the relationship between solid and plane geometry.

(Grades 3–5)

Categories: *Geometry, Patterns and Relationships*

Vocabulary: *Solid, plane, net, congruent*

Format: *Activity*

What you need: *Empty food or tissue boxes, scissors*

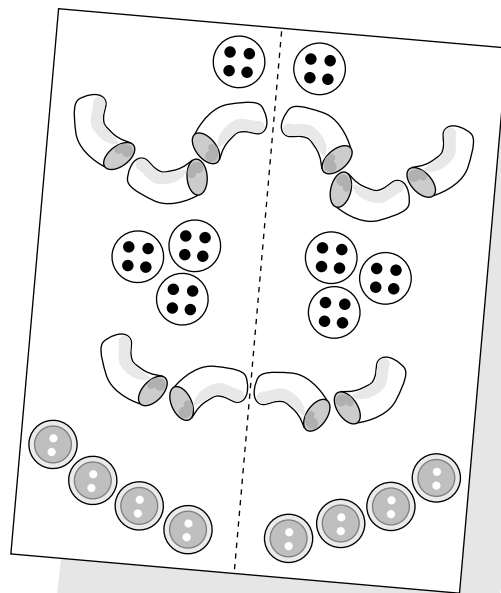
What to do:

- 1 Your child can carefully pull apart or cut along the seams of a cereal (or cookie, cracker, or pasta) box and lay it out flat. This flat shape is called a *net*.
- 2 Once the net is made, encourage your child to analyze what he or she sees. Focus attention on the individual shapes formed by the folds in the cardboard. Ask questions such as “What shapes do you see? Are some shapes the same? Where are the congruent shapes located in relation to each other?” Encourage your child to refold the net to make the box again if he or she has difficulty answering the questions.
- 3 Invite an older child to think about questions such as “How could the cereal box makers change the net to hold more cereal? less cereal?”

Artistic Reflections

Your child learns more about reflections and symmetry as he or she creates a design with you.

(Grades 3–4)



Category: *Geometry*

Vocabulary: *Reflection, symmetry, symmetrical*

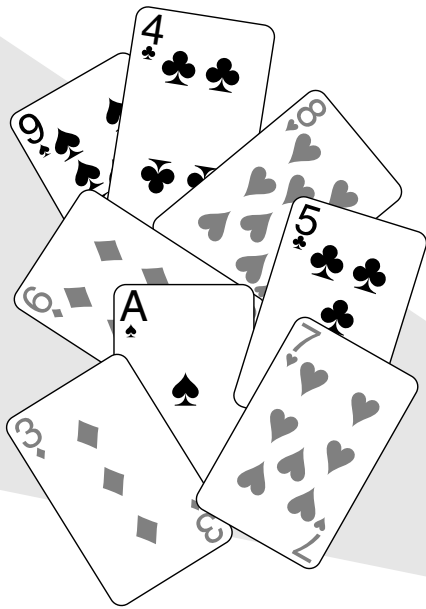
Format: *Activity*

What you need: *Paper, buttons, pasta shapes, nuts and bolts, other household items*

What to do:

- 1 Fold a piece of paper in half, either horizontally or vertically.
- 2 Place several items touching one half of the fold.
- 3 Challenge your child to place the identical items on the other side of the paper to form a mirror image, or *reflection*.
- 4 Repeat steps 2 and 3 until you have created a symmetrical design together.
- 5 Reverse roles and repeat the activity.
- 6 As an extension, you may wish to fold the paper into fourths and challenge your child to repeat the design three more times, using symmetry or “mirror images.”

Sort the Deck



Your child will learn to sort a deck of playing cards by rules of symmetry.

(Grades 4–5)

Categories: *Geometry, Patterns and Relationships*

Vocabulary: *Symmetry, symmetrical*

Format: *Activity*

What you need: *Deck of playing cards*

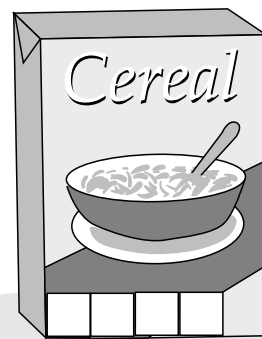
What to do:

- 1 Have your child examine a deck of regular playing cards. Encourage him or her to sort using rules of symmetry.
- 2 Have your child use cards to prove his or her answers to the questions below:
 - (a) Which number cards are symmetrical?
 - (b) Which face cards are symmetrical?
 - (c) Which cards have a vertical line of symmetry?
 - (d) Which cards have a horizontal line of symmetry?
 - (e) Which cards have both a vertical and a horizontal line of symmetry?
- 3 As a variation, have your child make a pile of presorted cards and challenge you to identify the rule. Switch roles and repeat the procedure.

Square Unit Suspicions

This activity focuses on two mathematics concepts: the concept of area having two dimensions (length and width), and therefore needing units that are two-dimensional (square units), and the idea of *estimating* area.

(Grades 3–4)



Categories: *Geometry, Measurement*

Vocabulary: *Square unit, area*

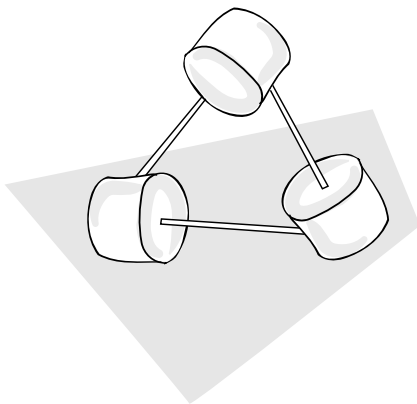
Format: *Activity*

What you need: *Paper, scissors, inch ruler, selected household objects*

What to do:

- 1 Measure and cut 1-inch squares (1- inch on all four sides).
- 2 Select a household item that has flat, rectangular surfaces, such as a book, a CD, a cereal box, a shoebox, or an envelope.
- 3 Have your child estimate the number of squares it will take to cover one row (the distance from side to side) of the object. Then ask your child to estimate the number of rows needed to cover the object.
- 4 Finally, help your child use the row and column amounts to estimate how many squares he or she would need to cover the entire surface.
- 5 Repeat the activity with several other objects.

Edible Geometric Figures



Your child will learn more about symmetry as he or she creates figures he or she can eat.

(Grades 4–6)

Category:	<i>Geometry</i>
Vocabulary:	<i>Plane, solid</i>
Format:	<i>Activity</i>
What you need:	<i>Toothpicks, miniature marshmallows</i>

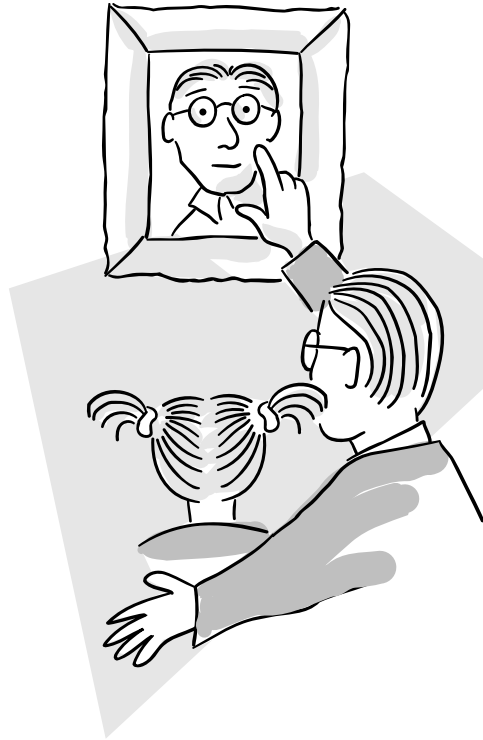
What to do:

- 1 Have your child make triangles, squares, pentagons, and other figures using toothpicks and marshmallows. For example, using three toothpicks and three marshmallows would make a triangle.
- 2 Ask your child to count the figure's sides and corners.
- 3 Repeat the steps for several other figures.
- 4 Encourage your child to make some sides longer than others by connecting two or three toothpicks to form some sides and using single toothpicks to form others.
- 5 Solid figures can also be made using the same materials. For prisms, your child should first create two congruent faces to form the bases, then connect the bases at the corners using other toothpicks. To create pyramids, your child should begin with a single base, then connect toothpicks from each corner to one single point (marshmallow) at the top.
- 6 After several figures have been assembled, have your child sort them into categories of his or her choice, such as number of sides and/or corners, or "more/fewer toothpicks than marshmallows."
- 7 Ask your child to describe the sorting "rule" and tell how each figure belongs in each category.

Perimeter and Area Hunt

In this observation activity, your child will use common household objects and situations to apply the concepts of perimeter and area.

(Grades 4–5)



Categories: *Geometry, Measurement*

Vocabulary: *Perimeter, area*

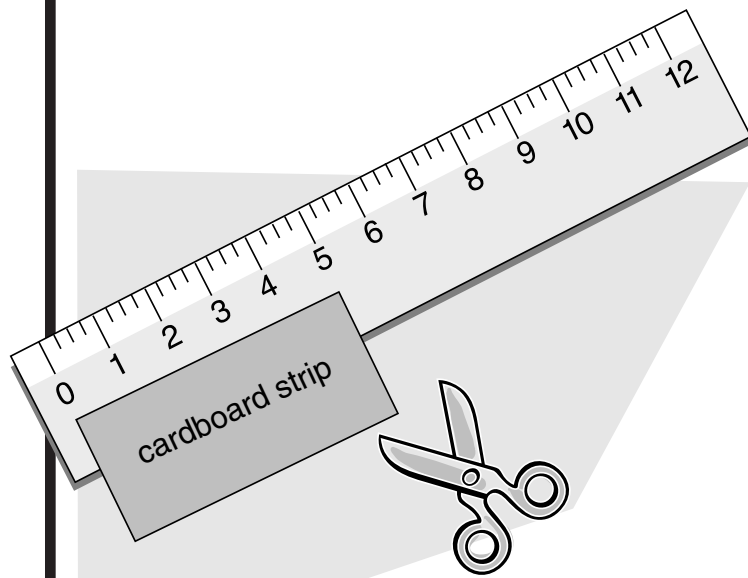
Format: *Activity*

What you need: *Ruler (optional)*

What to do:

- 1 Show your child a framed photograph in your home. Say, “Suppose you are framing this photograph. Would you measure around the outside of the photo or the area inside?” (outside; the frame goes around the perimeter of the photo).
- 2 Have your child look at the kitchen floor and say, “Imagine you want to cut new tile in this room. Would you measure around the outside or the area inside of the room?” (inside; the tile will be laid in the inside area of the room)
Look around your home together for other objects that have a measurable perimeter or area.
- 3 Other possibilities for the hunt include: window frames (perimeter), tablecloths (area).
- 4 As an extension, have your child estimate and then measure the perimeter or area of the items you have identified.

Measuring Strip



Your child uses skip-counting and measurement ideas to estimate lengths of various household objects.

(Grades 3–5)

Category: *Measurement*

Format: *Activity*

What you need: *Scissors, inch ruler, cardboard, household objects*

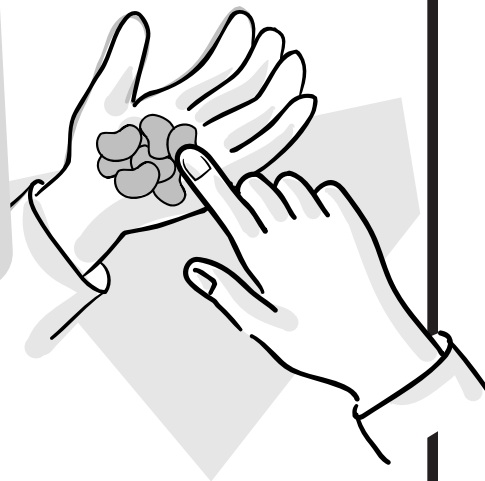
What to do:

- 1 Have your child measure and cut a cardboard strip 5 inches long.
- 2 Your child uses his or her strip to measure household objects. For example, your child may measure the length of the kitchen counter. Younger children may just say the length of the table is “5 strips.” Older children may skip-count or use multiplication to find the total estimated length. If the strip is 5 inches long and the table is 7 strips long, the total length would be estimated at 7 strips at 5 inches each, or about 35 inches.
- 3 Challenge your children to measure oddly shaped objects. The strip is pliable and can go around curves and corners.
- 4 Another day, vary the activity by having your child cut a 10-inch (or some other length of your choice) strip and remeasure the objects.

“Handy” Estimates

This activity enables your child to practice logical reasoning and estimation techniques as he or she applies them to measurement concepts.

(Grades 4–5)



Categories: *Measurement, Estimation*

Format: *Activity*

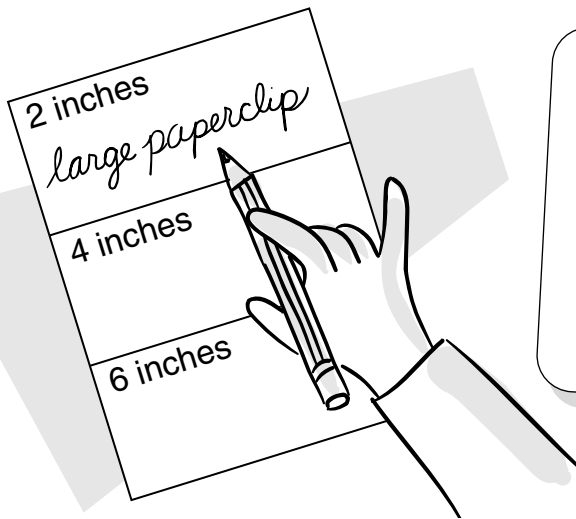
What you need: *Dried beans, small (12–16 ounce) jars*

What you do:

- 1 Have your child take a handful of beans, then count them.
- 2 Ask your child to compare the size of the beans to popcorn kernels and to marshmallows. Your child could use this number to predict the number of popcorn kernels or beans they could hold. Ask questions such as “How did you use the number of beans in a handful to guess the number of kernels in a handful? Explain why your answer makes sense.”
- 3 In a variation of this activity, your child can use the “handful of beans” number to estimate the number of beans needed to fill a jar. Have your child follow these steps:
 - (a) *Spill one handful of beans into the jar.*
 - (b) *Determine how much of the jar is filled by one handful.*
 - (c) *Estimate the number of handfuls he or she would need to fill the jar.*
 - (d) *Multiply the number of handfuls by the number in one handful to estimate the total number of beans needed to fill the jar.*

Ask questions such as “How did you use the number of beans in a handful to guess the number of beans in the jar?”

Measurement Hunt



In this activity, your child will learn how to measure lengths in inches through real-life experiences.

(Grades 3–5)

- Categories:** *Geometry, Spatial Sense*
- Format:** *Game*
- Who can play:** *2 or more people*
- What you need:** *Inch ruler, timer, household items, paper, pencil*

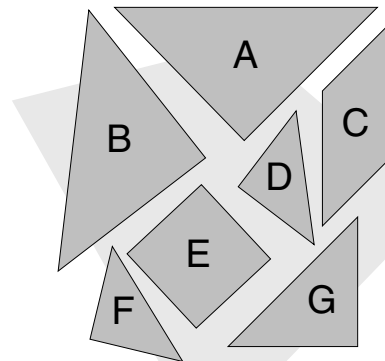
What to do:

- 1 Challenge your child to a measurement scavenger hunt. Tell your child that the object of the game is to find and identify items with lengths of about 2, 6, and 12 inches.
- 2 Players each need a pencil and a recording sheet folded into three sections.
- 3 Set a timer for 15 minutes. Players record as many things as they can find whose measurements are close to or exactly 2, 6, or 12 inches. Each section should be labeled “2 inches,” “6 inches,” or “12 inches.”
- 4 At the end of five minutes, players check each other’s work by measuring each item on the lists. The player with the most items with approximately correct measurements wins the round.
- 5 As a variation, change the lengths and play another round.
- 6 After several rounds of play, you may wish to try this extension: A player estimates lengths without measuring, then lets an opponent measure to check estimates.

Tangram Challenge

A tangram is an ancient puzzle that may have been invented in China. It has been challenging people ever since!

(Grades 3–5)



Categories: *Geometry, Visual Reasoning*

Vocabulary: *Tangram, triangle, square, rectangle, parallelogram, trapezoid*

Format: *Activity*

What you need: *Tangram Piece Set (p. 82), cardboard (optional), scissors, plain paper, pencil*

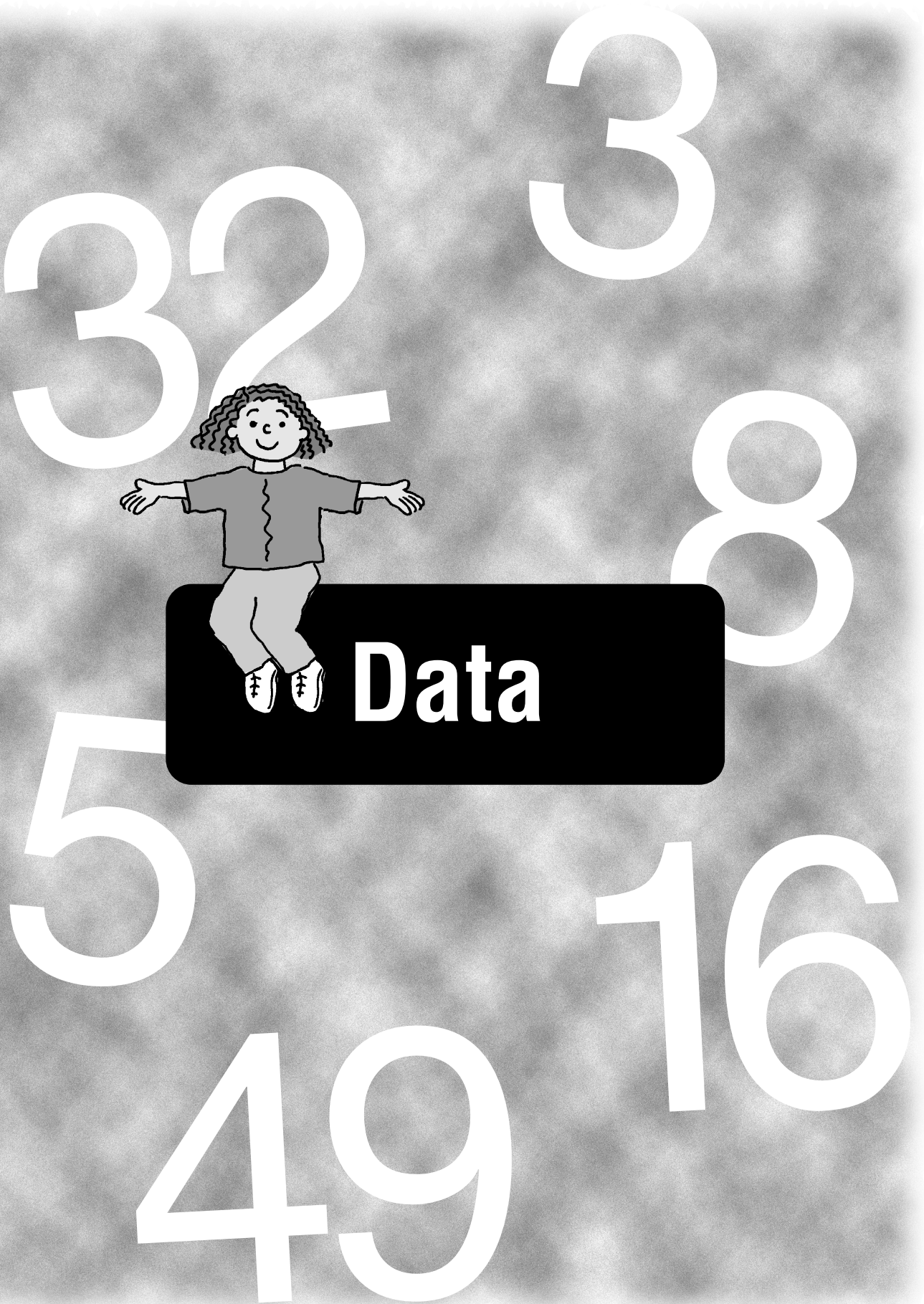
What to do:

- 1 Have your child cut the tangram pieces along the lines. If possible, trace the pieces onto cardboard so that they can be easily manipulated.
- 2 Have your child use specific tangram pieces to make each of the figures below:
 - (a) a square using pieces D, F, and G
 - (b) a square using pieces A, D, F, and G
 - (c) a rectangle using pieces C, D, and F
 - (d) a parallelogram using pieces D and F
 - (e) a trapezoid using pieces D, E, and F
 - (f) a square using all seven pieces
- 3 As an extension, have your child make a new puzzle. The names of the pieces need to be listed, as well as the shape of the outcome. Make sure your child understands that he or she must be able to solve the puzzle before challenging you to do it!

Tangram puzzles help your child to solidify concepts of spatial and visual reasoning as well as in basic geometry.



Data



Junk Drawer

In this activity, your child will graph the contents of a junk drawer.

(Grades 3–4)



Category: *Data*

Format: *Activity*

What you need: *Junk drawer, Ten-by-Ten Grid (p. 76) (optional)*

What to do:

- 1 Have your child empty out the contents of a junk drawer, desk drawer, or cupboard. Make sure there is enough space so that the contents can be spread out.
- 2 Ask your child to suggest a good way for organizing the contents of the drawer. Then have your child sort the contents according to the rule he or she made.
- 3 Give your child the Ten-by-Ten Grid or a piece of plain paper and a straightedge. Ask your child to make a bar graph or pictograph showing the sorted contents of the drawer. Your child may wish to make a tally chart as an organizational tool before constructing a graph.
- 4 Have your child place the sorted, organized contents back into the drawer.
- 5 If you wish, ask your child questions about the graph. Possible questions include: "How did you decide on a rule for sorting the items? Could they have been sorted another way? If you chose a different sorting rule, how would the graph change?"

Total Coupon Savings



In this activity, your child sorts coupons and uses addition and multiplication to find the total amount saved by using them.

(Grades 4–5)

Categories: *Data, Whole Number Operations, Money*

Format: *Activity*

What you need: *Newspaper with coupons, scissors, graph paper*

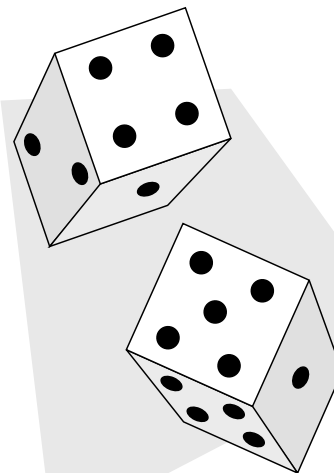
What to do:

- 1 Have your child clip coupons and sort by face value. Then have your child graph his or her collection on a bar graph.
- 2 Ask your child to tell the total savings for each group of coupons. For example, if there are four coupons worth 20¢ each, the total savings would be 80¢.
- 3 Ask your child how he or she found the answer. He or she may use repeated addition or skip-counting, or may use multiplication. All reliable methods are acceptable!
- 4 An older child may select a group of coupons he or she would really use in the store; then calculate the total that would be saved.

Line Plot Data Collector

In this activity, your child will roll two dice 50 times and record each resulting sum to create a line plot. The outcome of this activity is particularly fascinating to him or her if he or she realizes that it will help him or her predict the result of a dice roll while playing a board game!

(Grades 3–5)



Categories: *Data, whole number operations*

Vocabulary: *Line plot*

Format: *Activity*

What you need: *Dice, paper, pencil, Ten-by-Ten Grid (p. 76) (optional)*

What to do:

- 1 Have your child draw a horizontal line on a piece of plain paper. Beneath the line, have your child write the numbers 2–12. The empty line plot should look like this:

2 3 4 5 6 7 8 9 10 11 12
- 2 Have your child roll two dice and record an “X” above the number that tells the sum of the roll. For example, if a 4 and a 5 are rolled, your child records an “X” above the 9 on the line plot.
- 3 Have your child repeat the procedure for a total of 50 rolls.
- 4 Discuss the resulting line plot with your child. Talk about the sums and how often each sum was rolled.
- 5 As an extension, your child may wish to use the Ten-by-Ten Grid to create a bar graph showing the data recorded on the line plot.

Be sure to talk about conclusions and predictions after completing this activity!

Newspaper Graphs



In this activity, your child will read, analyze, and discuss a graph in the newspaper.

(Grades 3–5)

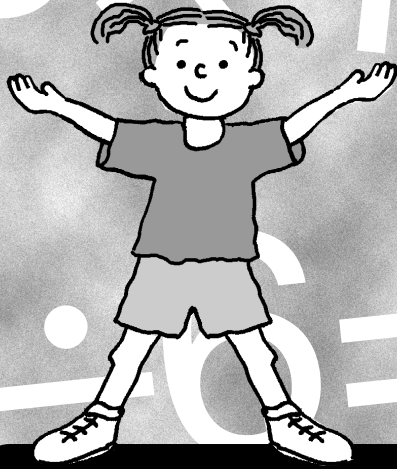
Category:	<i>Data</i>
Vocabulary:	<i>Graph</i>
Format:	<i>Activity</i>
What you need:	<i>Newspaper or magazine</i>

What to do:

- 1 Have your child look in a daily or weekly newspaper for a bar graph, pictograph, line graph, or circle graph that conveys data on a topic that your child will understand. You may wish to try the weather page, the stock market page, or the local news section of the paper.
- 2 Have your child cut the graphic out, along with the accompanying article or caption.
- 3 Ask your child to describe what he or she sees in the graph. Encourage all reasonable responses. If necessary, prompt your child by asking questions such as “Which item (category) shows the greatest amount? The least amount? What is the title of the graph? If there is no title, what do you think the title should be? What does each part of the graph show? What can you tell by reading this graph?”
- 4 As an extension, have your child make up two questions that can be answered using the data shown in the graph. Try to answer the questions, and discuss the correctness of the responses with your child. It is important for children to see the use of graphs in everyday life.

Graphs help people absorb a great deal of information in a simple picture, or graphic. They also show relationships between topics that could not as easily be conveyed if written in words.

$$8 \times 4 = 32$$

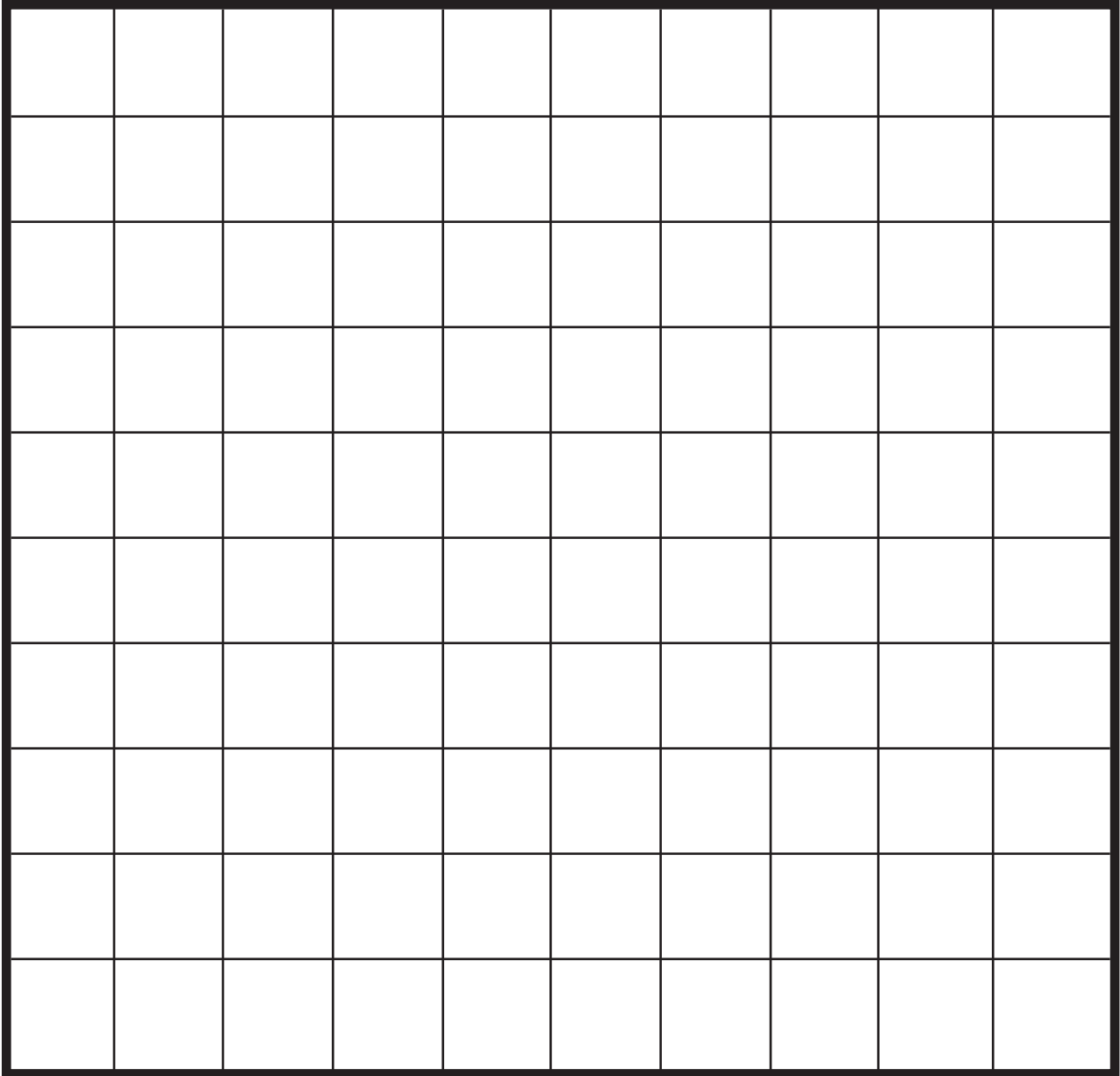


$$12 \div 6 = 2$$

Math Hooks Aids

$$24 \div 8 = 3$$

Ten-by-Ten Grid



Multiplication Facts List

$0 \times 0 = 0$ $0 \times 1 = 0$ $0 \times 2 = 0$ $0 \times 3 = 0$ $0 \times 4 = 0$ $0 \times 5 = 0$ $0 \times 6 = 0$ $0 \times 7 = 0$ $0 \times 8 = 0$ $0 \times 9 = 0$ $0 \times 10 = 0$	$1 \times 1 = 1$ $1 \times 2 = 2$ $1 \times 3 = 3$ $1 \times 4 = 4$ $1 \times 5 = 5$ $1 \times 6 = 6$ $1 \times 7 = 7$ $1 \times 8 = 8$ $1 \times 9 = 9$ $1 \times 10 = 10$	$2 \times 1 = 2$ $2 \times 2 = 4$ $2 \times 3 = 6$ $2 \times 4 = 8$ $2 \times 5 = 10$ $2 \times 6 = 12$ $2 \times 7 = 14$ $2 \times 8 = 16$ $2 \times 9 = 18$ $2 \times 10 = 20$	$3 \times 1 = 3$ $3 \times 2 = 6$ $3 \times 3 = 9$ $3 \times 4 = 12$ $3 \times 5 = 15$ $3 \times 6 = 18$ $3 \times 7 = 21$ $3 \times 8 = 24$ $3 \times 9 = 27$ $3 \times 10 = 30$
$4 \times 1 = 4$ $4 \times 2 = 8$ $4 \times 3 = 12$ $4 \times 4 = 16$ $4 \times 5 = 20$ $4 \times 6 = 24$ $4 \times 7 = 28$ $4 \times 8 = 32$ $4 \times 9 = 36$ $4 \times 10 = 40$	$5 \times 1 = 5$ $5 \times 2 = 10$ $5 \times 3 = 15$ $5 \times 4 = 20$ $5 \times 5 = 25$ $5 \times 6 = 30$ $5 \times 7 = 35$ $5 \times 8 = 40$ $5 \times 9 = 45$ $5 \times 10 = 50$	$6 \times 1 = 6$ $6 \times 2 = 12$ $6 \times 3 = 18$ $6 \times 4 = 24$ $6 \times 5 = 30$ $6 \times 6 = 36$ $6 \times 7 = 42$ $6 \times 8 = 48$ $6 \times 9 = 54$ $6 \times 10 = 60$	$7 \times 1 = 7$ $7 \times 2 = 14$ $7 \times 3 = 21$ $7 \times 4 = 28$ $7 \times 5 = 35$ $7 \times 6 = 42$ $7 \times 7 = 49$ $7 \times 8 = 56$ $7 \times 9 = 63$ $7 \times 10 = 70$
$8 \times 1 = 8$ $8 \times 2 = 16$ $8 \times 3 = 24$ $8 \times 4 = 32$ $8 \times 5 = 40$ $8 \times 6 = 48$ $8 \times 7 = 56$ $8 \times 8 = 64$ $8 \times 9 = 72$ $8 \times 10 = 80$	$9 \times 1 = 9$ $9 \times 2 = 18$ $9 \times 3 = 27$ $9 \times 4 = 36$ $9 \times 5 = 45$ $9 \times 6 = 54$ $9 \times 7 = 63$ $9 \times 8 = 72$ $9 \times 9 = 81$ $9 \times 10 = 90$	$10 \times 1 = 10$ $10 \times 2 = 20$ $10 \times 3 = 30$ $10 \times 4 = 40$ $10 \times 5 = 50$ $10 \times 6 = 60$ $10 \times 7 = 70$ $10 \times 8 = 80$ $10 \times 9 = 90$ $10 \times 10 = 100$	

Blank Basic Facts Table

\times/\div	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Basic Facts Table

\times/\div	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Line Up Game Board

Products

6	10	12	15	18
20	27	32	36	24
56	63	72	42	48
45	40	35	30	54
28	16	14	21	8

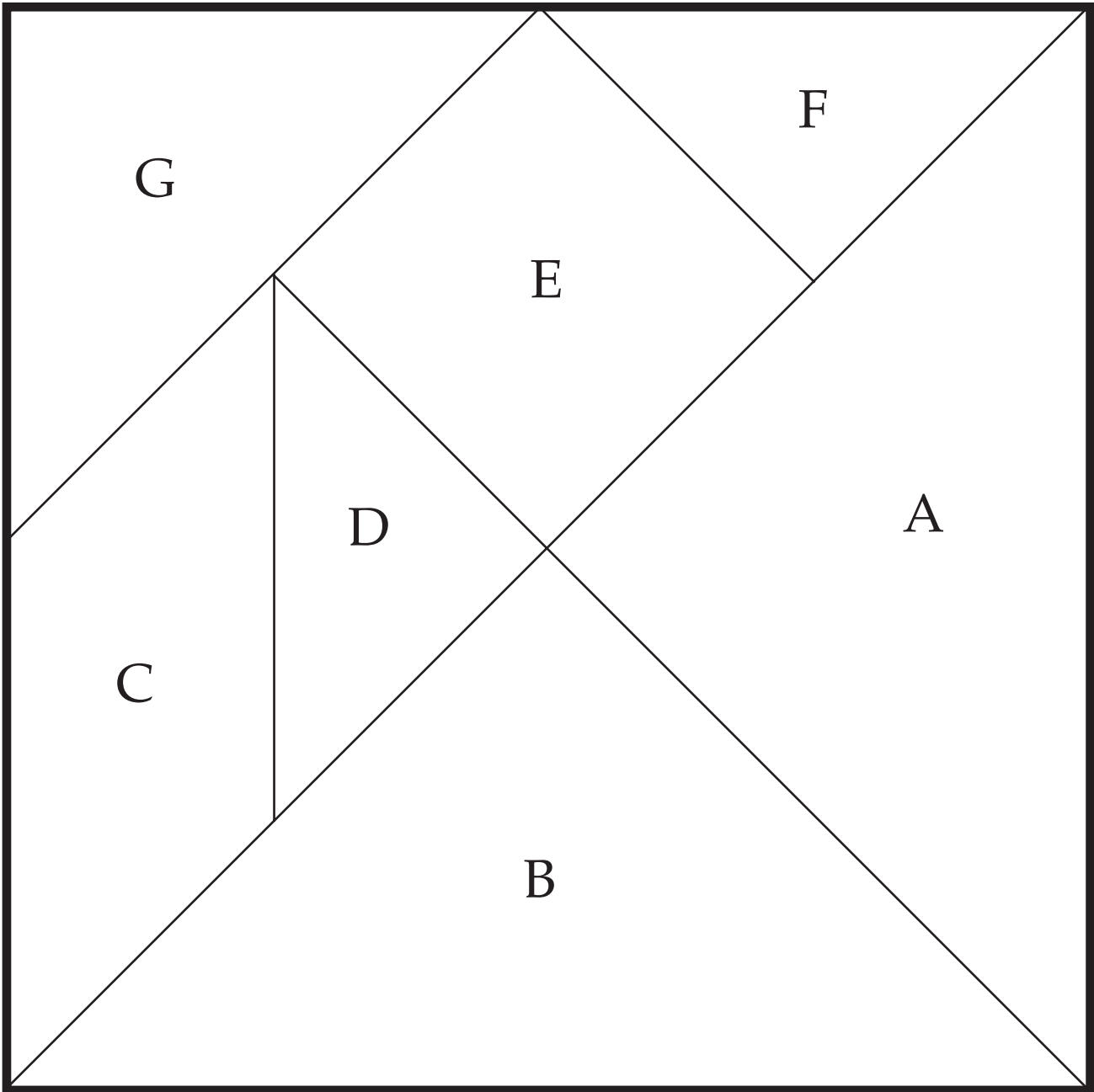
Factors

2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---

Make One Playing Cards

$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{5}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{1}{6}$	$\frac{5}{6}$	$\frac{5}{6}$
$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{10}$	$\frac{3}{10}$	$\frac{7}{10}$	$\frac{7}{10}$
$\frac{3}{5}$	$\frac{1}{5}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{3}{10}$
$\frac{1}{5}$	$\frac{1}{5}$	$\frac{2}{5}$			

Tangram Piece Set



Glossary

Addend: a number added to find a sum.

In $2 + 7 = 9$, 2 and 7 are the addends.

Area: the number of square units in a region.

Area is measured in square units.

Bar graph: a graph that uses bars to compare data.

Circle: a plane figure that has all points equal in distance from a center point.

Commutative: a property for addition and multiplication that states that the order of addends or factors does not change the outcome (sum or product).

Congruent: plane figures with the same shape and size.

Consecutive: numbers immediately following each other in some order.

Corner: the intersection of two sides of a plane figure.

Data: information used to make calculations or to analyze.

Difference: the number that is the result of subtracting one number from another.

Digits: the symbols used to show numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Distance: the amount of space between two things.

Dividend: the number that is divided by a smaller number. In $12 \div 4 = 3$, 12 is the dividend.

Divisor: the number of groups into which the dividend will be divided. In $12 \div 4 = 3$, 4 is the divisor.

Estimate: to find and name a number that is close to an exact number or answer. $40 + 19$ is about 60.

Fact family: a group of related facts using the same set of numbers. $3 \times 4 = 12$, $4 \times 3 = 12$, $12 \div 4 = 3$, and $12 \div 3 = 4$ is a fact family.

Factor: a number that is multiplied by another to create a product. In $3 \times 4 = 12$, 3 and 4 are factors.

Fraction: a way to compare equal parts to a whole. In $\frac{3}{5}$, 3 equal parts are compared to 5 equal parts.

Graph: a pictorial representation of some mathematical relationship. Graphs include bar graphs, pictographs, line graphs, and circle graphs.

Greater than: the relationship of one number being farther to the right on a number line than another; having a greater magnitude. 7 is greater than 3.

Hour: a period of time lasting 60 minutes.

Length: the extent of anything from end to end.

Less than: the relationship of one number being farther to the left on a number line than another; having a lesser magnitude. 3 is less than 7.

Line plot: a graph that uses symbols above a number line to represent data.

Minute: a period of time lasting 60 seconds.

Net: a pattern to be cut and folded to make a solid shape.

Order: to arrange numbers from least to greatest or from greatest to least.

Ordinal: a number used to tell order. The ordinal numbers corresponding to 1 through 10 are first, second, third, fourth, fifth, sixth, seventh, eighth, ninth, tenth.

Outcome: a possible result of an experiment.

Parallelogram: a four-sided figure with both pairs of opposite sides parallel.

Perimeter: the distance around a closed figure.

Pictograph: a graph that uses pictures or symbols to compare data.

Place value: the value given to the place a digit has in a number. In 23, the place value of the digit 2 is 2 tens and has a value of 20.

Plane: a flat surface that extends without end in all directions.

Plane figure: a figure that lies on a flat surface and has length, width, and area.

Glossary *(continued)*

Prediction: an educated guess about what will happen.

Product: the outcome of a multiplication problem. In $3 \times 4 = 12$, 12 is the product.

Quotient: the outcome of a division problem. In $12 \div 4 = 3$, 3 is the quotient.

Rectangle: a four-sided figure with four right angles and two pairs of parallel sides.

Reflection: the “flip” of a figure across an axis; creating a congruent mirror image of the original figure.

Related facts: facts that contain the same numbers; facts that are part of the same fact family.

Side: the distance between two corners in a plane figure.

Similar: two or more plane figures that are the same shape but differ in size.

Skip-counting: a method of counting the multiples of a number.

Solid: a three-dimensional figure.

Space figure: a figure with length, width, depth or height, and volume.

Square: a plane figure with four equal sides and four right angles.

Square unit: the unit for measuring area.

Subtraction: an operation that tells the difference between two numbers, compares two numbers, or tells how many are left when some are taken away.

Sum: the number that is the result of adding two or more addends.

Symmetry: a figure that can be folded along a line to show two parts that are mirror images of each other. The fold line is called a line of symmetry.

Tally chart: a chart used to compare groups of tally marks.

Tally mark: a mark used to record data.

Tangram: a Chinese mathematical puzzle.

Trapezoid: a four-sided figure with one pair of parallel sides.

Triangle: a plane figure with three sides and three corners.

Turnaround facts: two related facts containing the same addends and sums or factors and products. $3 \times 2 = 6$ and $2 \times 3 = 6$ are turnaround facts.

Year: a period of time lasting about 365 days; the period of time required for the Earth to make one complete revolution around the sun.