



## MATHEMATICS

In third grade, your child will develop an understanding of multiplication and division and strategies for multiplication and division within 100. He will expand his knowledge of place value and use this understanding to solve addition and subtraction problems. An understanding of fractions will be developed, especially fractions using 1 as the numerator. Your child will use arrays to solve problems and calculate area. He will also learn more about two-dimensional shapes. Some activities will include:

- Generating measurement data.
- Creating line plots to represent data.
- Using visual fraction models to represent parts of a whole.
- Justifying area by using multiplication.
- Describing and analyzing two-dimensional shapes.



**Your child can interpret products of whole numbers (e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each).**

- Think in terms of groups of things rather than individual things when multiplying.
- Learn that the multiplication symbol “ $\times$ ” means “groups of” and problems such as  $5 \times 7$  refer to 5 groups of 7.

**HELP AT HOME**

- ▶ Arrange pennies into different arrays and have your child write the multiplication fact for the array.
- ▶ Have your child arrange 4 pennies across the top and 3 pennies going down, which would represent 3 groups of 4, and your child would identify that 3 groups of 4 would represent  $3 \times 4 = 12$ .

**RESOURCES**

**SAMPLE ARRAY**

Using a sheet of notebook paper or construction paper, make a simple chart your child can use to create arrays for different multiplication facts.

	1	2	3	4	5	6	7
1	●	●	●				
2	●	●	●				
3	●	●	●				
4	●	●	●				
5							



Your child can interpret  $56 \div 8$  as the number of objects in each share when 56 objects are portioned (divided) equally into 8 shares, or as a number of shares when 56 objects are partitioned (divided) into equal shares of 8 objects.

- Answer questions such as, “How many objects will be in each group so that the groups are equal?”
- Answer questions such as, “How many equal groups can you make?”

## HELP AT HOME

- ▶ You and your child can bake cookies and then divide them equally among each other and create a division fact.
- ▶ Have your child divide 12 cookies equally among 3 people so that every person receives 4 cookies. Your child should then identify that 12 cookies divided among 3 people would represent  $12 \div 3 = 4$ .
- ▶ Give your child all 12 of the cookies and ask, “If you divide these cookies among 3 people, how many cookies will each person get?”



## VOCABULARY

**PARTITION MODELS** provide students with a total number and the number of groups.

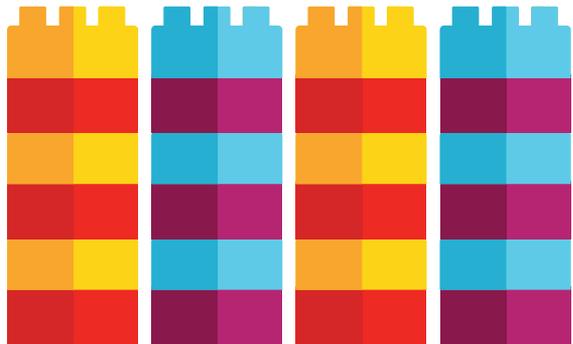
**MEASUREMENT MODELS** provide students with a total number and the number of objects in each group.

Your child can use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.)

- Use a variety of representations for creating and solving one-step word problems.
- Find the product of the problem, the group size, or the number of groups. Note: The product is the answer to a multiplication problem.
- Use a variety of pictures and letters to represent unknown numbers in the problem.

### HELP AT HOME

- ▶ Give your child a certain number of small blocks. Ask your child questions like, "You have 24 blocks. If you put 6 blocks in each row, how many rows of blocks are there?" He can then arrange the blocks into an array and solve the problem.
- ▶ Divide your child's blocks into an array, such as 4 rows of 6. Then, ask your child, "How many blocks are there total?"



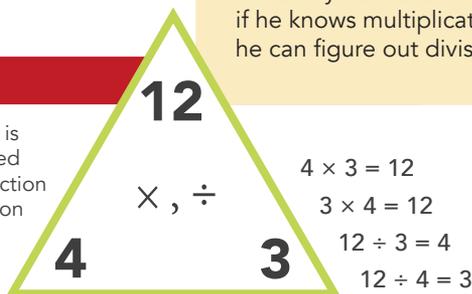
SAMPLE ARRAY OF 24 BLOCKS

## Your child can determine the unknown whole number in a multiplication or division equation.

- Solve equations with unknown variables (numbers), such as,  $N \times 5 = 20$  or  $N \div 5 = 4$ .
- Use fact families and knowledge to determine that multiplication is the opposite of division, and to determine missing numbers in equations.

### RESOURCES

A **FACT FAMILY** is a collection of related addition and subtraction facts, or multiplication and division facts, made from the same numbers.



### HELP AT HOME

- ▶ Give your child problems with variables, such as:  $N \times 4 = 12$  or  $N \div 4 = 3$ . Have him use blocks to figure out the missing number.
- ▶ Remind your child that if he knows multiplication he can figure out division.

## Your child can apply properties of operations as a strategy to multiply and divide.

- Know the Commutative Property states that the factors of a problem can be multiplied in any order and the product will be the same.
- Know the Associative Property states that the factors can be grouped in different ways and the product will still be the same.
- Know the Distributive Property states that a multiplication fact can be broken up into the sum of two other multiplication facts.

### HELP AT HOME

- ▶ Provide your child with note cards pertaining to each property. (See page 35 for examples of the properties of operations.) Have the definition of the property on one side and an example of the property on the opposite side of the note card. Have your child practice guessing which property he has, until he commits the properties to memory.
- ▶ Write different examples of the properties on note cards and have your child sort them into the correct property category.

**Your child can understand division as an unknown factor problem. For example, he will find  $32 \div 8$  by finding the number that makes 32 when multiplied by 8.**

- Use the strategy  
Part + Part = Whole and fact families to solve a division problem.

### HELP AT HOME

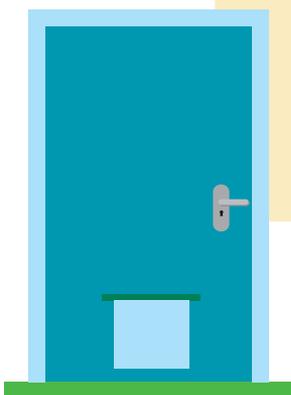
- ▶ Encourage your child to always ask what the inverse operation to a problem is. For example, if the problem is  $36 \div 6$ , have your child ask, "What times 6 will give me 36?"
- ▶ Help your child understand that multiplication is the opposite (inverse) of division.

**Your child can fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of 3rd grade, your child will know from memory all products of two one-digit numbers.**

- Have multiplication and division facts memorized up to  $10 \times 10$  and  $100 \div 10$ .
- Practice skip-counting to help better learn math facts.

### HELP AT HOME

- ▶ Committing math facts to memory is a must to be successful in 3rd grade math. Spend time making silly sayings with your child to go along with the math facts to help memorization. For example, " $2 \times 2$  walked through the door because  $2 \times 2$  is 4."



Your child can solve two-step word problems using addition, subtraction, multiplication, and division. Your child can assess the reasonableness of answers using estimation and rounding.

- Recognize a letter represents an unknown number in an equation.
- Recall and use strategies for addition, subtraction, multiplication, and division.

## RESOURCES

### T-CHART

T-Charts are used to organize information in order to help students solve problems. Below is an example T-chart used to solve a word problem about elapsed time.

## T-CHART METHOD

for elapsed time

The baseball game started at 4:10 P.M. It lasted for one hour and 30 minutes. What time did the game end?

5:40 PM

4:10 PM	start
5:10 PM	1 hour
5:20 PM	10 minutes
5:30 PM	10 minutes
5:40 PM	10 minutes

Image from <http://teacherweb.com/AZ/Pueblodel-Sol/Gojkovich4th/time-T-Chart-method.jpg>

## HELP AT HOME

- ▶ After reading a problem, have your child mentally estimate what the answer should be. Have him write the estimate down. After solving the problem, look back at the estimation and discuss if the estimate was close to the answer or determine why the estimate was wrong.
- ▶ Work on solving multi-step problems one step at a time through the usage of T-Charts to better organize information.
- ▶ Provide your child with a dry erase marker and a plastic plate. Have your child practice solving the multi-step problems one step at a time on the plate. Talk about the importance of reading the question carefully and marking out unimportant information. Ask questions such as, "What is the problem really asking?" and "What do I already know before I start working?"

## Your student can identify patterns in addition and multiplication and explain them using properties of operations.

- Identify patterns in addition by using an addition table.
- Identify patterns in multiplication using a multiplication table.

### INTERNET RESOURCES



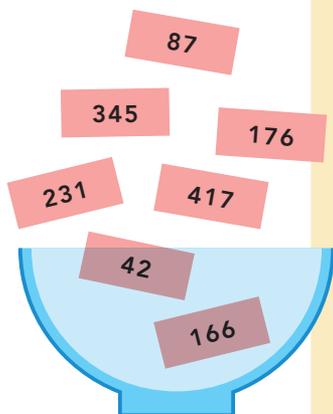
Free, printable 100 charts can be found on the Internet, or you can make your own using notebook paper or construction paper.

### HELP AT HOME

- ▶ Practice skip-counting.
- ▶ Provide your child with a 100 chart. Take a highlighter and highlight a pattern of numbers. Have your child practice identifying the pattern. For example, each highlighted number is increasing by 5.

## Your child can use place value understanding to round whole numbers to the nearest 10 or 100.

- Use a number line and a hundred chart to round numbers.



### HELP AT HOME

- ▶ Teach your child the saying, “4 or less, let it rest; 5 or more, up the score.” It is a fun way for your child to remember the rounding rules.
- ▶ Write several numbers ranging from 10 - 500 on small pieces of paper. Fold them up and put them in a bowl. Have your child draw a number from the bowl. Then, have him round the number to the nearest 10 and then the nearest 100 (e.g., 417 rounded to the nearest 10 is 420; to the nearest 100 is 400). Next, you draw a number and complete the task. Repeat until all the numbers have been drawn.

**Your child can fluently add and subtract within 1000 using different strategies and is able to explain how the answer is reasonable.**

- Know that the relationship between addition and subtraction is an inverse relationship.
- Use properties of operations (associative, commutative, and distributive properties) to solve addition and subtraction problems.
- Think about multi-digit numbers as groups of hundreds, tens, and ones.

#### INTERNET RESOURCES



xtramath.org is a great website for your child to practice becoming fluent in math facts.

#### HELP AT HOME

- ▶ Play a number cube game! Provide a pair of number cubes (dice). You take one and give your child the other. Have a paper and pencil handy. Roll the cube four times to get a 4-digit number. Then have your child do the same. After creating two 4-digit numbers, you add the numbers together and have your child subtract them. Compare answers. Repeat the game, swapping operations. (Your child will add and you will subtract.)

**Your child can multiply one-digit whole numbers by multiples of 10 in the range 10 - 90 using strategies based on place value and properties of operations.**

- Understand place value when multiplying by tens.
- Understand that  $50 \times 4$  is 4 groups of 5 tens or 20 tens, and twenty tens equals 200.

#### HELP AT HOME

- ▶ Take your child on a multiplication scavenger hunt. There are numbers all over your house or in the grocery store. Have your child find two numbers and multiply them before being able to find the next set of numbers.

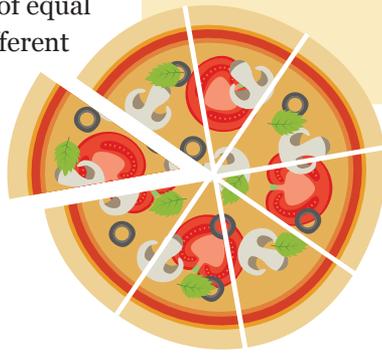


**Your child can understand how fractions with a numerator of 1 (e.g.,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ) relate to equal parts of a whole number.**

- Fractions must have equal parts.
- Know that fractions can show equal parts of a whole and parts of a set.
- Know that when a whole is cut into equal parts, the denominator represents the number of equal parts.
- Know the numerator of a fraction is the count of the number of equal parts that are shaded or different from the other parts.

**HELP AT HOME**

▶ Pizza Time! Cook a pizza with your child. After cutting the pizza, talk about what fraction of the pizza is there. As each piece is eaten, have your child identify the fraction of pizza that remains.



**Your child can compare equal fractions (e.g.,  $\frac{1}{2}$  and  $\frac{2}{4}$ ) using number lines or visual models.**

- Compare fractions by looking at the size of the parts and the number of the parts (e.g.,  $\frac{1}{9}$  is smaller than  $\frac{1}{3}$  because when one whole is cut into 9 pieces, the pieces are much smaller than when one whole is cut into 3 pieces).

**HELP AT HOME**

▶ Draw visual representations of fractions on index cards and then draw a matching equivalent fraction on another index card. Scatter the index cards on the floor in front of your child and have him sort the cards, matching up the equivalent fractions (e.g.,  $\frac{1}{2}$  would match up with  $\frac{2}{4}$ ).

**VOCABULARY**

**EQUIVALENT FRACTIONS** are fractions which have the same value, even though they may look different (e.g.,  $\frac{1}{2}$  and  $\frac{2}{4}$  are equivalent, because they are both “half”).

**Your child can tell and write time to the nearest minute. Solve word problems involving addition and subtraction of time intervals in minutes.**

- Know that elapsed time is the interval of time, given a specific unit, from a starting time to an ending time.
- Know that 60 minutes is equivalent to one hour.

**HELP AT HOME**

- ▶ Encourage your child to tell time. Ask your child, "What time is it?" using an analog clock. Then ask questions such as, "What time is it now? What time will it be in 5 minutes?"
- ▶ Label your wall clock with sticky notes, marking each 5-minute increment. For example, when the long hand is pointing to the 3, the sticky note would say 15.

**Your child can solve problems by measuring an object's mass and liquid volume.**

- Measure objects using grams, kilograms, and liters.
- Solve word problems about mass and volume.

**HELP AT HOME**

- ▶ Provide your child with different sized containers (e.g., 2 liter bottles, milk jugs, glasses). Have your child fill the containers with water and compare the amount the different containers hold.
- ▶ Have your child look at containers of unknown capacity and estimate how much liquid they will hold. Have your child fill the containers and then empty them into a measuring cup to calculate the container's capacity.



## Your child can use picture and bar graphs to illustrate measurement data.

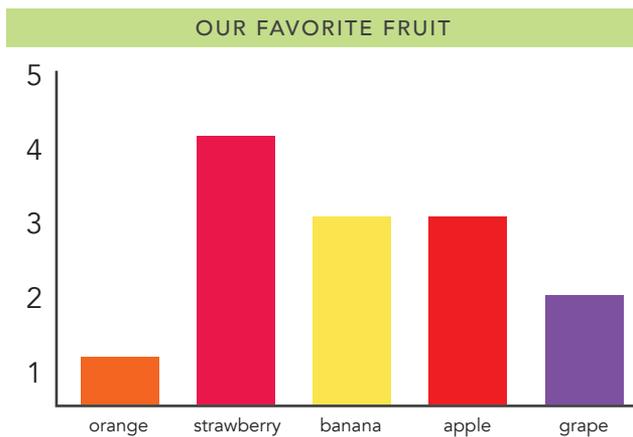
- Correctly draw a picture graph.
- Correctly draw a scaled bar graph.
- Answer questions based on information from graphs.

### HELP AT HOME

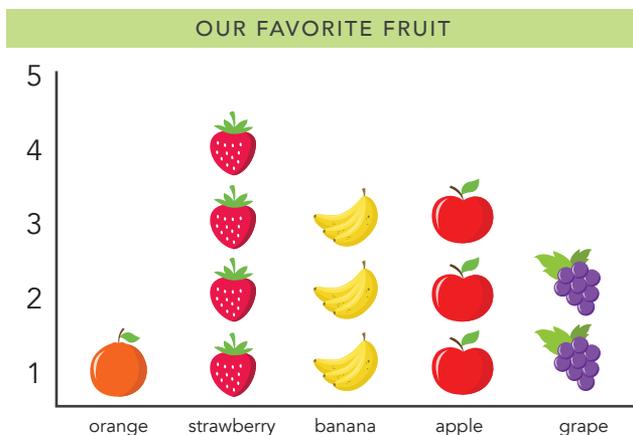
▶ Have your child survey others to find out what the most liked food is in your family. Based on the information collected, have your child draw a bar graph or picture graph to represent that information.

### RESOURCES

#### SAMPLE BAR GRAPH



#### SAMPLE PICTURE GRAPH



Your child can generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Your child can show the data by making a line plot.

- Use a ruler to measure to the nearest inch,  $\frac{1}{2}$  inch, and  $\frac{1}{4}$  inch.

### HELP AT HOME

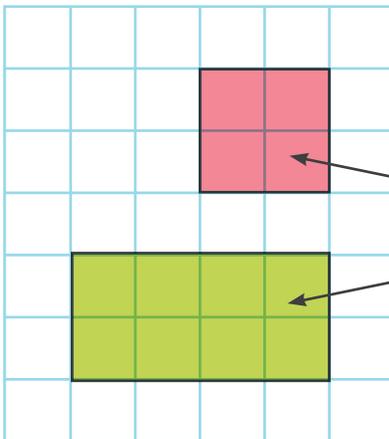
- ▶ Have your child practice measuring different things around the house, like the furniture or windows, using a ruler.
- ▶ Have your child go on a measuring scavenger hunt to find things that measure  $\frac{1}{2}$  inch,  $\frac{1}{4}$  inch, and 1 inch.

Your child can find the area of shapes using and understanding square units.

- Understand that a unit square can be used to find the area of a plane figure.
- Find area through multiplication by using the formula  
 $\text{Area} = \text{Length} \times \text{Width}$ .

### HELP AT HOME

- ▶ Trace different shapes onto graph paper for your child. Discuss with your child that each small square on the graph paper represents one square unit. Then, have your child count and then calculate by using the formula  $\text{Length} \times \text{Width}$  to find the square units for each shape on the page.



4 square units

**Length  $\times$  Width = AREA**

$4 \times 2 = 8$  square units

## Your child can solve real-world and mathematical problems involving perimeters of polygons.

- Find the perimeter of polygons when side lengths are given.
- Find the perimeter by using the formula  $\text{Perimeter} = \text{Side} + \text{Side} + \text{Side} + \text{Side}$ .
- Find the perimeter of polygons when one side length is unknown.

### RESOURCES

See page 35 for examples of polygons.

### HELP AT HOME

- ▶ Using straws cut into lengths of 2, 4, and 6 inches, along with pipe cleaners cut into 2-inch pieces, your child can explore perimeter by making polygons with sides of various lengths. Have your child measure and record the lengths of his polygons, and then draw the shapes on paper.

## Your child can recognize that rhombuses, rectangles, and squares are examples of quadrilaterals; and can draw examples of quadrilaterals that do not belong to any of these subcategories.

- Understand that a quadrilateral is a closed shape with four sides (e.g., square, rectangle, trapezoid, parallelogram, rhombus).
- Understand that a parallelogram includes: squares, rectangles, rhombi, or other shapes that have two pairs of parallel sides.
- Sort shapes based on their characteristics or attributes.
- Draw shapes.

### HELP AT HOME

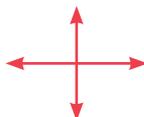
- ▶ Make a paper copy of each quadrilateral. Hold up each shape and have your child describe all of the attributes of the shape. Ask your child questions such as: How many sides does the shape have? Does the shape have any parallel lines or perpendicular lines? Are the sides of the shape the same length or different?

### VOCABULARY



#### PARALLEL LINES

are lines that run side by side but never touch.



#### PERPENDICULAR LINES

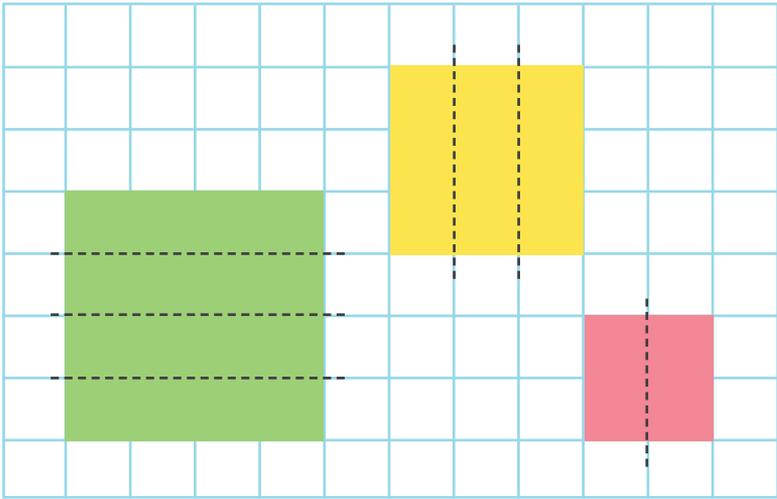
are lines that intersect to form four right angles.

## Your child can relate fractions to shapes as he divides a whole into equal parts.

- Divide a shape into equal fractional parts.
- Understand that each fractional part has the same area.

### HELP AT HOME

► Have your child draw several different sized squares on graph paper and divide the squares into equal parts. Take the time to discuss that each fractional part has the same area.



## RESOURCES

### PROPERTIES OF OPERATIONS

Below is a table describing the Associative, Commutative, and Distributive Properties.

Name	Hints	Example	Notes
<b>Associative</b> "Grouping"	You "associate" with different groups.	$5 + (15 + 4) = (5 + 15) + 4$	Works with addition and multiplication, not subtraction or division.
<b>Commutative</b> "Ordering"	Since Commutative has an "o" in it, think "order".	$5 + 4 + 3 = 4 + 3 + 5$	Works with addition and multiplication, not subtraction or division.
<b>Distributive</b> "Distributing or Pushing Through Parentheses"	Think of "distributing" something to your friends.	$5 \times (3 + 4) = 5 \times 3 + 5 \times 4 = 15 + 20 = 35$  $5 - 2(x - 3) = 5 - 2x + 6$ $5x + 7x = (5 + 7)x = 12x$	When negatives are on the outside of the parenthesis, make sure you distribute the negatives to second number, too.  Remember that multiplying two negatives results in a positive.

Image from <http://www.shelovesmath.com/algebra/beginning-algebra/numbers-properties-and-notation-in-algebra/>

A **POLYGON** is a simple closed shape made up of straight line segments only. Polygons are classified according to the number of sides they have.



triangle



quadrilateral



pentagon



hexagon



heptagon



octagon



nonagon



decagon