

TIPS FOR FAMILIES

KEY CONCEPT OVERVIEW

In this first topic, students explore **multiplicative comparison**, or multiplication as a comparison of two quantities. They recognize and apply statements such as *times as many*, *times as much*, and *times more*. In Lessons 1 through 3, students learn models that they can later use to solve word problems in Lesson 4.

You can expect to see homework that asks your child to do the following:

- Use different colored strips to explore multiplication as a comparison of one quantity to another. For example, the red strip is 2 times as much as the blue strip.
- Determine how many times greater one quantity is than another by using **strip diagrams**.
- Use **input–output tables** to explore multiplication as a comparison. For example, 8 is 4 times as much as 2 (as shown in the Sample Problem below)



SAMPLE PROBLEM (From Lesson 3)

The tables show what happens when the magician puts a number in the magic box.

Complete the table by using the following rule.

The number that comes out of the box is 4 times as much as the number that went into the box.

In	Out
1	4
2	8
3	12
4	16
5	20
10	40

HOW YOU CAN HELP AT HOME

- Play the Guess My Rule Game with your child.
 - Player 1 says an input number. (Start with your child playing the role of Player 1.)
 - Player 2 silently comes up with an input–output rule and says the output. (Start with you playing the role of Player 2.)
 - Use the same input–output rule, repeating the exchange until your child thinks they can guess the rule.

HOW YOU CAN HELP AT HOME *(continued)*

- Player 1 states the rule. (Encourage your child to state the rule by using the phrase *times as much*.)

See the following exchange for an example of how the game might go:

Player 1 says “4.”

Player 2 says “8.”

Player 1 says “10.”

Player 2 says “20.”

Player 1 says “13.”

Player 2 says “26.”

Player 1 says “I can guess your rule! The output is 2 times as much as the input.”

TERMS

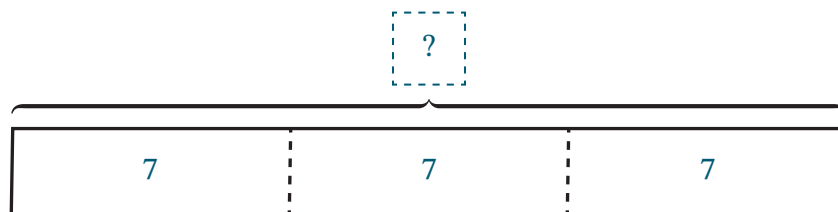
Multiplicative comparison: A statement comparing two quantities by using multiplication. For example, 32 is 4 times as much as 8.

MODELS

Input–Output Table: Shows how a value changes according to a rule.

In	1	7	8	3	5	9
Out	7	49	56	21	35	63

Strip Diagram: A visualization used to help make sense of a word problem.



TIPS FOR FAMILIES

KEY CONCEPT OVERVIEW

Lessons 5 and 6 focus on the commutative property. This property helps students recognize, for example, that if they know $3 \times 6 = 18$, then they also know $6 \times 3 = 18$. Lesson 3 introduces the use of a blank box to represent unknown values in **equations**.

You can expect to see homework that asks your child to do the following:

- Use **arrays** to write two multiplication facts.
- Match **expressions** that show the commutative property, for example, $3 \times 6 = 6 \times 3$; 3 sixes = 6 threes; 10 twos = 2×10 .
- Find the value of the unknown in simple equations and in word problems (as shown in the Sample Problem below).

SAMPLE PROBLEM (From Lesson 7)

1. Each equation contains a box representing the unknown.



HOW YOU CAN HELP AT HOME

- Give your child a blank multiplication chart (ask your child's teacher for one, or search online for a printable), and ask him to fill in as many facts as possible in five minutes. Ask your child what strategies he used to fill in the chart quickly.

\times	1	2	3	4	5	6	7	8	9	10
1		2	3							
2		4		8				16		
3						18				
4					20					
5										50
6		12								
7										
8										
9										
10										

HOW YOU CAN HELP AT HOME *(continued)*

- Play The Product Dice Game with your child.
 1. Player 1 rolls two dice and multiplies those two numbers together. On a piece of paper, write the multiplication equation and the product for that turn, which represents the score.
 2. Pass the dice to Player 2, who does the same.
 3. When the dice return to Player 1, add the product of the new roll to the previous score. The player who reaches 500 first is the winner.

For example:

Player 1 Roll 1: $5 \times 4 = 20$

Player 1 Roll 2: $6 \times 5 = 30$; $20 + 30 = 50$, so Player 1's score is now 50.

Player 1 Roll 3: $2 \times 3 = 6$; $50 + 6 = 56$, so Player 1's score is now 56.

- Variation: Use one die and a deck of playing cards up to the 10's (no aces or face cards). Roll one die, and then choose one card and multiply the two numbers together. This will help your child practice larger facts.

If dice are not available, the game may be played using a random number generator on a smart phone.

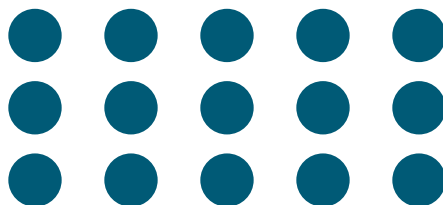
TERMS

Equation: A statement that two expressions are equal, for example, $3 \times 4 = \underline{\quad}$ or $3 \times 4 = 12$.

Expression: Any combination of sums, differences, products, or divisions of numbers that evaluates to a number. Expressions do not have an equal sign. For example, $3 + 4$, 3×4 , and $12 \div 4$ are all expressions.

MODELS

Array: An arrangement of objects in rows and columns.



TIPS FOR FAMILIES**KEY CONCEPT OVERVIEW** _____

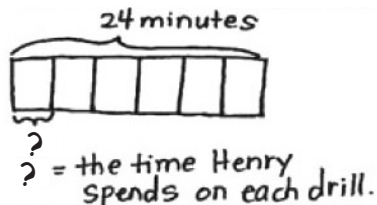
In Lessons 8 through 10, students learn to solve multiplication and division problems that use units of 6 and 7. They will learn to use the 5's to help them solve these problems.

You can expect to see homework that asks your child to do the following:

- Use **number bonds** to help **skip-count** by 6 and 7.
- Use **strip diagrams** and number bonds to solve challenging multiplication problems that use units of 6 and 7 (as shown in the Sample Problem below).
- Find the value of the unknown in simple equations and in word problems.

SAMPLE PROBLEM *(From Lesson 10)* _____

Henry spends 24 minutes practicing 6 different basketball drills. He spends the same amount of time on each drill. How much time does Henry spend on each drill?



$$24 \div 6 = \square$$
$$\square = 4$$

Henry spends 4 minutes on each drill.

HOW YOU CAN HELP AT HOME _____

- Continue to practice multiplication facts for 6's and 7's from memory. For example, ask your child a 6-fact such as, "What is 5×6 or 5 sixes?" (30) Then say, "Add one more group of 6 to 30. What's 6×6 or 6 sixes?" Your child should be able to do the mental math to add 6 to 30, answering "36."
- Use an empty egg carton and a die to make a simple game. In one row of the carton's compartments, use a marker to write the numbers 2, 3, 4, 5, 6, and 7, one number in each

HOW YOU CAN HELP AT HOME *(continued)*

compartment. In the next row, write the numbers in descending order: 7, 6, 5, 4, 3, 2. Toss the die into the egg carton. Have your child multiply the number on the top face of the die by the number written on the compartment in which it landed. For example, in the image shown, your child would solve the problem 6×5 . Another way to come up with random numbers is to place the die in the egg carton, close it, and shake it.



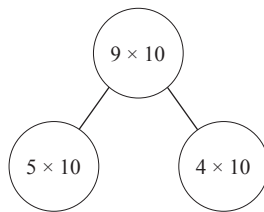
If a die is not available, the game may be played using a random number generator on a smart phone.

TERMS

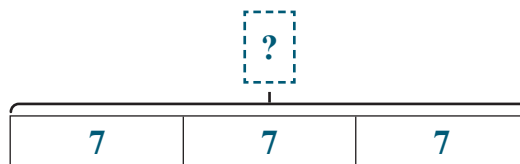
Skip-count/Count-by: To count in equal increments by a number other than 1. For example, 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 is skip-counting by twos.

MODELS

Number Bond: A model that illustrates a part–part–whole relationship.



Strip Diagram: A model used to help make sense of a word problem.



TIPS FOR FAMILIES**KEY CONCEPT OVERVIEW**

In Lessons 11 and 12, students focus on multiplication and division problems with units up to 8.

You can expect to see homework that asks your child to do the following:

- Use parentheses to group numbers to make an easier problem (as shown in the sample problem below).
- Find the value of the unknown in simple equations and in word problems.

SAMPLE PROBLEM *(From Lesson 11)*

The teacher writes $24 \div 4 + 2 = \underline{\hspace{1cm}}$ on the board. Chad says it equals 8. Samir says it equals 4.
Explain how placing the parentheses in the equation can make both answers true.

The answer can equal 8 because $(24 \div 4) + 2 = 6 + 2 = 8$.

The answer can equal 4 because $24 \div (4 + 2) = 24 \div 6 = 4$.

Both students are correct!

HOW YOU CAN HELP AT HOME

- Continue to practice multiplication and division, including all facts up to 8's, from memory. Focus on the problems that your child has the most difficulty remembering. Use car rides, shopping trips, or other “in-between” times to have your child exercise her math muscles.
- Write multiplication and division facts on a beach ball, football, volleyball, or soccer ball with a permanent marker. Toss the ball to your child. He must answer the problem under his left thumb before tossing the ball back to you.
- Have your child use cereal, small candies, stickers, or small toys to construct an array that shows a multiplication by 8 problem. Then ask your child to separate the array after the fifth column. Next ask her to write and solve two smaller multiplication problems that would show how many total objects are in the larger array.

TIPS FOR FAMILIES**KEY CONCEPT OVERVIEW** _____


In Lessons 13 and 14, students learn to solve multiplication and division problems with units of 9. They explore the unique patterns that occur in this set of facts to help with recall.

You can expect to see homework that asks your child to do the following:

- Find ten more and one less than a number.
- Find the value of the unknown in simple equations and in word problems.

SAMPLE PROBLEM *(From Lesson 13)* _____

Matt buys a pack of postage stamps. He counts 9 rows of 4 stamps. He thinks of 10 fours to find a total number of stamps. Show the strategy that Matt might have used to find the total number of stamps.


$$9 \times 4$$
$$9 \text{ fours} = 10 \text{ fours} - 1 \text{ four}$$
$$40 - 4 = 36$$

Matt bought 36 postage stamps.

HOW YOU CAN HELP AT HOME

- Continue to practice multiplication and division facts up to multiples of 9 from memory. Focus on the facts that your child has the most difficulty remembering.
- Read children’s picture books about multiplication and division with your child. Check for titles online or in your local library or bookstore. Here are some titles to get you started:
 - $7 \times 9 = \text{TROUBLE!}$, by Claudia Mills and C. Brian Karas
 - *365 Penguins*, by Jean-Luc Fromental and Joëlle Jolivet
 - *Multiplying Menace: The Revenge of Rumpelstiltskin*, by Pam Calvert and Wayne Geehan
 - *Now ... for My Next Number! Songs for Multiplying Fun*, by Margaret Park and Sophia Esterman. The book comes with a CD of songs to help children remember math facts.
 - *Breakfast at Danny’s Diner: A Book About Multiplication*, by Judith Stamper and Chris Demarest
- Play a memory match game with multiplication and division.
 1. Use note cards or paper to make a set of cards. On the cards, write the multiplication and division facts that your child struggles with the most.
 2. Make a second set of cards showing the answers that match the facts.
 3. Mix the two sets of cards together and arrange them all facedown in an array.
 4. Players take turns turning over two cards at a time to see whether the cards match a multiplication or division fact with its correct answer. If no match is made, the cards are turned facedown. If a match is made, the player keeps the two cards. Continue until all the cards in the array have been matched. The player with the most cards at the end of the game is the winner

For example, if your child turns over one card that shows 8×7 and another showing 63, a match was not made. She must turn the cards facedown because $8 \times 7 = 56$, not 63. If, however, she turns over a 9 and $63 \div 7$, she keeps both cards because 9 is the correct answer for the division expression.

TIPS FOR FAMILIES**KEY CONCEPT OVERVIEW**

In Lessons 15 through 17, students learn to multiply and divide with units of 0 and 1. While the multiplication and division facts for 0 and 1 tend to be easy for students to recall, they have unique patterns.

You can expect to see homework that asks your child to do the following:

- Solve multiplication and division facts with units of 0 and 1.
- Look for patterns in multiplication and division facts, using the multiplication table.
- Use the **RDW process** to solve two-step word problems involving addition, subtraction, multiplication, and division.

SAMPLE PROBLEM *(From Lesson 15)*

Matt explains to his little sister what he learned about dividing with zero.

- a. What might Matt tell his sister about solving $0 \div 9$? Explain your answer.

If 0 is divided by any number, it is still 0 because the amount you start with is 0 so there is nothing to divide. I can also write a related multiplication fact that is true: $0 \div 9 = 0$ and $0 \times 9 = 0$.

- b. What might Matt tell his sister about solving $8 \div 0$? Explain your answer.

If any amount is divided by 0, it doesn't make sense because I cannot divide something into 0 equal groups. I also cannot write a related multiplication fact that is true: $8 \div 0$ does not equal 8 or 0, because 8×0 does not equal 8 and 0×0 does not equal 8.

HOW YOU CAN HELP AT HOME

- Continue to practice all multiplication and division facts from 0 to 9 from memory. Practice with games or with blank multiplication tables. Use a timer to see how quickly your child can fill in a blank multiplication table.
- Make Fact Towers. Get a box of small paper cups. On the outside of every cup, write a multiplication or division fact. On the inside of every cup, write the answer. Stack the cups and have your child pull the top cup from the stack and solve the problem written on it. If your child answers correctly, place the cup upside down on the table; if not, place the cup on the bottom of the stack. Arrange cups with correct answers to form a pyramid. (See images.) Keep going until all the cups are part of the pyramid. See how tall your child can make the pyramid.



TERMS

RDW process: A three-step process used in solving word problems. RDW stands for Read, Draw, Write:

- Read** the problem for understanding;
- Draw** a model (e.g., a strip diagram) to help make sense of the problem;
- Write** an equation and a statement of the answer.

TIPS FOR FAMILIES

KEY CONCEPT OVERVIEW

In Lessons 18 through 23, students apply knowledge of multiplication facts to multiplying with multiples of ten. For example, if students know $4 \times 6 = 24$, then they know $4 \times 60 = 240$ because 60 is ten times larger than 6.

You can expect to see homework that asks your child to do the following:

- Use Place Value Disks to represent two-digit by one-digit multiplication with and without regrouping (as shown in the sample problem below).
- Use **place value disks** and a place value chart to solve multiplication problems.
- Place parentheses around numbers to group multiplication problems to make an easier problem. (See Sample Problem.)
- Multiply two-digit numbers by one-digit numbers using the standard algorithm.
- Solve word problems that require multiplying two-digit numbers by one-digit numbers.

SAMPLE PROBLEM *(From Lesson 20)*

Use your place value disks and charts to represent the following expressions. Record your work on the place value chart shown. Then write a matching expression, and record the partial products vertically. Problem (a) below is already done.

a. 3×31

		$\begin{array}{r} 31 \\ \times 3 \\ \hline 3 \leftarrow 3 \times 1 \text{ one} \\ +90 \leftarrow 3 \times 3 \text{ tens} \\ \hline 93 \leftarrow 3 \times 3 \text{ tens} + 3 \times 3 \text{ ones} \end{array}$
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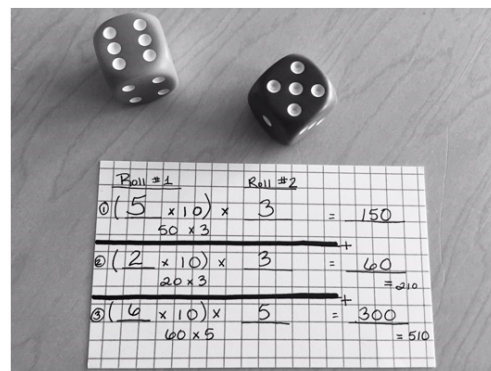
		$\begin{array}{r} 24 \\ \times 3 \\ \hline 12 \leftarrow 3 \times 4 \text{ ones} \\ +60 \leftarrow 3 \times 2 \text{ tens} \\ \hline 72 \leftarrow 3 \times 2 \text{ tens} + 3 \times 4 \text{ ones} \end{array}$
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HOW YOU CAN HELP AT HOME

- Play the Double Dice game with your child.
 1. You will need two dice and a piece of paper.

HOW YOU CAN HELP AT HOME *(continued)*

- The first player rolls one die and multiplies the number rolled by 10. The player then multiplies this answer by the number rolled with the second die. This final product is the player's score for this turn.
- For example, if your child's first roll is a 6, he writes $6 \times 10 = 60$. When he rolls the second die, he gets a 5. He then multiplies the 60 by 5 to get 300, which is his score for that turn. Play multiple rounds, taking turns with your child. (See image at right.)
- Use the paper to record calculations and keep track of each player's scores. Keep a running total of each player's score, adding the score for each round to the previous total.
- The first player to break 1,000 is the winner!



NOTE: Since the Double Dice game limits players to factors up to 6, you may want to try this variation that offers practice with factors up to 9.

- Instead of using two dice, use one die and playing cards with numbers 2 through 9 only. Shuffle the cards and place them facedown in a stack.
- Roll the die and multiply the number rolled by 10. Then draw one playing card. Multiply the previous result by the number on the playing card. This final number is the score for the turn.
- Set the winning score higher because you are playing with larger factors. For example, say the first player to break 5,000 is the winner.

If dice are not available, the games may be played using a random number generator on a smart phone.

MODELS

Place Value Disks

