LETTER HOME

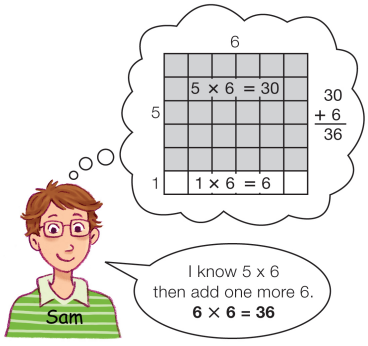
Multiplication Patterns

Dear Family Member:

In this unit, we return to the study of multiplication and division and we focus on multiplication facts. We also solve word problems involving multiplication and division to help students understand when to use each operation.

In third grade, students become fluent with the basic multiplication facts by developing strategies for learning them. The availability of calculators does not eliminate the need to know the multiplication and division facts. Students should be able to quickly estimate answers and perform calculations. For this, a knowledge of the facts is essential.

Students will first focus on identifying patterns and finding strategies to solve the multiplication facts for 0, 1, 2, 3, 5, and 10. These facts are called the "Handy Facts" because these facts can be used to reason solutions to many other facts.



Next, students will arrange square-inch tiles into rectangles to look for patterns and investigate how multiplication is related to the dimensions of the rectangles. Using this rectangle model, students will identify patterns and strategies for the multiplication facts for the nines and for the square numbers.

You can help your child with multiplication using the following ideas:

Play Floor Tiler. This game will help your child learn the multiplication facts by using spinners to generate factors and a product. Players then draw a rectangle on a grid game board that represents that product. The winner is the first player to fill his or her grid paper game board. Directions are in the *Student Activity Book.*

Playing a game to practice multiplication facts

Identify Patterns and Strategies. Ask your child to tell you some of the patterns and strategies they have discovered for the multiplication facts for the square numbers and the nines.

Play Four in a Row. In this game, players choose factors to generate products that are on a game board. The winner covers four products in a row. Directions are in the *Student Activity Book.*

Math Facts and Mental Math

This unit continues the review of the subtraction facts and development of the multiplication facts. Help your child using the activities below.

Subtraction Facts. Students review all the subtraction facts to maintain and increase proficiency and to learn to apply subtraction strategies to larger numbers.

Groups	Subtraction Facts	Strategies Used	
1 2	$12-9, 12-10, 13-9, 13-10, 13-4,$ $15-9, 15-10, 15-6, 19-10,$ $14-10, 14-9, 14-5, 17-10, 17-9,$ $11-9, 16-9, 16-7, 16-10$	Using Tens Thinking Addition	Assessed in Unit 7
3 4	$10-4, 9-4, 11-4, 10-8, 11-8,$ $9-5, 10-6, 11-6, 11-5,$ $10-7, 9-7, 11-7, 10-2, 9-2, 9-3,$ $10-3, 11-3, 9-6$	Making Tens Thinking Addition	
5 6	$7-3, 7-5, 7-2, 11-2, 8-6, 5-3,$ $8-2, 4-2, 5-2,$ $6-4, 6-2, 13-5, 8-5, 8-3, 13-8,$ $12-8, 12-4, 12-3$	Counting Thinking Addition	Assessed in Unit 8
7 8	$14-7, 14-6, 14-8, 12-6, 12-7,$ $12-5, 10-5, 13-7, 13-6,$ $15-7, 16-8, 17-8, 18-9, 18-10,$ $8-4, 7-4, 6-3, 15-8$	Using Doubles Thinking Addition	

Figure 1: *Subtraction Facts Groups as reviewed in Units 7 and 8*

You can help your child review these facts using the flash cards the teacher sends home or by making a set of flash cards from index cards or scrap paper. Study the facts in small groups each night. As your child goes through the flash cards, put the cards into three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out.

For the Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For the Facts I Know Quickly, help your child use strategies to solve problems like these using mental math: 140 – 70 (practices 14 – 7), 1500 – 700 (Practices 15 – 7),
70 – 30 (practices 7 – 3)

See the Letter Home in Units 2–5 for more specific examples and strategies.

Multiplication Facts. This unit begins the systematic review and assessment of the multiplication facts. Students work on developing fluency with the multiplication facts for the 5s and 10s.

You can help your child review these facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For Facts I Need to Learn, work on strategies for figuring them out. Good strategies include:

Skip counting: To solve 5×6, skip count: 5, 10, 15, 20, 25, 30

Reasoning from known facts: To solve 5×6, I know $5 \times 3 = 15$ and $15 + 15 = 30$, so $5 \times 6 = 30$. To solve 5×8, I know $10 \times 8 = 80$, so 5×8 is half of 80, or 40.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to multiply 10s and 100s: $50 \times 30 = 150$, $100 \times 60 = 6000$, $40 \times 40 = 1600$

Grade 3 Math Facts Overview

The goal of the math facts development in *Math Trailblazers* is for students to learn the basic facts efficiently, gain fluency with their use, and retain that fluency over time. A large body of research supports an approach in which students develop strategies for figuring out the facts rather than relying on rote memorization. This not only leads to more effective learning and better retention but also to the development of mental math skills. In fact, too much drill before conceptual understanding may interfere with a child's ability to understand concepts at a later date. Therefore, the teaching of the basic facts in *Math Trailblazers* is characterized by the following elements:

Use of Strategies. Students first approach the basic facts as problems to be solved rather than as facts to be memorized. In all grades, students are encouraged to use strategies to find facts, so they become confident that they can find answers to facts problems that they do not immediately recall. In this way, students learn that math is more than memorizing facts and rules which "you either get or you don't."

Distributed Facts Practice. Students study small groups of facts that can be found using similar strategies. In third grade, they review the multiplication facts to develop mental math strategies and gain fluency. See Figure 2. In Units 3–7, students focus on developing mental math strategies for each multiplication facts group. In Units 8–13, students use flash cards to gain fluency with these strategies.

Unit	Multiplication Facts Group	Focus
3	5s and 10s	Development of mental strategies and number sense
4	2s and 3s	
5	Square Numbers	
6	9s	
7	Last Six Facts	
8	5s and 10s	Use strategies fluently
9	2s and 3s	
10	Square Numbers	
11	9s	
12	Last Six Facts	
13	Last Six Facts	

Figure 2: *Development of Multiplication Facts in Grade 3*

Practice in Context. Students continue to practice the facts as they use them to solve problems, investigate math concepts, and play math games.

Appropriate Assessment. Students are regularly assessed to see if they can find answers to facts problems quickly and accurately and retain this skill over time. They take a short quiz on each group of facts. Students record their progress on *Multiplication Facts I Know* charts and determine which facts they need to study.

A Multiyear Approach. In Grades 1 and 2, the curriculum emphasizes the use of strategies that enable students to develop proficient strategies for the addition and subtraction facts by the end of second grade. In Grade 3, students review the subtraction facts and develop proficiency with the multiplication facts. In Grade 4, the addition and subtraction facts are checked, the multiplication facts are reviewed, and students develop fluency with the division facts. In Grade 5, students review the multiplication and division facts.

Facts Will Not Act as Gatekeepers. Use of strategies and calculators allows students to continue to work on interesting problems and experiments while learning the facts. Lacking quick recall of the facts does not prevent students from learning more complex mathematics.

Thank you for taking time to talk with your child about what he or she is doing in math.

Sincerely,