Name Date Time

HOME LINK 8•9

Unit 9: Family Letter

Multiplication and Division

In Unit 9, children will develop a variety of strategies for multiplying whole numbers. They will begin by using mental math (computation done by counting fingers, drawing pictures, making diagrams, and computing in one's head). Later in this unit, children will be introduced to two specific algorithms, or methods, for multiplication: the partial-products algorithm and the lattice method.

Partial-Products Algorithm

The partial-products algorithm is a variation of the traditional multiplication algorithm that most adults learned as children. Note that the multiplication is done from left to right and emphasizes place value in the numbers being multiplied.

		28	
		× 4	
Multiply 4 × 20.	→	80	First, calculate 4 [20s].
Multiply 4 × 8.	→	+ 32	Then calculate 4 [8s].
Add the two partial products.	→	112	Finally, add the two partial products.

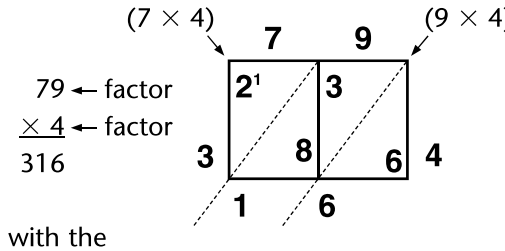
It is important that when children verbalize this method, they understand and say *4 [20s],* not *4 × 2.* In doing so, they gain a better understanding of the magnitude of numbers along with better number sense.

		379	
		× 4	
Multiply 4 × 300.	→	1,200	First, calculate 4 [300s].
Multiply 4 × 70.	→	280	Second, calculate 4 [70s].
Multiply 4 × 9.	→	+ 36	Then calculate 4 [9s].
Add the three partial products.	→	1,516	Finally, add the three partial products.

Check that when your child is verbalizing this strategy, he or she says *4 [300s],* not *4 × 3;* and *4 [70s],* not *4 × 7.* Using this strategy will also help to reinforce your child's facility with the basic multiplication facts and their extensions.

Lattice Method

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



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

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

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

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

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

Also in this unit, children will…

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

Vocabulary

Important terms in Unit 9:

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

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

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

negative number A number less than or below zero; a number to the left of zero on a horizontal number line. The symbol − may be used to write a negative number. For example, negative 5 is usually written as −5.

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

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

Do-Anytime Activities

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

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

As You Help Your Child with Homework

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

Home Link 9•1

1. 31 **2.** 25 **3.** 22

4. 13 or 18 **5.** 12 or 24 **6.** 56; 560; 5,600

7. 20; 200; 20,000

Home Link 9•2

1. a. 56; 56 **b.** 560; 560 **c.** 7
d. 70 **e.** 8 **f.** 8

2. a. 63; 63 **b.** 630; 630 **c.** 7
d. 70 **e.** 9 **f.** 9

3. a. 40; 40 **b.** 400; 400 **c.** 50
d. 50 **e.** 8 **f.** 80

Home Link 9•3

1. 7 raccoons **2.** 500 lb **3.** 100 arctic foxes

4. 600 lb **5.** 400 lb **6.** 60 beluga whales

Home Link 9•4

1. 93 **2.** 375 **3.** 765

4. 258 **5.** 1,134

Home Link 9•5

1. yes; estimate; $0.80 × 7 = $5.60

2. $12.72; calculate; $2.12 × 6 = $12.72

3. $0.90; Sample answer: calculate; 10 cards is $6.00 times 2. Compare that with $1.29 times 10. Then subtract to find the difference.

Home Link 9•6

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

1; 18; 2; 9; 3; 6

Unit 9: Family Letter *cont.*

Home Link 9•7

1. a. 1 **b.** 9 **c.** 1 **d.** $0.25

e. $19.25 **f.** $77.00 ÷ 4 = $19.25

2. 42 **3.** 192 **4.** 315

Home Link 9•8

1. 8 tables

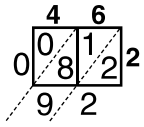
2. 7 cartons

3. 10 packs

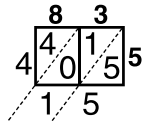
4. 116 **5.** 425 **6.** 768

Home Link 9•9

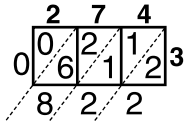
1. 92



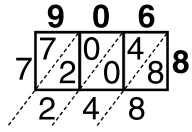
2. 415



3. 822

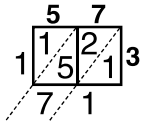


4. 7,248

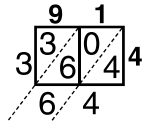


Home Link 9•10

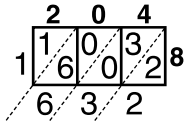
1. 171



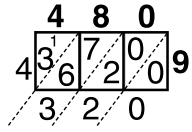
2. 364



3. 1,632

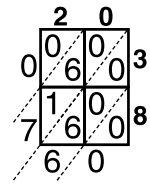


4. 4,320

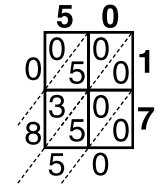


Home Link 9•11

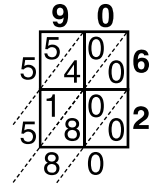
1. 760



2. 850



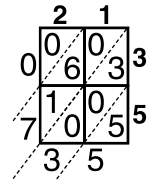
3. 5,580



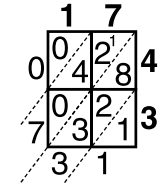
4. 1,120 **5.** 2,100

Home Link 9•12

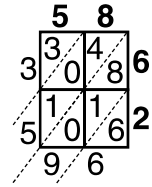
1. 735



2. 731



3. 3,596



4. 2,695 **5.** 3,003

Home Link 9•13

1. −40˚F; −40˚C **2.** 220˚F; 104˚C

3. 10˚C **4.** 18˚ colder

5. yes; no; It would be about 86˚F outside.

6. yes; no; Water freezes at 0˚C, so it would be cold enough to ice-skate.