

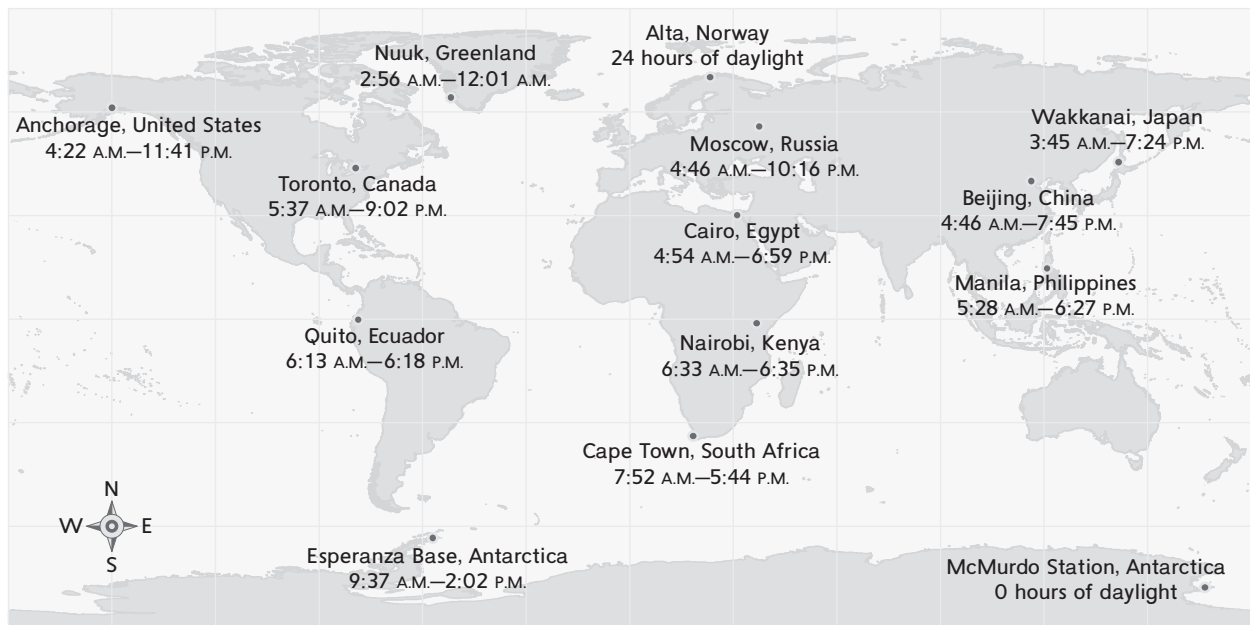
Multidigit Operations

In Unit 9, children make sense of and solve problems involving multiplication and division, units of mass, geometry, and elapsed time. They play a new multiplication game that encourages automaticity with all multiplication facts, which is an end-of-year goal. Using mental math and area models, children apply basic fact strategies to solve multiplication and division number stories with larger factors. They revisit the Length-of-Day Project and calculate elapsed time.

In Unit 9, your child will:

- Use multiplication-fact knowledge while playing *Product Pile-Up*.
- Make sense of number stories and solve them by multiplying and dividing with multiples of 10.
- Use mental arithmetic to multiply problems involving larger factors.
- Solve multidigit multiplication problems using area models.
- Analyze bar graphs that show the class length-of-day data.
- Calculate the length of day for locations around the world.

Sunrise and Sunset Data for June 21, 2016



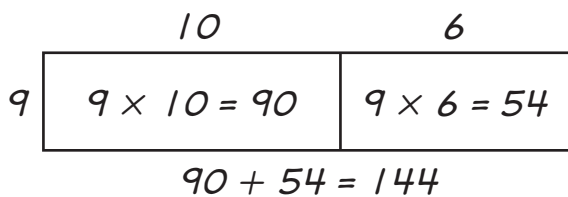
Vocabulary

Important terms in Unit 9:

basic multiplication and division facts

Multiplication facts with whole-number factors between 0 and 10 and the corresponding division facts, except there can be no division by 0. For example, $4 \times 6 = 24$ and $24 \div 6 = 4$ are basic facts.

break-apart strategy A multiplication strategy in which one or both factors are broken into two or more smaller parts, resulting in easier-to-solve multiplication problems. Partitioning a rectangular area model is a way to represent this strategy.



$$9 \times 16 = 144$$

A rectangular area model can be used to model the break-apart strategy.

decompose To separate a number into smaller numbers. For example, 16 can be decomposed into 10 and 6. Children decompose factors when using the break-apart strategy.

elapsed time The amount of time that has passed from one point to the next. For example, the elapsed time between 12:45 P.M. and 1:30 P.M. is 45 minutes.

extended fact Variations of basic arithmetic facts involving multiples of 10, 100, and so on. For example, the extended fact $40 \times 5 = 200$ is related to the basic fact $4 \times 5 = 20$.

length of day Total number of hours and minutes between sunrise and sunset.

multiplication/division diagram A diagram for modeling situations with equal-size groups. The diagram has a number of groups, a number in each group, and a total number.

| number of birds | grams per bird | grams in all |
|-----------------|----------------|--------------|
| 6 | 20 | ? |

Do-Anytime Activities

The following activities provide practice for concepts taught in this unit and previous units.

1. Continue to work toward automaticity with all multiplication facts using Fact Triangles or by playing games such as *Product Pile-Up*, *Multiplication Top-It*, and *Salute!*
2. Practice using basic facts to solve extended multiplication and division facts, such as using $3 \times 7 = 21$ to solve $3 \times 70 = 210$, or $18 \div 6 = 3$ to solve $180 \div 6 = 30$.
3. Calculate how long daily activities take. For example: *Shawna arrives at school at 8:45 A.M. and leaves at 3:00 P.M. How many hours and minutes is she at school? Your dentist appointment is at 3:15 P.M. It takes 20 minutes to drive to the dentist. If we leave at 2:45 P.M., will we arrive on time?*

Building Skills through Games

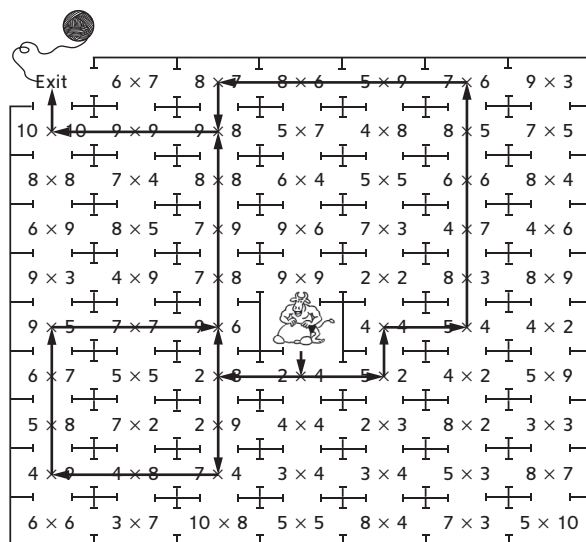
Product Pile-Up Players are dealt eight number cards. They take turns selecting two cards and multiplying the numbers to generate a product that is greater than the product of the last two cards played. The winner is the first player to

run out of cards or the player with the fewest cards when there are no more cards to draw. For detailed instructions, see the *Student Reference Book*.

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



Home Link 9-2

1.

| number of flamingos | mass of 1 flamingo in kg | total mass in kg |
|---------------------|--------------------------|------------------|
| 40 | 2 | ? |

Sample answer: $2 \times 40 = ?$; 80 kg

2.

| number of bluebirds | mass of 1 bluebird in g | total mass in g |
|---------------------|-------------------------|-----------------|
| 9 | ? | 270 |

Sample answer: $9 \times ? = 270$; 30 g

Unit 9: Family Letter, continued

3. Sample answer: I thought of $9 \times$ what number is 270. I know $9 \times 3 = 27$, so $9 \times 30 = 270$. One bluebird has a mass of about 30 g.

Home Link 9-3

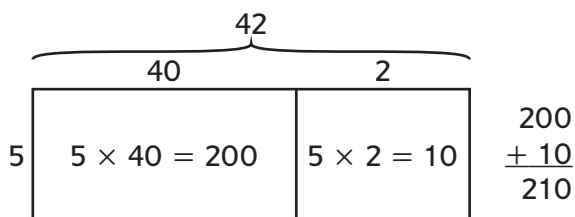
- Sample answer: I broke apart 12 into 6 and 6. I know $6 \times 9 = 54$, so I can double that to get 12×9 . So $12 \times 9 = 54 + 54 = 108$; 108 kilograms
- Sample answers: I broke apart 7 into 4 and 3. I know $25 \times 4 = 100$ and $25 \times 3 = 75$. So $7 \times 25 = 100 + 75 = 175$; I used the break-apart strategy and thought $25 \times 7 = 20 \times 7 + 5 \times 7 = 140 + 35 = 175$. So $25 \times 7 = 175$; 175 grams
- Answers vary.

Home Link 9-4

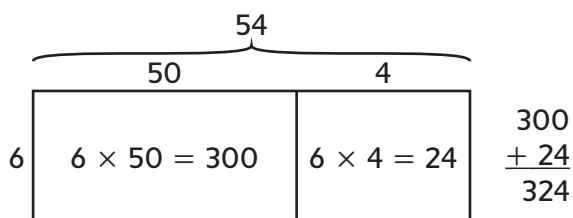
- 50, 60, 20, 75
- 240
- 210
- 480
- 720

Home Link 9-5

1. 210



2. 324



3. Answers vary.

Home Link 9-6

- 15; Sample answer: I knew that the number of cartons had to be more than 10 because $10 \times 12 = 120$ and the class needed 180 eggs. So I tried 12×12 on the calculator, but that was only 144. So I tried 12×13 , 12×14 , and 12×15 . $12 \times 15 = 180$, so 15 is the number of cartons they need.
- Sample answer: 1, 8, 0, -, 12, =, =, =, =, =, =, =, =, =, =; I had to push the = key 15 times to reach 0, so the number of cartons is 15.

Home Link 9-7

- San Francisco: 9 hours 33 minutes;
Minneapolis: 8 hours 46 minutes;
Miami: 10 hours 32 minutes
- Miami
- Minneapolis