Operations

In Unit 3, your child will add, subtract, multiply, and divide whole numbers using a variety of problem-solving strategies and computational skills. *Everyday Mathematics* encourages children to choose from any of the methods explored in this unit, or invent their own computation methods. When children create and share their own ways of computing instead of simply learning one method, they begin to realize that problems can be solved in more than one way. They are more willing and able to take risks, think logically, and produce more reasonable answers.

In Unit 3, children will:

• Describe rules for patterns and use them to solve problems.

• Estimate to check whether their answers are reasonable.

• Add using the partial-sums and column-addition methods. Subtract using the counting-up and expand-and-trade methods.
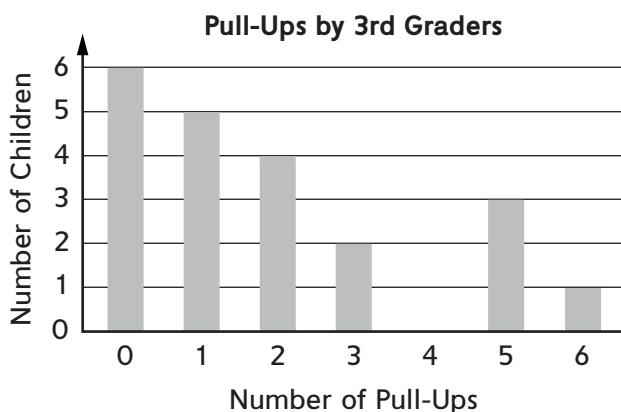
$$
\begin{array}{r}
6\,|\,7 \\
+2\,|\,5 \\
\hline
8\,|\,12 \\
9\,|\,2 \\
\hline
\end{array}
$$

$67 + 25 = 92$

column addition

$$
\begin{array}{r}
& & 70 \quad 14 \\
184 \rightarrow & 100 + 80 + 4 \\
-\ 37 \rightarrow & \underline{\qquad 30 + 7} \\
& 100 + 40 + 7 = 147
\end{array}
$$

expand-and-trade subtraction

• Use helper facts and create arrays to solve unknown multiplication facts.

• Learn helpful rules and new groups of multiplication facts.

• Find and write equivalent names for numbers within name-collection boxes.

• Collect and organize data in scaled bar and picture graphs.

Pull-Ups by 3rd Graders

(vertical axis: Number of Children, 0–6; horizontal axis: Number of Pull-Ups, 0–6)

A bar graph with a scale by 1s

How Bay School 3rd Graders Get to School

(vertical axis: Number of Children, 0–10; horizontal axis: Ways — walk, bike, car, bus, skate)
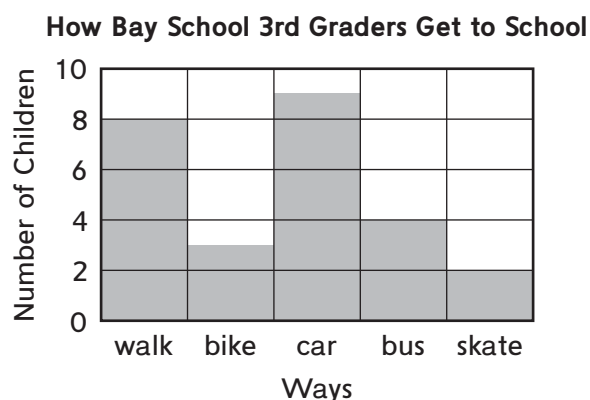
A bar graph with a scale by 2s

Please keep this Family Letter for reference as your child works through Unit 3.

Vocabulary

Important lesson components and terms used in Unit 3:

bar graph A graph with horizontal or vertical bars that represent data. Sometimes when the scale shows counts other than by 1s, the graph is called a scaled bar graph.

column addition An addition strategy in which the addends' digits are first added in each place-value column separately and then 10-for-1 trades are made until each column has only one digit. Lines may be drawn to separate the place-value columns.

estimate 1. An answer close to an exact answer. 2. To make a guess based on information you have. Some ways to estimate calculations include rounding the numbers in the problem to the nearest 10 or 100 or changing them to close-but-easier numbers. For example, to estimate the sum $245 + 92$, one might calculate $200 + 100 = 300$ or $245 + 100 = 345$.

expanded form A way of writing a number as the sum of the values of each digit. For example, 356 is $300 + 50 + 6$ in expanded form.

function machine An imaginary device that receives inputs and pairs them with outputs using a rule.
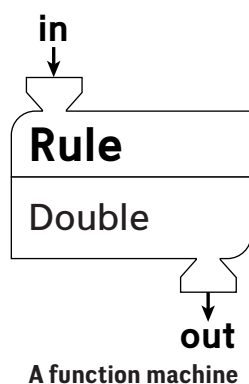
in	out
1	2
3	6
5	10
10	20
100	200

A function machine

helper facts Well-known facts used to help figure out less familiar facts.

input A number inserted into a function machine that applies a rule to pair the input with an output.

output A number paired to an input by a function machine applying a rule.

partial-sums addition An addition method in which separate sums are computed for each place value of the numbers and then added to get a final sum.

picture graph A graph constructed with picture symbols. Sometimes when a symbol represents more than one, the graph is called a scaled picture graph.

turn-around rule for multiplication A rule that says two numbers can be multiplied in either order without changing the product. For example, $2 \times 8 = 16$ and $8 \times 2 = 16$.

Do-Anytime Activities

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

1. Review addition and subtraction facts that your child needs to practice. You may want to ask your child's teacher for $+, -$ Fact Triangles. Look in your child's *Student Reference Book* for games that practice these facts.

2. Practice 2s, 5s, and 10s, squares, and 3s and 9s multiplication facts using $\times, \div$ Fact Triangles. Squares and 3s and 9s will be sent home with upcoming Home Links.
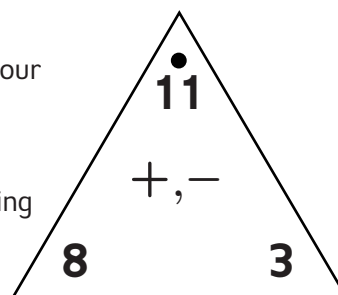
3. When adding or subtracting multidigit numbers, talk about which strategy works best for your child. Try not to impose the strategy that works best for you! Have your child make an estimate for each problem and discuss why the answer is reasonable. Here are some problems to try:

$267 + 743 =$ _____ $794 - 554 =$ _____

_____ $= 851 + 697$ $840 - 694 =$ _____

Building Skills through Games

In Unit 3 your child will practice multiplication and mental addition by playing the following games. For detailed instructions, see the *Student Reference Book*.

Array Bingo Players make a 4-by-4 array of array cards. They draw number cards and try to match them to an array card with that number of dots. If there is a match, they turn the array card facedown.

Multiplication Draw Players draw two cards and multiply the numbers on them. They add the products of 5 draws to try to get the largest sum.

Name That Number Players try to name a target number by adding, subtracting, multiplying, or dividing the numbers on two or more of five cards.

Roll to 1,000 Players mentally add the results of dice rolls.

Shuffle to 100 Players estimate to find sums close to 100.

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.
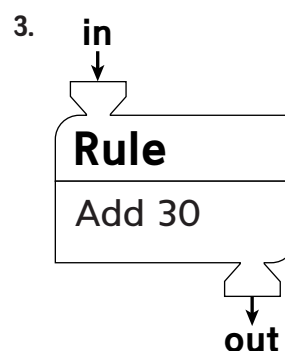
Home Link 3-1

1.

in	out
14	7
7	0
12	5
15	8
10	3
21	14

2.

in	out
1	5
5	25
4	20
6	30
2	10

3.

in	out
70	100
20	50
30	60
90	120
50	80

Answers vary.

Home Link 3-2

1. Sample answer: 80 and 40; 120

2. Sample answer: 200 and 400; 400

Home Link 3-3

1. 337　　2. 339　　3. 562　　4. 574

Home Link 3-4

Sample answer: $90 + 30 = 120$; 115

Home Link 3-5

Representations vary.

1. 202

Sample estimate: $500 - 300 = 200$

2. 122

Sample estimate: $300 - 200 = 100$

Home Link 3-6

1. 194　　2. 202　　3. 122　　4. 206

Home Link 3-7

1. 2　　　2. 2　　　3. 4

4. Answers vary.

Home Link 3-8

1. 2　　2. 8　　3. 6　　4. 7

5. Sample answer: Beth and Bill caught more fish than Max and Chen. Max and Chen caught 7 and 8, or 15 fish. Beth and Bill caught 11 and 10, or 21 fish. Beth and Bill caught 6 more fish.

Home Link 3-9

5. 817
   Estimate: $50 + 770 = 820$

6. 954
   Estimate: $360 + 600 = 960$

Home Link 3-10

1. $6 \times 2 = 12$　　2. $3 \times 5 = 15$

3. Sample answer: Each array shows the same number of dots, but the rows and columns are switched. I can also switch the numbers around when I multiply.

4. Answers vary.

Home Link 3-11

1. x x x x x x x　35
   x x x x x x x
   x x x x x x x
   x x x x x x x
   x x x x x x x
   o o o o o o o

2. 42

Home Link 3-12

1a. x x x x　　　　b. 36
    x x x x
    x x x x
    x x x x
    x x x x
    x x x x
    x x x x
    x x x x
    x x x x
    x x x x

c. Sample answer: I know $10 \times 4 = 40$, so I start with 40 and subtract 1 group of 4. So $40 - 4 = 36$.

2. 90　　3. 45　　4. 40　　5. 80

Home Link 3-13

1.

18	Sample answers:
$9 + 9$	2×9
$6 + 6 + 6$	⊬⊬ ⊬⊬ ⊬⊬ ⊬⊬ ///
dieciocho $4 \times 5 - 2$	$36 \div 2$
number of days in two weeks + 4 days, one and a half dozens	

2. 12

3. Answers vary.