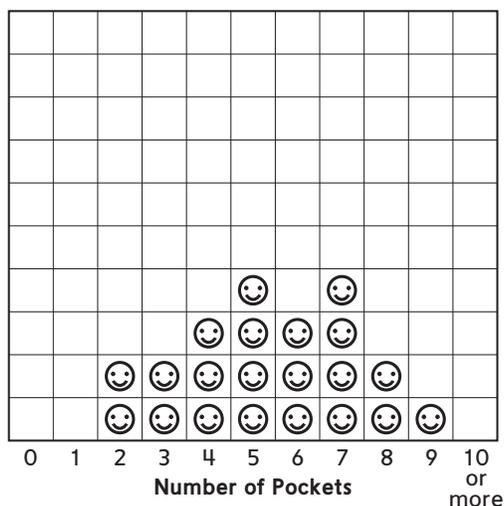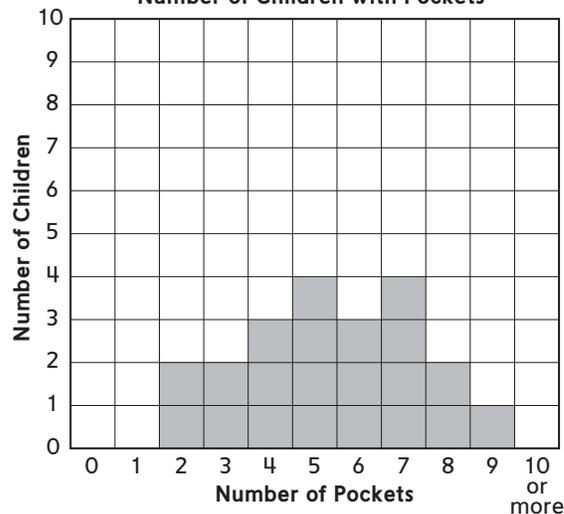# Whole Number Operations and Number Stories

In Unit 6 children collect data about the number of pockets on their clothing and display the data in a picture graph (shown below at left) and a bar graph (right).

Number of Children with Pockets

Number of Children with Pockets

KEY: each ☺ = 1 child

Children also continue solving number stories and learn to use a new diagram, the **comparison diagram,** to organize information from number stories that involve comparing two different quantities. The comparison diagram at the right shows the information from this comparison number story:

> Barbara has 35 markers. Edward has 20 markers. How many more markers does Barbara have than Edward?

Children also revisit the diagrams introduced in Unit 5, using them to organize their thinking and plan their strategies for solving one- and two-step number stories. Organizing information from a given number story in one of these diagrams can help children decide, for example, whether they should add or subtract to solve the number story.

Quantity
35

Quantity
20

?
_____
Difference
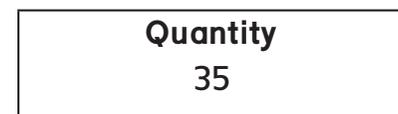
A comparison diagram

Throughout the first part of Unit 6, children practice writing number models for number stories using ? to represent the number they need to find. For example, a number model for the number story about Barbara's and Edward's markers might be $20 + ? = 35$.

In the final part of this unit, children invent and use their own strategies to add 2- and 3-digit numbers and are introduced to a formal addition strategy called **partial-sums addition.** Home Links 6-6, 6-7, and 6-8 provide more information about the various addition strategies your child will encounter.

Please keep this Family Letter for reference as your child works through Unit 6.

Vocabulary   Important terms in Unit 6:

bar graph A graph with horizontal or vertical bars that represent data. The heights (or lengths) of the bars show the counts for each category. For example, the bar graph on the previous page shows that 4 children are wearing clothes with 5 pockets each.

picture graph A graph with pictures or symbols that represent data. The number of pictures above (or next to) each category shows the count for that category. For example, the picture graph on the previous page shows that 3 children are wearing clothes with 6 pockets each.

graph key A list of the symbols used on a graph that explains how to read the graph. The key on the picture graph on the previous page shows that each smiley-face symbol stands for 1 child.

comparison number story A number story involving the difference between two quantities. *For example:* Ross squeezed 12 lemons. Anthony squeezed 5 lemons. How many more lemons did Ross squeeze than Anthony?

comparison diagram A diagram used to organize information from a comparison number story. For example, the diagram at the right organizes the information from Ross and Anthony's lemon story.

Quantity 12	
Quantity 5	5

Difference

two-step number story A number story that most children solve using two arithmetic operations. *For example:* Kyla had 6 leaves. She found 8 more in the woods. Then she gave 3 to her sister. How many leaves does Kyla have now?

ballpark estimate A rough estimate that is reasonable or "in the ballpark." Children can use ballpark estimates to check the reasonableness of answers they find using other computation methods. A ballpark estimate for the problem $23 + 81$ might be 100 because $20 + 80 = 100$.

partial-sums addition An addition strategy in which separate sums are computed for each place-value column that are then added to get a final sum. More information on partial-sums addition will be provided in the Family Note for Home Link 6-8.

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

Do-Anytime Activities

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

1. Encourage your child to show you his or her favorite addition strategy.

2. Ask your child to make a ballpark estimate for the sum of two 2- or 3-digit numbers.

3. Pose one- and two-step number stories for your child to solve. Ask your child to explain his or her solution strategy to you.

4. Have your child compare two objects' lengths. Ask which object is longer and prompt your child to use a ruler or a tape measure to find the difference between the lengths.

Building Skills through Games

In Unit 6 your child will practice mathematical skills by playing the following games.

The Exchange Game

Each player rolls a die and collects that number of base-10 cubes from the bank. As players accumulate cubes, they exchange 10 cubes for 1 long. As they accumulate longs, they exchange 10 longs for 1 flat.

Salute!

The dealer gives one card to each of two players. Without looking at their cards, the players place them on their foreheads facing out. The dealer finds the sum of the numbers on the cards and says it aloud. Each player uses the sum and the number on the opposing player's forehead to find the number on his or her own card.

Beat the Calculator

One player is the Caller, who names two 1-digit numbers. Another player is the Brain, who adds the two numbers mentally. A third player is the Calculator, who adds the numbers with a calculator. The Brain tries to find the sum faster than the Calculator.

The sum is 12.
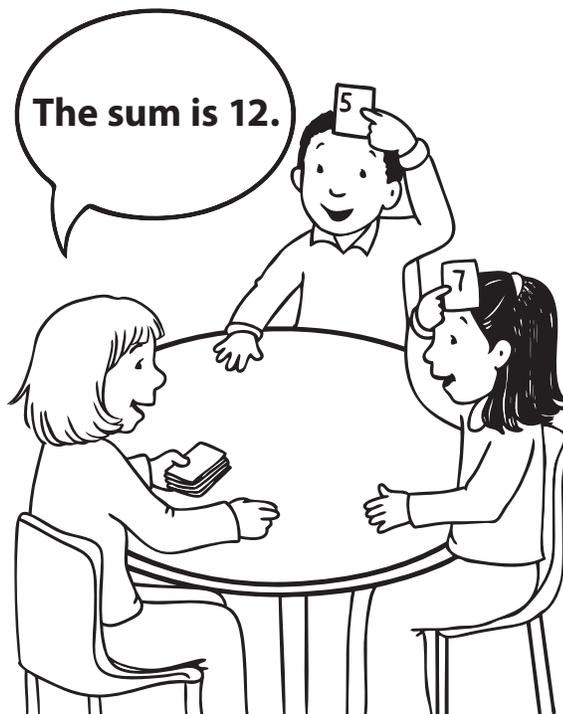
As You Help Your Child with Homework

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 the Unit 6 Home Links.

Home Link 6-1

1. Answers vary.   **2.** Answers vary.

Home Link 6-2

1.

Quantity 29

Quantity 10	?
	Difference

Rosa; Sample answer: $29 - 10 = ?$; $19

2.

Quantity 15

Quantity ?	8
	Difference

Sample answer: $8 + ? = 15$; 7 miles

Home Link 6-3

1. Sample answer: $16 + 7 = ?$; 23 inches
2. Sample answer: $24 + ? = 30$; 6 blocks

Home Link 6-4

1. 20 feet   2. 32 feet

Home Link 6-5

1. Sample answers: $11 + 6 - 8 = ?$; $11 + 6 = ?$ and $17 - 8 = ?$; 9 children

Home Link 6-6

For 1–2, strategies will vary.

1. Sample estimate: $30 + 60 = 90$; 93
2. Sample estimate: $20 + 70 = 90$; 85
3. 246   4. 200; 70; 8
5. 350   6. 400; 20

Home Link 6-7

1. $70 + 5 = 75$
2. $40 + 12 = 52$
3. 532   4. 300; 40
5. 405   6. 600; 9

Home Link 6-8

In 1–3, sample estimates are shown.

1. $50 + 40 = 90$; 89
2. $30 + 80 = 110$; 108
3. $125 + 240 = 365$; 363

Home Link 6-9

1. 10
2. 8
3. **a.** 28   **b.** 25   **c.** 25   **d.** 29

Home Link 6-10

1. X X X X X X X X
   X X X X X X X X
   Sample answer: $8 + 8 = 16$
2. X X X X X X
   X X X X X X
   X X X X X X
   X X X X X X
   Sample answer: $6 + 6 + 6 + 6 = 24$
3. X X X X X X X
   X X X X X X X
   X X X X X X X
   Sample answer: $7 + 7 + 7 = 21$

Comparison Number Stories

Family Note

Today your child learned to use comparison diagrams. These diagrams help your child organize the information in a number story. When the information is organized, it is easier to decide whether to add or subtract to solve a problem.

Children use comparison diagrams to represent problems in which two quantities are compared. Sometimes children find the difference between the two quantities (as in Example 1 below). In other problems the difference is known, and children find one of the quantities (as in Example 2 below).

Quantity
49 fourth graders

Quantity
38 third graders

?
_____
Difference

Example 1: There are 49 fourth graders and 38 third graders. How many more fourth graders are there than third graders?

Note that the number of fourth graders is being compared with the number of third graders.

- *Possible number models:* Children who think of the problem in terms of subtraction will write $49 - 38 = ?$ Other children may think of the problem in terms of addition: "Which number added to 38 will give me 49?" They will write the number model as $38 + ? = 49$.

- *Answer:* There are 11 more fourth graders than third graders.

Example 2: There are 53 second graders. There are 10 more second graders than first graders. How many first graders are there?

Note that the difference is known, and one of the two quantities is unknown.

Quantity
53

Quantity
?

10
_____
Difference

- *Possible number models:* $53 - ? = 10$ or $10 + ? = 53$

- *Answer:* There are 43 first graders.

For Problems 1–2 on the next page, ask your child to explain the number models he or she wrote.

Please return the second page of this Home Link to school tomorrow.

Addition Strategies

Family Note

Everyday Mathematics encourages children to use a variety of strategies to solve computation problems. Doing so helps children develop a sense for numbers and operations, rather than simply memorizing a series of steps.

We suggest that you give your child an opportunity to explore and choose addition strategies that he or she feels comfortable using. At some point you may want to share the method that you know from your own school experience. However, please allow your child some time to use his or her own methods before doing so.

Below are three examples of methods that your child might use to solve 2-digit addition problems.

Counting Up

$47 + 33 = ?$	⟵	"My problem"
47, 57, 67, 77	⟵	"Start at 47. Count up 30 by 10s."
78, 79, 80	⟵	"Count 3 more."
80	⟵	"The answer is 80."

Combining 10s and 1s

$29 + 37 = ?$	⟵	"My problem"
$20 + 30 = 50$	⟵	"Add the 10s."
$9 + 7 = 16$	⟵	"Add the 1s."
$50 + 16 = 66$	⟵	"Put the 10s and 1s together. The answer is 66."

Making Friendly Numbers

$52 + 29 = ?$	⟵	"My problem"
30	⟵	"30 is close to 29. Just add 1 more to get 30."
$52 + 30 = 82$	⟵	"52 plus 30 is 82."
$82 - 1 = 81$	⟵	"Take away 1 because I added 1 to get 30. The answer is 81."

Encourage your child to use a ballpark estimate as a way to check whether an answer to a computation problem makes sense. *For example:* In $29 + 37$, 29 is close to 30 and 37 is close to 40. Because $30 + 40 = 70$, a ballpark estimate is 70. The final answer of 66 is close to 70, so 66 is a reasonable answer. Your child can make a ballpark estimate before or after solving the problem.

Please return the second page of this Home Link to school tomorrow.