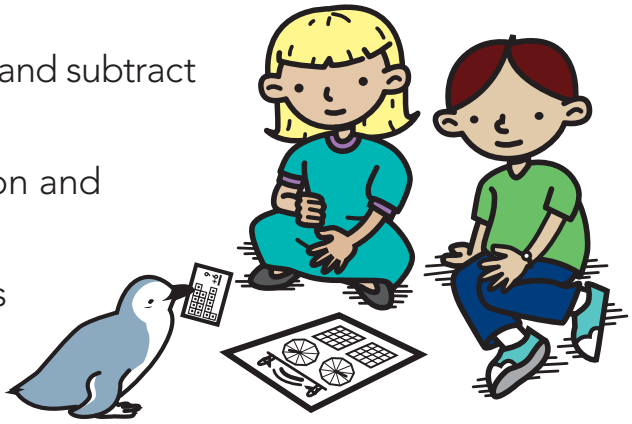
Bridges in Mathematics Grade 1

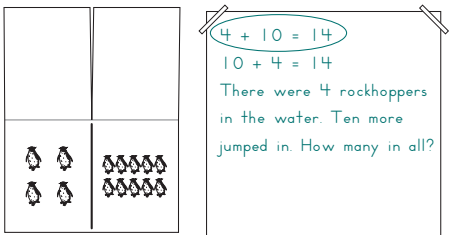
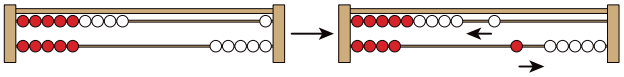
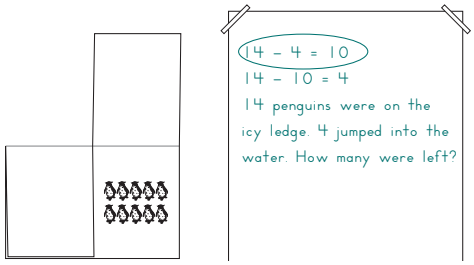
Unit 6: Figure the Facts with Penguins

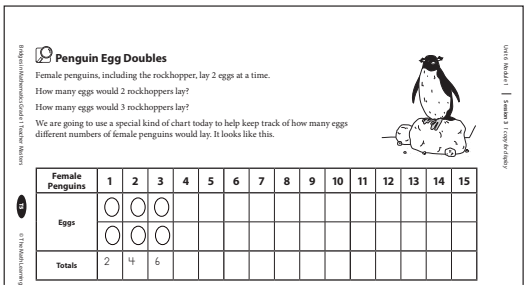
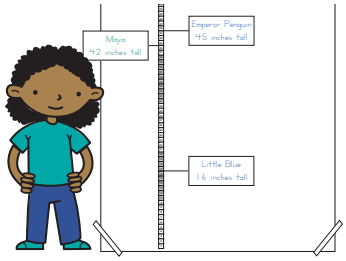
In this unit your child will:

- Practice efficient math strategies to add and subtract within the range of 0–20
- Tell, write, and solve a variety of addition and subtraction story problems
- Write equations to match the problems
- Use place value strategies to add and subtract up to 100
- Measure, order, and compare height in inches



Your child will practice these skills by solving problems like those shown below.

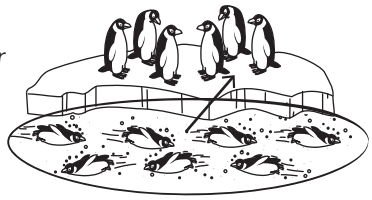
PROBLEM	COMMENTS
Choose one fact and write a story.  Solve 9 + 5.  "I added 1 bead to the top row to make a 10, and then I took 1 bead away from the bottom row. 9 + 5 = 10 + 4, so it's 14!"	Math fact strategies from Units 2 and 3 are used to solve word problems up to 20. Models like the Double-Flap Cards (shown) help students understand how addition and subtraction are related through fact families.  Students also use known facts to solve new facts like the one on the number rack to the left. Here the student used a known fact, 10 + 4, to add 9 + 5.
Solve these problems: 1. Twelve penguins were standing on the ice. Three of them dove into the water. How many penguins were left on the ice? 12 – 3 = ____ 2. Nine penguins were in the water. More penguins jumped in. Now there are 12. How many jumped in? 9 + ____ = 12 3. Some penguins were in the water. Three more joined them. Now there are 12. How many penguins were in the water at the start? ____ + 3 = 12 4. There were 9 penguins on the ice. There are 3 penguins in the water. How many more penguins are on the ice than in the water? 9 – 3 = ____ or 3 + ____ = 9	Penguins standing on ice ledges, huddling in groups, laying eggs, and catching fish provide story settings for first graders as they are introduced to a variety of addition and subtraction problems. These problems include situations where numbers are joined (added), separated (subtracted), or compared. Students write equations to go with these story problems, including a box for the unknown number. Problems that involve comparing (example 4) may be solved with either addition or subtraction strategies. These problems involve understanding the relationship between two numbers. When helping your child at home, you may want to read and discuss the story problems together, and provide counters or paper and pencil for drawings. First graders' reading and comprehension skills are still developing.

PROBLEM	COMMENTS
Complete the chart. Then use it to answer the question. How many eggs would 8 rockhopper penguins lay?  **Penguin Egg Doubles** Female penguins, including the rockhopper, lay 2 eggs at a time. How many eggs would 2 rockhoppers lay? How many eggs would 3 rockhoppers lay? We are going to use a special kind of chart today to help keep track of how many eggs different numbers of female penguins would lay. It looks like this. Female Penguins: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Eggs Totals: 2 4 6 It would be 16. It's counting by 2s. It's also a doubles fact. 8 + 8 = 16.	Problems like this one encourage students to look for patterns that occur in mathematics. Some students will notice how the number of eggs is double the number of penguins. Others will notice the number of eggs grows by 2 each time another penguin is added, and the numbers of eggs are all even numbers. Still others will see that the chart is counting by 2s.
Compare the three heights using symbols. Put them in order from least to most.  Maya 42 inches tall Emperor Penguin 45 inches tall Little Blue 16 inches tall "It's what I thought—I'm bigger than the little blue and smaller than the emperor."	Students gather information about two new penguins and record what they learn on data sheets. They measure and compare the heights of the emperor and little blue penguins to the height of a student, write inequality statements using the > (greater than) and < (less than) symbols, and order the three heights from shortest to tallest.

FREQUENTLY ASKED QUESTIONS ABOUT UNIT 6

Q: Why are students solving story problems? Wouldn't it be simpler to have them solve addition and subtraction problems with numbers on a worksheet?

A: It might seem simpler for students to complete addition and subtraction facts with numbers alone. However, first graders are still developing a sense of number as well as an understanding of what it means to add and subtract. Students build this understanding of number and adding and subtracting through story context in real situations. For example, math equations with a missing addend such as 6 + ___ = 13 are notoriously challenging for many first graders. When the same problem is put into a story context such as "*There are 6 penguins resting on the ice. Some other penguins got out of the water to join them on the ice. Now there are 13 penguins on the ice. How many penguins got out of the water?*" it takes on meaning, and students are able to act out the story or use math materials to make sense of the problem. Then, they can write the equation that matches the story problem.



6 + ___ = 13

As students work with the wide variety of problem types they begin to understand addition as a process of combining or adding to, and subtraction as a process of taking away or finding the difference. As they make these connections, they are better able to represent and solve problems with numbers and symbols alone.

Q: How are the measuring activities related to problem solving?

A: The measurements activities provide wonderful opportunities for students to make comparisons (e.g., How much taller am I than a little blue penguin?), which leads naturally to problem situations in which they calculate with single- and multi-digit numbers. In this way, students use measurements they have taken themselves to develop place value concepts in real-world situations.