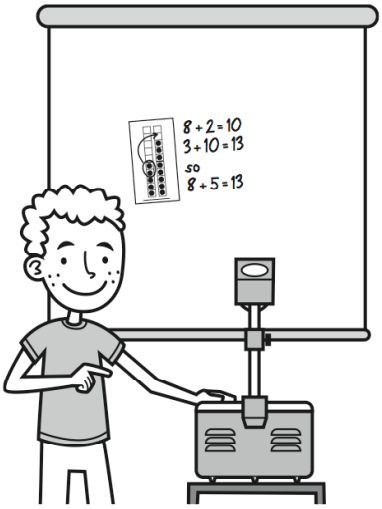
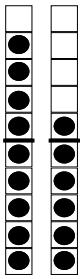
Grade 3, Unit One: Computation, Algebraic Thinking & Probability

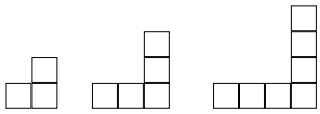
In this unit your child will:

- quickly recall addition and subtraction facts to and from 20
- describe, extend, and make generalizations about number and shape patterns
- determine one quantity when given another, based on a simple relationship
- estimate and measure length in inches

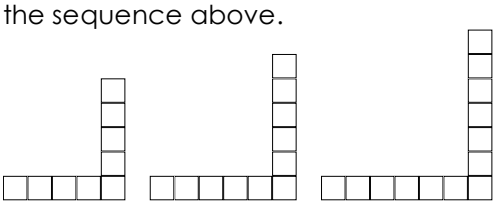


Your child will learn and practice these skills by solving problems like those shown below. Keep this sheet for reference when you're helping with homework.

Problem	Comments
Write all the equations in the fact family that goes with this pair of ten-strips. **9 + 6 = 15** **15 − 9 = 6** **6 + 9 = 15** **15 − 6 = 9**  Write a story problem to go with one of the equations you wrote above. **Our class fish tank had 9 fish on Monday. The teacher added 6 more fish to the tank on Wednesday. How many fish are in the tank now?**	While students are expected to recall basic addition and subtraction facts from memory, it is helpful first to use visual models like the ten-strips shown here to review strategies and explore relationships among associated facts. When students can *see* that 9 + 6 is equal to 6 + 9, for example, it effectively cuts in half the number of facts they need to remember. Fact families (groups of addition and subtraction facts that go together) can help students use what they already know to solve facts they may not recall immediately. For example, if you remember that 6 + 9 = 15, it's fast and straightforward to figure out that 15 – 9 = 6, especially when working with the ten-strips has allowed you to see *why* this must be so. ***Note*** *You will receive a booklet explaining strategies for remembering the facts. The booklet uses the ten-strips model to show the strategies.*
Jacob had 13 stickers. His mom gave him 18 more. How many stickers does he have now? Show all your work. **13 = 10 + 3** **18 = 10 + 8** **10 + 10 = 20 and 3 + 8 = 11** **20 + 11 = 31** **He has 31 stickers.**	Many students will be ready to apply their mastery of basic facts to calculations with larger numbers. Story problems provide ample opportunities to extend their thinking in this way. This student not only used the fact 3 + 8 = 11 to solve this problem, but also an understanding that a teen number can be broken into a 10 and some ones. The ten-strips support the development of this understanding for all students.



Show the next three arrangements in the sequence above.

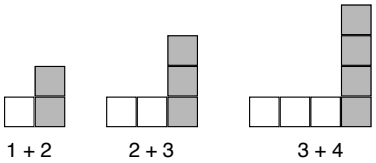


How many tile would be in the 20th arrangement of this pattern? Explain how you know.

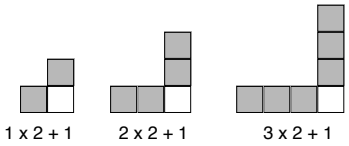
Arrangement	Tile
1	1 + 2 = 3
2	2 + 3 = 5
3	3 + 4 = 7
4	4 + 5 = 9
…	…
20	20 + 21 = 41

There would be 41 tile. Each time, you have a leg that's the same as the arrangement number plus another leg that's 1 more. You can see that pattern in the table.

This student extended the tile sequence correctly and then used a table to identify a numerical pattern in the arrangements. This pattern makes it possible to determine the number of tile in *any* arrangement in the sequence. The illustration below is color-coded to show the numerical pattern the student described.



Another student might also see that you can calculate the number of tile in any arrangement by doubling the arrangement number and adding 1 more, as shown in the picture below.



In later grades, we would describe what students are doing as expressing the total number of tile as a function of the arrangement number. The two methods above can be expressed as functions in the following ways:

$f(x) = x + (x + 1)$ $\quad$ $f(x) = 2x + 1$

If you simplify the first function, you can see that it is equal to the second function. Using tile sequences allows third graders to begin doing this kind of sophisticated algebraic reasoning far earlier than they could using symbolic notation alone.

Frequently Asked Questions about Unit One

Q: Weren't students supposed to learn the addition and subtraction facts in second grade?
A: Most students probably did master, or came close to mastering, basic addition and subtraction facts in second grade. Without regular practice, however, many students have probably forgotten some of those facts over the summer. It's crucial that students master those facts before proceeding with the rest of the mathematics in Grade 3 Bridges, so we spend time reviewing and practicing them in this first unit.

Q: Why does this unit cover so many different topics?
A: Although it's critical for students to review basic addition and subtraction facts at this time, we also know that reviewing this material on its own would not be the most engaging way to begin the year. To capture students' interest, many of the lessons in this unit feature patterns and probability games that not only allow students to practice the facts in fun and engaging contexts, but also to explore complex and interesting concepts in algebra and probability.