

Getting Ready to Teach Unit 3

Learning Path in the Common Core Standards

In this unit, children begin the study of the teen numbers and their structure as ten ones and more ones. They continue to represent the numbers 6–10 as a 5-group and some ones, and they find all the partners for the numbers 2 through 7. Children tell and retell stories about a park scene and make up and solve story problems about the scene. In geometry, they put shapes together to make new shapes. They also sort shapes by a given attribute.

Help Students Avoid Common Errors

Math Expressions gives children opportunities to analyze and correct errors, explaining why the reasoning was flawed.

In this unit, we use Puzzled Penguin to show typical errors that children make. Children enjoy teaching Puzzled Penguin the correct way, telling why this way is correct, and explaining why the error is wrong. The common errors are presented as requests for help from Puzzled Penguin to the children:

- ▶ **Lesson 1:** counting 4 and 3 out of order
- ▶ **Lesson 4:** misreading operations signs and adding instead of subtracting and subtracting instead of adding
- ▶ **Lesson 11:** counting the totals for 8 and 9 incorrectly and counting 8 fingers when only 6 fingers are shown
- ▶ **Lesson 13:** putting only 4 objects as 5-groups to show the numbers 6–10
- ▶ **Lesson 19:** incorrectly writing the number of objects after correctly drawing the objects

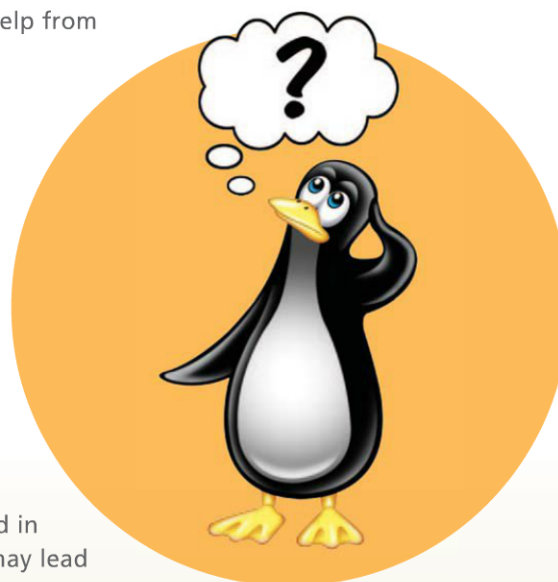
In addition to Puzzled Penguin, other suggestions are listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.

Math Expressions VOCABULARY

As you teach this unit, emphasize understanding of these terms.

- partners
- total
- add
- subtract
- sort
- teen number
- 10-group

See the Teacher Glossary.



Story Problems

Lessons

1

4

7

11

16

Create Story Problems Children make up stories about a park scene. After telling a story, children retell the story to help them understand the situation. To create problems, they ask “What if” questions about the story situation.

Five Steps to Problem Solving The steps are cumulative to help reinforce an orderly approach to solving problems, so encourage children to work through all the steps for each problem.

Build language through retelling story problems. Ask a child to retell, in his or her own words, another child’s story problem. Other children listen and determine if the situation is the same as in the original story. The retelling of each story facilitates language comprehension and vocabulary development.

Use objects to solve story problems. Children use Square-Inch Tiles or centimeter cubes to solve problems by modeling the situation and acting out the problem.

Show the operation with Number Tiles and +/– Tiles. To show the operation needed to solve the problem (for example, $7 + 1$ or $9 - 4$), children use their Number Tiles and +/– Tiles. The expression they generate is actually the operational part of the solution equation. Because equations may be difficult for kindergarten children to write, they use Number Tiles to represent the operation.

Share solutions. Have one or two children share how they solved the story problem using objects.

Record the situation and equation. At the end, summarize for the children by using circles to make a math drawing and then writing an equation.

Draw the circles with 5-groups. To show subtraction, cross out circles beginning with the first circle. (This will help later when children count on to subtract.) Using a horizontal line to cross out helps children connect the drawing and the minus sign in the equation.

Math Drawing



Equation

$$7 + 1 = 8$$

$$9 - 4 = 5$$

The class should say the equations aloud together using the math words *plus* or *minus* and *equals*.

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING

Kindergarten Students learn and use mathematical and non-mathematical language, especially when they make up problems and explain their representation and solution. The teacher can write expressions (e.g., $3 - 1$) to represent operations, as well as writing equations that represent the whole situation before the solution (e.g., $3 - 1 = \square$) or after (e.g., $3 - 1 = 2$). Expressions like $3 - 1$ or $2 + 1$ show the operation, and it is helpful for students to have experience just with the expression so they can conceptually chunk this part of an equation.

All Lessons

1 – 21

Quick Practice Routines

In this unit, new Quick Practice routines are introduced in Lesson 3. As in previous units, turn over directing the tasks to **Student Leaders** as soon as the children are familiar with the routines.

New Routines The Quick Practice routines introduced in Lesson 3 reinforce the ten ones and more ones structure of the teen numbers, build subitizing skills with 5-groups and ones for 6–10, and show the recursive nature of the numbers beyond 20. The first two routines use the Giant Number Cards and the last one uses the 120 Poster.

10 and 1 Make 11... Children flash 10 fingers to the left and then show the number of ones in a teen number to the right. This helps reinforce how teen numbers are written and shows the underlying structure of a teen number as ten ones and some more ones.

Fast Fingers for 6–10 For Fast Fingers, children show all the fingers for a number at once. They do not show a 5 and then add on as many as needed to show the number.



To keep children alert, mix in some numbers less than 6, so that they do not automatically show 5 with their left hands for each number.

Count by Ones from 20 Through 60 As children count by ones the numbers that are pointed out on the 120 Poster, they flash an appropriate number of tens for each decade number. Then children count by tens, again flashing fingers for the number of tens in each number they say.

from THE PROGRESSIONS FOR
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STANDARDS ON OPERATIONS
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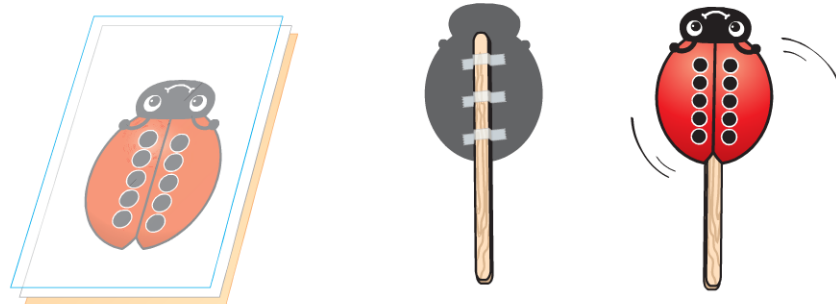
Kindergarten Students act out adding and subtracting situations by representing quantities in the situation with objects, their fingers, and math drawings. To do this, students must mathematize a real world situation (MP.4), focusing on the quantities and their relationships rather than non-mathematical aspects of the situation. Situations can be acted out and/or presented with pictures or words. Math drawings facilitate reflection and discussion because they remain after the problem is solved. These concrete methods that show all of the objects are called Level 1 methods.

Teen Numbers as Ten Ones and More Ones

Lessons

2	5	6	8	13
15	17	18	19	20

Ten Bug Use this new character daily to help children see tens in their world. The Ten Bug cutout is at the end of Lesson 2 in this unit. Glue the Ten Bug onto cardboard or construction paper. If you would like it to be as sturdy as possible, laminate it as well. Then cut it out and attach a stick or a ruler to the back. Now you have created a puppet that you can manipulate to fly around the classroom looking for groups of ten or for two groups of five.

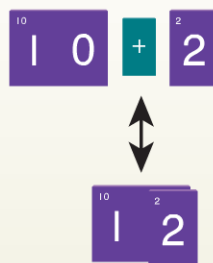


Groups of Ten Ones A main focus of this unit is for children to see teen numbers as ten ones and more ones. Children count a teen number of objects, then group 10 objects as a 10-group and see how many more ones are in the number.



Math Expressions uses a 10-Counter Strip as a manipulative to represent 10 ones or 10. The 10-Counter Strip shows a group of 10 counters with a small gap, so that it also represents two 5-groups. The 10-Counter Strip shows 10 counters but also looks like a 1, so it supports teen numbers written in standard form, such as 12.

The Number Tiles and the + Tile are also useful to help children see the structure of teen numbers as 10 ones and some more ones. When they make 12 by placing a 2 tile over the 0 on the 10 tile, they see that 12 is 10 ones + 2 more ones. To help children visualize the 10 as 10 ones, have them turn the 10 tile over to see the dot side.

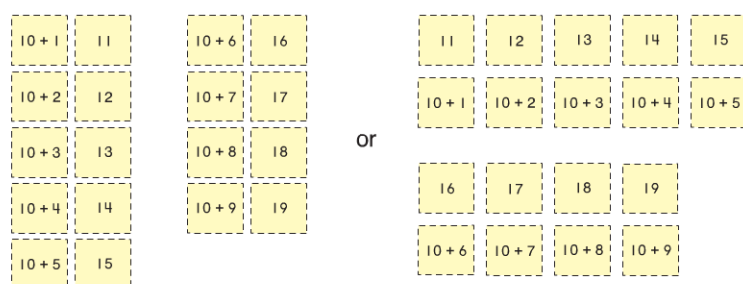


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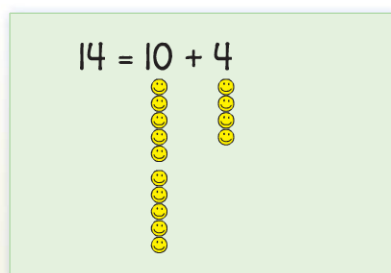
Work with numbers from 11 to 19 to gain foundations for place value The numerals 11, 12, 13, ..., 19 need special attention for children to understand them. The first nine numerals 1, 2, 3, ..., 9 and 0 are essentially arbitrary marks. These same marks are used again to represent larger numbers. Children need to learn the differences in the ways these marks are used. For example, initially, a numeral such as 16 looks like "one, six," not "1 ten and 6 ones." Layered place value cards can help children see the 0 "hiding" under the ones place and that the 1 in the tens place really is 10 (ten ones). By working with teen numbers in this way in Kindergarten, students gain a foundation for viewing 10 ones as a new unit called a ten in Grade 1.

Match Partners and Totals Rather than immediately writing equations to show matching partners and totals, children use Teen Total Cards in an activity where they match the partners of a teen number with the teen number total. The Teen Total Cards are cutouts in the Student Activity Book, and extras can be made using a blackline master from the Teacher's Resource Book.

Children first sort the cards into partner cards and total cards. They then work in pairs to match each partner card with a total card. Encourage them to discuss quietly how they match the cards and what strategies they use. Each pair may order the cards in any way that makes sense. Two ways children may use are shown below.



Teen Display For a classroom display, children make pages with an equation and a model for a teen number. For each page, you write the equation and then the child uses stickers or simple drawings to represent the equation. Children may group the ten as 1 ten-group or as 2 five-groups. Post the pages to make a Teen Display. You may want to first pass them around so that children can practice using Finger Freezes to show each number. When pointing out numbers for various counting activities, use the Teen Display.



from **THE PROGRESSIONS FOR
THE COMMON CORE STATE
STANDARDS ON OPERATIONS
AND ALGEBRAIC THINKING**

Work with numbers from 11 to 19 to gain foundations for place value Students use objects, math drawings, and equations to describe, explore, and explain how the “teen numbers,” the counting numbers from 11 through 19, are ten ones and some more ones. Students can count out a given teen number of objects, e.g., 12, and group the objects to see the ten ones and the two ones. It is also helpful to structure the ten ones into patterns that can be seen as ten objects, such as two fives.

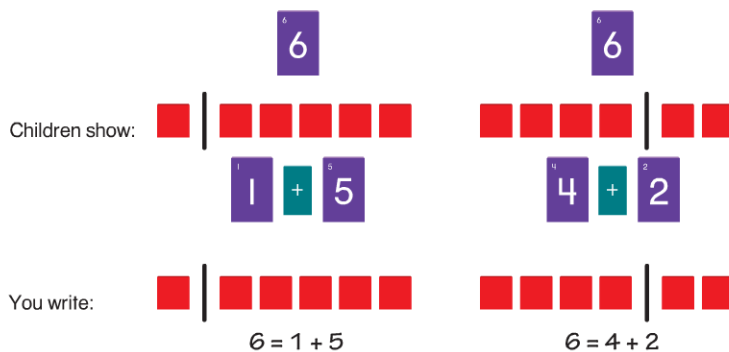
Partners of Numbers

Lessons

3 **6** **16** **17** **18**

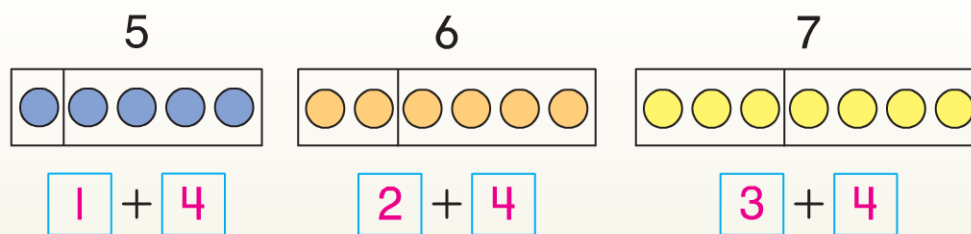
Finding partners of numbers prepares children to represent addition and subtraction situations with expressions and equations.

Counting Mat In Unit 3, children use a new manipulative, the Break-Apart Stick, to find all the partners of the numbers 2–7. After showing a number with Square-Inch Tiles or centimeter cubes, children use the Break-Apart Stick to find a pair of partners for that number. The Break-Apart Stick visually separates the partners and helps children remember which partners they made. After children use Number Tiles to show the expression for the partners, you write the equation for the total and the partners.



When writing a partners equation, write the total to the left of the equal sign and the partners to the right, showing that the starting number is decomposed into two partners.

Children also demonstrate understanding of partners by completing expressions for drawings of partners.



The term *total* is used instead of *sum*. The word *sum* can be confusing because of its homophone *some*. Since *some* means “a number of,” “a few,” or “several” but not “all,” young children may not easily associate the word *sum* with “total” or “all.” For this reason, *Math Expressions* uses the term *total* in Grades K–2.

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING

Kindergarten Put Together/Take Apart situations with Both Addends Unknown play an important role in Kindergarten because they allow students to explore various compositions that make each number. As students decompose a given number to find all of the partners that compose the number, the teacher can record each decomposition with an equation such as $5 = 4 + 1$, showing the total on the left and the two addends on the right. Students can find patterns in all of the decompositions of a given number and eventually summarize these patterns for several numbers.

Reinforce Subitizing with 5-Groups

Lessons

5

7

11

12

13

14

Drawing Models Children use circles as models for ones to draw representations of the numbers through 10. As they make their drawings of the numbers 6–10, emphasize the importance of drawing the first five ones as a 5-group. Help children see that making a 5-group gives them a starting place for counting and modeling the numbers from 6–10.

1	2	3	4	5	6	7	8	9	10
○	○ ○	○ ○ ○	○ ○ ○ ○	○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○ ○

from THE PROGRESSIONS FOR
THE COMMON CORE STATE
STANDARDS ON COUNTING
AND CARDINALITY

From subitizing to single-digit arithmetic fluency Perceptual subitizing develops into conceptual subitizing—recognizing that a collection of objects is composed of two subcollections and quickly combining their cardinalities to find the cardinality of the collection (e.g., seeing a set as two subsets of cardinality 2 and saying “four”).

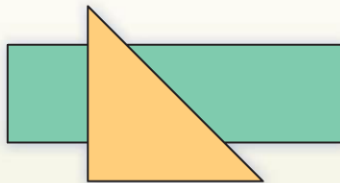
Lessons

9

21

Make New Shapes

Among the Geometry skills in the Kindergarten Common Core State Standards are composing simple shapes to form larger shapes, correctly naming shapes, and describing relative positions of objects. The lessons in this unit focus on these skills that help children describe their physical world.



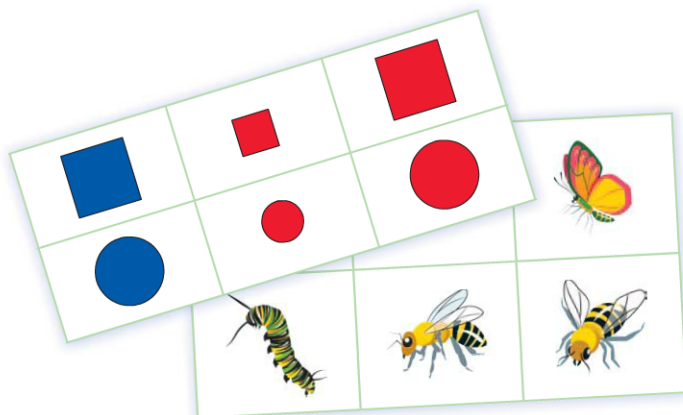
Sorting Objects

Lessons

10

12

Sorting Cards Children use Sorting Cards to explore ways to classify shapes and objects. First, they sort shape cards by color, shape, and size. After sorting shapes, they sort picture cards by various attributes.



After sorting with the cards, children classify a group of classroom objects by attributes chosen by you at first and then by the children.

Lessons

4

5

6

7

12

14

18

19

Path to Fluency

As part of developing understanding of addition and subtraction, the Common Core State Standards ask that kindergarten children fluently add and subtract within 5. One way for children to achieve this goal is persistent practice. In many lessons, a full or half page of exercises provides this continual practice that will enable children to become fluent with addition and subtraction within 5 by the end of kindergarten. A *Path to Fluency* icon marks these exercise sets in the Student Activity Book, thus ensuring that parents will also be aware of this important kindergarten goal.

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON MEASUREMENT AND DATA

Students in Kindergarten classify objects into categories, initially specified by the teacher and perhaps eventually elicited from students. For example, ... the teacher might ask students in the class to sort pictures of various organisms into two piles: organisms with wings and those without wings. Students can then count the number of specimens in each pile. Students can use these category counts and their understanding of cardinality to say whether there are more specimens with wings or without wings.

from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING

Working within 10 Later in the year, students solve addition and subtraction equations for numbers within 5, for example, $2 + 1 = \square$ or $3 - 1 = \square$, while still connecting these equations to situations verbally or with drawings. Experience with decompositions of numbers and with Add To and Take From situations enables students to begin to fluently add and subtract within 5.