

Getting Ready to Teach Unit 1

Learning Path in the Common Core Standards

Unit 1 emphasizes the 1-more and 1-less pattern, first with counting numbers, then with finding partners, and finally with addition and subtraction. The repeated experiences in Unit 1 are a bridge from Kindergarten experiences to the embedded addends required in Unit 2 for counting on. It takes time for children to build understanding of such embedded addends, but this is crucial, and they need to see them for each number through 10. Later in Units 2 and 3, children will extend their thinking to using strategies for adding and subtracting within 10.

Help Children 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, why this way is correct, and why Puzzled Penguin made an error. Common errors are presented in the Puzzled Penguin feature in the following lessons:

- ▶ **Lesson 1:** Difficulty seeing quantities as 5-groups and extra ones
- ▶ **Lesson 3:** Not recognizing that when adding 0 to a number, the answer is the number that is not 0

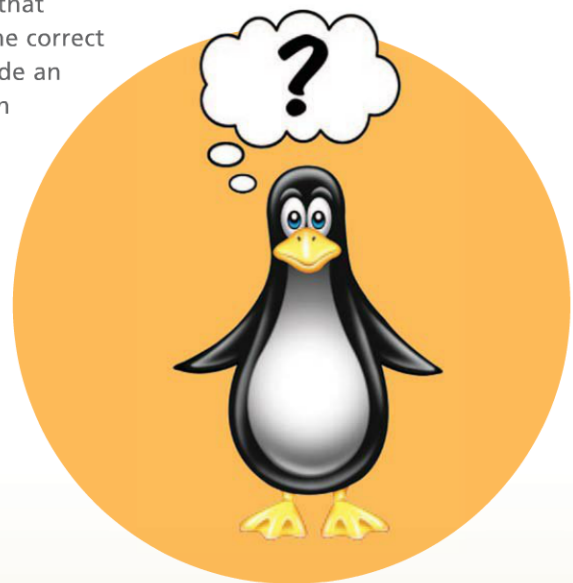
In addition to Puzzled Penguin, there are other suggestions listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.

Math Expressions VOCABULARY

As you teach this unit, emphasize understanding of these terms

- 5-group
- break-apart
- Math Mountain
- partner
- switch the partners

See the Teacher Glossary.



Perceptual/Conceptual Subitizing

Lessons

1 **2**

1-More, 1-Less Children begin the year using various lengths of Stair Steps to find 1-more and 1-less patterns. The sequence of all the Stair Steps illustrates these relationships in a way that is easy to visualize. The pattern is recited and enjoyed by children.

1 and 1 more is 2.

2 and 1 more is 3.

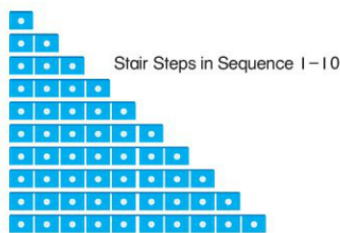
3 and 1 more is 4, and so on.

The sequence is then reversed.

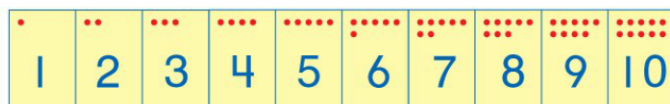
1 less than 10 is 9.

1 less than 9 is 8.

1 less than 8 is 7, and so on.



Visualizing Fives Perceptual subitizing is visualizing quantities without counting individual units. Seeing a number as a 5-group and extra ones is one method for visualizing numbers. The Number Parade and Number Cards show 5 dots across so children become accustomed to seeing the 5 dots and knowing it is 5 without counting. They will look at a set of 5 dots across and say, "5."



Number Parade

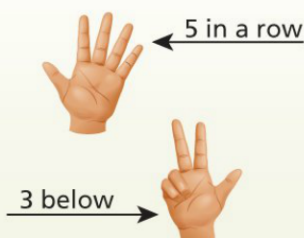
Math Expressions offers many ways for children to see 5-groups and extra ones.

Stair Steps



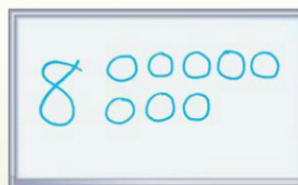
5 and 3 more is 8

Finger Rhymes



Five crows in a row and 3 below

Circle Drawing



5-group and extra ones

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

Perceptual Subitizing *From subitizing to single-digit arithmetic fluency.* Students come to quickly recognize the cardinalities of small groups without having to count the objects; this is called *perceptual subitizing*.

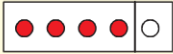
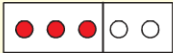
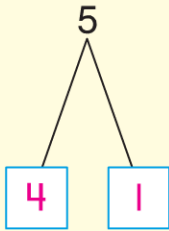
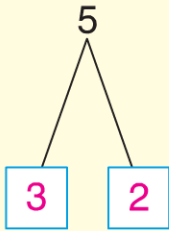
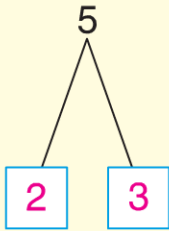
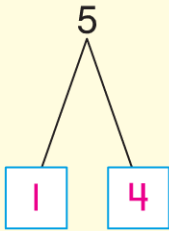


Perceptual subitizing develops into *conceptual subitizing*—recognizing that a collection of objects is composed of two subcollections.

Representing Partners

Lessons

3 **4** **5** **6** **7** **8**

Break-Aparts and Partners of a Number Before children can fully understand addition and subtraction, they must build a detailed knowledge of embedded numbers. They need to recognize that each number has other numbers "hiding" inside it.

	$5 = 4 + 1$				
	$5 = 3 + 2$				
	$5 = 2 + 3$				
	$5 = 1 + 4$				

The partners on the left become 1 less as they go down in the circle drawings and the equations, and they become 1 less as they go to the right in the Math Mountains. The partners on the right become 1 more in the same ways.

Properties and Equations In the equations and Math Mountains, we see the partners switched. This early introduction of the concept of the Commutative Property allows children to remember only 50 basic addition facts instead of 100.

The Zero Property is introduced informally as children discuss the totals when one partner is 0.



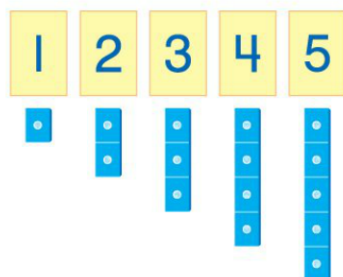
from **THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON OPERATIONS AND ALGEBRAIC THINKING**

Representing Partners 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.

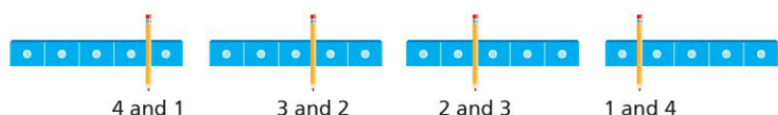
Multiple Representations Math Expressions uses multiple representations with different activities to help children master the partner pairs through 10. The more ways you can present a concept in a hands-on or visual way, the more likely the children will grasp the concept. Using a variety of representations can help differentiate instruction by addressing different learning styles.

Using Stair Steps to model concepts is done with different activities.

Number Cards and Stair Steps



Break Apart Stair Steps



Modeling Partners Using Fingers



Finding all partners of a given number also is prerequisite knowledge for Level 3 Make-a-Ten Methods. The first step, partners of 10, is introduced in this unit.

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

Methods Used for Solving Single-digit Addition and Subtraction Problems

Level 1. Direct Modeling by Counting All or Taking Away. Represent situation or numerical problems with groups of objects, a drawing, or fingers. Model the situation by composing two addend groups or decomposing a total group. Count the resulting total or addend.

Level 2. Counting On.

Embed an addend within the total (the addend is perceived simultaneously as an addend and as part of the total). Count this total but abbreviate the counting by omitting the count of this addend; instead, begin with the number word of this addend. Some method of keeping track (fingers, objects, mentally imaged objects, body motions, other count words) is used to monitor the count.

For addition, the count is stopped when the amount of the remaining addend has been counted. The last number word is the total. For subtraction, the count is stopped when the total occurs in the count. The tracking method indicates the difference (seen as an unknown addend).

Level 3. Convert to an Easier Problem. Decompose an addend and compose a part with another addend.

Partner Stories

Lessons

3

4

5

6

7

8

MATH TALK Activities where children tell partner stories lend themselves to Math Talk in Action discussions. To do this, children connect the symbols with the words of a real world situation. Situations can be acted out and/or presented with pictures or words. Children learn and use mathematical and non-mathematical language, especially when they make up problems.



Ask children to tell a partner story about each set of partners of 5.

Who would like to tell a partner story about one set of partners of 5?

Mike: There are 5 acorns under the tree. 4 of the acorns belong to the brown squirrel, and 1 acorn belongs to the red squirrel.

Which partners of 5 did Mike use in his story?

Mio: 4 and 1

That's right. Who would like to tell a story about a different set of partners of 5?

Kristal: I have 3 small dolls and 2 big dolls.

Juan: Kristal has 5 dolls.

Sasha: The partners in the story are 3 and 2.

When telling partner stories for all the partners of a number, children are informally solving Put Together/Take Apart with Both Addends Unknown problem types. These problems involve situations that correspond to finding the decompositions of a number. They will formally solve these types of problems in Units 3 and 5 of this grade.

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

Put Together/Take Apart Both

Addends Unknown

These problem types play an important role 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 a 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. This will help students to build the Level 2 embedded number representations used to solve more advanced problem subtypes.

Addition and Subtraction

Lessons



Patterns and Operations Unit 1 focuses on moving children from Level 1 Count All to Level 2 Count On. It also is moving toward fluency with the $+0/-0$ and $+1/-1$ patterns within 10. These patterns appear in both the activities and the practice.

Patterns with Partners								
2	3	4	5	6	7	8	9	10
1 + 1	2 + 1	3 + 1	4 + 1	5 + 1	6 + 1	7 + 1	8 + 1	9 + 1
		2 + 2	3 + 2	4 + 2	5 + 2	6 + 2	7 + 2	8 + 2
				3 + 3	4 + 3	5 + 3	6 + 3	7 + 3
						4 + 4	5 + 4	6 + 4
								5 + 5

Doubles Children identify the doubles partners through 10. They use these addition doubles to solve the related subtraction doubles. Children see the addition and subtraction doubles in pairs to facilitate seeing this relationship. Children will further explore strategies with doubles in Unit 4.

$$3 + 3 = 6$$

$$6 - 3 = 3$$

Focus on Mathematical Practices

Lesson



The Standards for Mathematical Practice are included in every lesson of this unit. However, there is an additional lesson that focuses on all eight Mathematical Practices. In this lesson, students use what they know about 1-more and 1-less patterns to record the formation of a marching band.