

# Getting Ready to Teach Unit 1

## Learning Path in the Common Core Standards

In this unit, children study the numbers from 1 through 10 and learn about simple shapes. In the number range 1–10, they learn to use the count sequence (counting), to tell what quantity of objects is in a set (cardinality), and to order numbers. They learn to write the numbers from 1 through 5, to draw sets of 1, 2, 3, 4, or 5 objects, to use objects, their fingers, and pictures to add and subtract in the range 2–5. Children explore and learn to identify these two-dimensional shapes—circles, squares, and rectangles.

Visual models and real world situations are used throughout the unit to illustrate important counting, cardinality, and geometry concepts.

## Help Students Avoid Common Errors

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

In this unit, we use Puzzled Penguin to show typical errors that students make. Students enjoy teaching Puzzled Penguin the correct way, which way is correct, and why the error is wrong. The common errors are presented as letters from Puzzled Penguin to the students:

- ▶ **Lesson 6:** counting the number of objects in a set incorrectly as Puzzled Penguin says there are 6 dogs in a drawing that shows 5 dogs
- ▶ **Lesson 15:** comparing two numbers incorrectly as Puzzled Penguin does not circle the number that is more

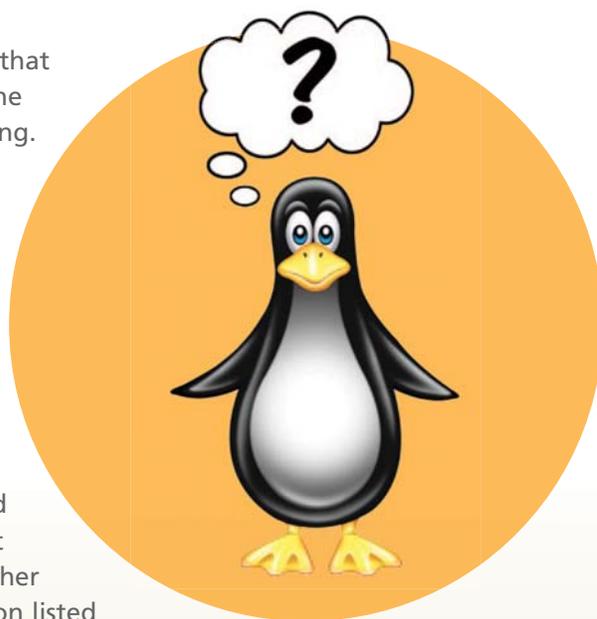
In addition to Puzzled Penguin, other suggestions are listed in the Teacher Edition to help you watch for situations that may lead to common errors. As a part of the Unit Test Teacher Edition pages, you will find a common error and prescription listed for each test item.

### Math Expressions VOCABULARY

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

- numbers
- arrangement
- visualize
- compare

See the Teacher Glossary.



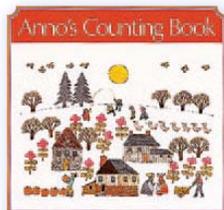
## Connect Mathematics to the Real World with Anno's Counting Book

Lessons

1

3

11



**Count with Anno's Counting Book** To help children count objects, *Anno's Counting Book* is used throughout Unit 1. In this lesson, children read and discuss the entire story. Since the story is told only through pictures and numbers, all children can describe the scenes, look for repeated arrangements, and make up stories about the scenes.

As you model counting objects in each scene, say the number aloud and point to each object as you count to the number, "One, two, three, four, five, six." Point out that the last counting word you use tells the number of objects in the set. "Six tells us how many ducks we see." Encourage children to count with you. The book is large enough that you could invite a child to help you in the counting by pointing to each object in the set as you and the class count together.

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

**From saying the counting words to counting out objects** Students usually know or can learn to say the counting words up to a given number before they can use these numbers to count objects or to tell the number of objects. Students become fluent in saying the count sequence so that they have enough attention to focus on the pairings involved in counting objects. To count a group of objects, they pair each word said with one object.

**Understand Zero** For the first scene for zero, briefly discuss what children know about zero and why there are no pictures on the page. Explain that since zero tells how many there are in an empty set, there are no objects on that page. This understanding of zero is fairly easy and rather interesting for children, so they do not need to practice or focus on the concept at this time. Children will do more work with zero in later units, both as a cardinal number and as a placeholder in the base ten place value system. Delaying formal work with zero is appropriate mathematically and developmentally.

**Counting Numbers** Focusing children’s attention on the counting numbers helps them understand the cardinal number relationships involved in counting. The last word said when counting tells the number of objects in the counted set, so if zero were used as the starting number, the number of counting words and the number of objects would be different by one. This difference can be confusing when children are first learning to count.

**Develop Math Talk with *Anno’s Counting Book*** As you move through the pages of the book, encourage children to share their observations. This is a natural way to introduce Math Talk. In the early lessons, you will model the kinds of questions that you want the children to generate themselves in later lessons. Emphasize that many observations can be made about the scenes, that many stories can be told about the scenes in this book, and that you want all the children to share and discuss their ideas.

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

**From saying the counting words to counting out objects** To count a group of objects, they pair each word said with one object. This is usually facilitated by an indicating act (such as pointing to objects or moving them) that keeps each word said in time paired to one and only one object located in space.

## Connect Mathematics to the Real World with Drawings

Lessons

3 4 5 6 12 14 16

**Draw Scenes and Objects** Guide children to plan what they will draw before they begin to work. Suggest that they make drawings of things that they like or know something about. Their first scenes will consist of sets of 2 objects—some children may draw only one or two sets of two while others will draw several sets. Encourage children to draw as many sets as they can and to keep in mind the story their scene represents.

If some children try to make elaborate, detailed drawings of the objects they chose, suggest that they make simple drawings so that they have time to draw more sets of objects. As children work, circulate and ask questions about their work, both about how they decided what objects to draw and about how children know that they have drawn the correct number of objects in each set.

**Discuss Scenes** Children will describe and discuss the scenes they made. Try to uncover a story for each scene, but accept simple descriptions of the objects. For each scene, ask children to count together to find the number of objects.

**Develop Math Talk with Drawings** As children describe and discuss their scenes, encourage open sharing of ideas. This activity gives you an opportunity to model and establish classroom communication. Listen carefully to what children say, and ask clarifying questions if children do not independently engage in discussion. If some children tend to dominate the conversation, call on those children who seem to have something to say, but may be too timid to speak out. Emphasize that everyone's ideas are important.

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

**From saying the counting words to counting out objects** Counting objects arranged in a line is easiest; with more practice, students learn to count objects in more difficult arrangements, such as rectangular arrays (they need to ensure they reach every row or column and do not repeat rows or columns).

## Effective Practice Routines

All Lessons

1 – 18

The first five minutes of every math lesson is used for Quick Practice routines that are designed to help children become faster and more accurate with skills and concepts. The Quick Practice sessions also allow children to develop leadership skills and independence as Student Leaders assume responsibility for leading the activities.

**Quick Practice Routines** In this unit, the same Quick Practice routines are used for the first 12 lessons. These focus on learning to count from one to ten, learn the numerals 1–10, recognize small groups from 1 to 5, and demonstrate counting with creative movements and sounds. In later lessons, work with recognizing 5-groups will be done.

**Oral Counting 1–10** Use the Number Parade to lead children in counting. The arrangement of dots for each number helps children develop perceptual subitizing skills. As they progress through the unit, they will be able to recognize groups with different numbers of dots.

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1	2	3	4	5	6	7	8	9	10

Number Parade

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

**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*.

**Show Fingers 110** Fingers are the first tools children use as they develop beginning number concepts. Many children use their fingers to respond to the question “How old are you?” In this unit, children will use their fingers to help them explore and count numbers to 10.

Be aware of, and discuss with children, the different ways they use their fingers to count and show a number. Children should use the method with which they feel most comfortable. Encourage children to try different ways of using their fingers to help them understand that there is more than one way of counting and showing numbers. Daily practice will strengthen and improve the children’s finger coordination as they move from awkwardness to proficiency.

Some children start by putting up the index finger, then middle, ring, pinky, and the thumb last. Others start with the thumb first and count across, ending with the pinky. Or, children may start with the pinky and end with the thumb.



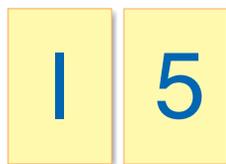
No matter which finger children start with, they will count 5 fingers on one hand.

**Giant Number Cards 1, 5** Children will develop counting and ordering skills as they use these cards throughout the unit. With these cards, as with the Number Parade, the arrangement of dots for each number supports children in their development of perceptual subitizing skills.

As they progress through the unit, they will associate the numerals with different numbers of dots, and they will immediately show a number rather than counting out on their fingers when shown or asked a given number from 1–5.

Giant Number Cards

(fronts)



(backs)



**Creative Movements and Sounds** Because so many of the scenes in *Anno's Counting Book* include different animals, this activity connects with that theme to encourage creative expression and to place counting activities in a real world context.

**Counting Rhymes** Some children may benefit from using a rhyme to remember the order of numbers, while others may simply enjoy the rhythm or the imagery. Teachers have used rhymes to help children learn counting for well over a hundred years, and there are many traditional counting rhymes, some of which are used in playing games to choose team members.

## Develop Subitizing Skills by Relating Numbers and Objects

Lessons



**Counting Mat** For these lessons, the Counting Mat is a workspace for structured work in exploring numbers. Through Lesson 9, children work with numbers from 1 through 5, and in Lesson 11, they begin to work with numbers from 1 through 10. A Counting Mat can be anything that contains a child's tools and work. For these activities, the mat may be a large piece of paper, a large box, or some kind of tray. The materials are Number Tiles 1–5 and red and blue Square-Inch Tiles, which may be paper cutouts from the Student Activity Book or manipulatives from the *Math Expressions* materials kits.

The first two parts of this activity structure include:

- Getting started by placing the Number Tiles in order at the top of the mat with the Square-Inch Tiles at the bottom of the mat.
- Hearing a spoken number word and identifying the corresponding Number Tile and showing a quantity of Square-Inch Tiles that match that number.

Then continue with the other parts of the activity structure by asking children to relate quantities, mental images, and words. These activities are in the next six parts of the activity structure:

- Relating visual quantity to fingers, sounds, and body motions.
- Practicing visual imagery.
- Describing, copying, and changing arrangements of objects.
- Seeing partners of numbers.

These activities all contribute to the development of math language and vocabulary, understanding conservation of number, and seeing partners of a number, an important aspect of conceptual subitizing.

As children use the blue and red Square-Inch Tiles to represent a number, they first see the group of tiles as a collection (perceptual subitizing), and then they see the red and blue tiles as subcollections (conceptual subitizing). These parts of the activity help children transition from perceptual to conceptual subitizing.

These activities also develop the skills of understanding the relationship between numbers and quantities and of connecting counting to cardinality. Begin to help children understand that the number of objects is the last number word used, not the sequence of counting numbers used.

**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”).

## Add and Subtract Within 5

### Lessons

**7****9****11****12****13****15****17**

**Using Objects** A ninth part is added to the Counting Mat activity structure in Lesson 7. Children will form two groups of Square-Inch Tiles and then put them together to add, or they will form one group of Square-Inch Tiles and take some away to subtract. Informal language for adding and subtracting is introduced and supported by use of sounds, such as claps or animal sounds, to represent the addition or subtraction situation.

As children connect the objects, the words, and the actions, they enhance their ability to subitize, first perceptually and then conceptually. Emphasize this ninth part of the activity in all Counting Mat activities throughout the rest of the unit.

**Using Fingers and Pictures** In Lesson 14, introductory work with addition and subtraction is extended to using fingers to represent the addition or subtraction situation and to using addition or subtraction to solve story problems represented by pictures. Children learn through these activities that there are many ways to represent a number or a problem situation.

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

**Working within 5** Focusing attention on small groups in adding and subtracting situations can help students move from perceptual subitizing to conceptual subitizing in which they see and say the addends and the total, e.g., “Two and one make three.”

## Identify Shapes

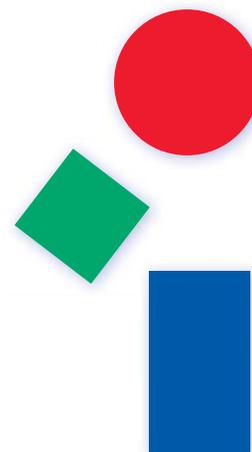
Lessons

8

10

18

The Kindergarten Common Core State Standards ask that children identify and describe two-dimensional shapes both in the environment and lying in a plane. The lessons in this unit focus on identifying circles, rectangles, and squares in the real world, drawing circles, identifying attributes of rectangles, classifying shapes, and describing positions. The emphasis on recognizing these shapes in the children's world is key to helping children see that all mathematics is used to describe and work on real-world problem situations.



## Compare by Matching

Lessons

9

11

12

13

15

17

**Comparing Mat** Representing numbers with Square-Inch Tiles on the Comparing Mat gives children a structured way to compare two numbers by matching. At first, children will match the objects to compare and later will use their understanding of the counting sequence to compare the numbers that represent each quantity by recognizing which number is farther along in the sequence.

The Comparing Mats are designed so that children can compare sets of objects either in vertical columns or in horizontal rows. This helps them build their ability to compare by visualizing. You may use the term *tower* instead of “column” to make the concept more accessible to children.

The mats use a picture graph format, thus providing a one-to-one correspondence between the numbers on the scales and the objects placed on the spaces above the numbers.

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

**From comparison by matching to comparison by numbers to comparison involving adding and subtracting** The standards about comparing numbers focus on students identifying which of two groups has more than (or fewer than, or the same amount as) the other. Students first learn to match the objects in the two groups to see if there are any extra and then to count the objects in each group and use their knowledge of the count sequence to decide which number is greater than the other (the number farther along in the count sequence).

## Write 1, 2, 3, 4, and 5

Lessons

12

14

16

In Kindergarten, the Common Core State Standards ask that children write numbers from 0 to 20. In this unit, children begin with the numbers that they have explored and represented in many ways—the numbers from 1 through 5. To support their work in this endeavor, children first draw numerals in the air and describe both the process and the shape of the numeral. This helps them visualize and associate the numeral with the number name.

Lessons

15

17

## Apply Skills

In this unit, children have used several activity structures to guide their exploration of counting numbers from 1 through 10 and relationships among the numbers in that counting range. In these two lessons, children apply what they have learned to new situations. They are asked to demonstrate both cardinality and perceptual subitizing by identifying and circling groups of a given number of objects and to demonstrate their understanding of the counting sequence by connecting dots to show order of numbers. To do this, children must bring together what they have learned and apply these skills to new situations.

*from* THE PROGRESSIONS FOR  
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AND CARDINALITY AND  
OPERATIONS AND ALGEBRAIC  
THINKING

Counting and Cardinality and Operations and Algebraic Thinking are about understanding and using numbers. ... From its very beginnings, this Progression involves important ideas that are neither trivial nor obvious; these ideas need to be taught, in ways that are interesting and engaging to young students.