

Getting Ready to Teach Unit 7

Learning Path in the Common Core Standards

In this unit, children will learn about arrays and equal shares and solve problems involving the addition and subtraction of lengths.

Visual models and real world situations are used throughout the unit to help children understand important fraction and measurement concepts.

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 the error. Common errors are presented in the Puzzled Penguin feature in the following lessons:

- ▶ **Lesson 2:** Not showing equal shares
- ▶ **Lesson 5:** Looping the numbers on a number line diagram instead of the lengths

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 this term:

- number line diagram

See the *Teacher Glossary*.



Lessons

1

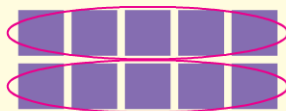
2

Equal Shares

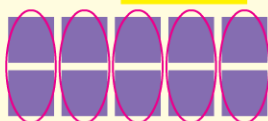
Some Common Core State Standards for Operations and Algebraic Thinking (2.OA.3, 4), Measurement and Data (2.MD.1), and Geometry (2.G.2, 3) connect ideas about making arrays and dividing rectangles with the understandings needed for work with area, multiplication, and fractions in Grade 3. These two lessons are rich in mathematical concepts, so encourage children to share, question, and explain freely.

Arrays Children use Square-Inch Tiles to make arrays. They learn to break an array apart into rows or into columns and can find the total number of squares in the array by counting in various ways or by using addition equations.

1. Loop the **rows**.



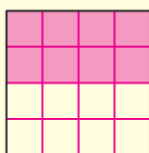
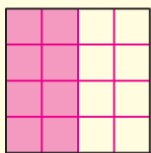
2. Loop the **columns**.



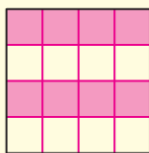
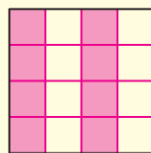
Children then measure rectangles to partition them into rows and columns of same-size squares and count to find the total number of squares. They use divided rectangles to show halves, thirds, and fourths and see that they can divide the rectangles into these fractions in different ways. As much as possible, encourage children to discuss the different ways and to discover that all ways represent the same part of the rectangle—a half, a third, or a fourth.

Measure in centimeters. Draw rows and columns.

13. Shade to show halves two different ways.



14. Shade to show fourths two different ways.



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

The Progression in Operations and Algebraic Thinking deals with the basic operations—the kinds of quantitative relationships they model and consequently the kinds of problems they can be used to solve as well as their mathematical properties and relationships.

Paper Folding By using this tactile and kinesthetic approach to working with equal shares, children develop a intuitive feeling for working with fractions in later grades.

Using circles and rectangles, children fold to make equal shares. They see that making halves and fourths is relatively easy, but making thirds presents them with a mathematical problem. Let children try their own ideas for doing this before guiding them to find a way as described in Lesson 2.

Making Drawings After the paper folding explorations, children are asked to draw lines in shapes to make equal shares. Again they should discover through their discussion of their work that a whole can be divided into equal shares in many ways and that all the ways do not consist of the same shapes.

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

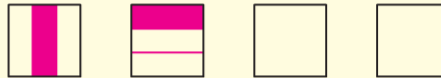
Although most of the standards organized under the OA heading involve whole numbers, the importance of the Progression is much more general because it describes concepts, properties, and representations that extend to other number systems, to measures, and to algebra.

4. Make 2 equal shares. Show different ways. Shade half of each square.

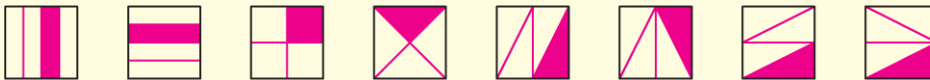


Children may shade any equal share.

5. Make 3 equal shares. Show different ways. Shade a third of each square.



6. Make 4 equal shares. Show different ways. Shade a fourth of each square.



Children may shade any fourth.

Working with arrays and equal shares in these ways prepares children for the area, multiplication, and fraction concepts they will learn in Grade 3.

Length Word Problems

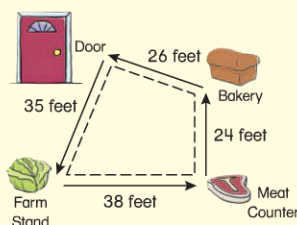
Lessons

3
4
5

Word Problems As children solve the word problems involving lengths in these lessons, they learn that using or making a drawing can help them understand what to do to solve the problem. They see that their answers must be labeled with the appropriate unit. They should also recognize that to solve these problems involving measures they can use the same problem-solving approaches they have used throughout the year.

3. Here is the route a customer takes while shopping at the store. How far does the customer walk altogether?

123 feet
unit



This informal introduction to perimeter prepares children for the more formal approach in Grade 3. Use the term *distance around* rather than *perimeter* when discussing these problems.

Number Line Diagrams

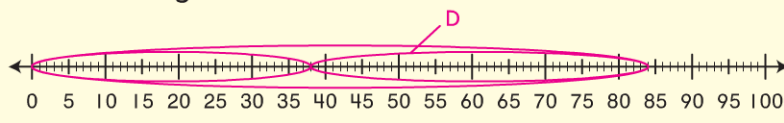
Lessons

3
5

Number Line Diagrams Children learn that addition and subtraction can be represented on a number line diagram.

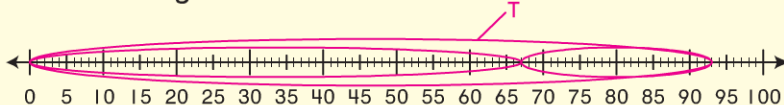
15. Loop 38 and 84. Loop the difference D .

How long is it? 46 units



16. Loop 67. Add 26 to it. Loop the total T .

How long is it? 93 units



from THE PROGRESSIONS FOR THE COMMON CORE STATE STANDARDS ON NUMBER AND OPERATIONS IN BASE TEN

Use place value understanding and properties of operations to add and subtract Students become fluent in two-digit addition. Representations such as manipulative materials and drawings may be used to support reasoning and explanations about addition with three-digit numbers.

Children relate number line diagrams to rulers but must understand that the distance between two numbers on a number line is not an actual unit of length. It is important that children learn how to represent these computations on a number line diagram, but they will likely find it easier to use one of the computation methods they have learned this year rather than using a number line diagram to find a total or a difference.

Focus on Mathematical Practices

Lesson

6

The Standards for Mathematical Practice are included in every lesson of this unit. However, the last lesson in every unit focuses on all eight Mathematical Practices. In this lesson, children apply what they have learned about equal shares to solve problems about nautical flags and to design their own flags.

