



## Unit Plan

## 3.1 Introducing Multiplication

Chester / Littleville Elementary / Grade 3 / Mathematics

[↗](#) Week 1 - Week 5 | 4 Curriculum Developers[Style Guide](#)

## What is the purpose of the unit? What are the major take-aways?

## Standards

**MA: Mathematics (2017)****MA: Grade 3****Operations & Algebraic Thinking****3.OA Represent and solve problems involving multiplication and division.**

- 4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. [Show Details](#)
- 1. Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. [Show Details](#)
- 3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities. [Show Details](#)

**3.OA Understand properties of multiplication and the relationship between multiplication and division.**

- 5. Apply properties of operations to multiply. [Show Details](#)

**3.OA Multiply and divide within 100.**

- 7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that  $8 \times 5 = 40$ , one knows  $40 \div 5 = 8$ ) or properties of operations. By the end of Grade 3, know from memory all products of two single-digit numbers and the related division facts. For example, the product  $4 \times 7 = 28$  has related division facts  $28 \div 7 = 4$  and  $28 \div 4 = 7$ .

**3.OA Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

- 9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. [Show Details](#)

**Measurement & Data****3.MD Represent and interpret data.**

- 3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. [Show Details](#)

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## Enduring Understandings

## Essential Questions

- Interpret scaled picture and bar graphs.
- Represent data using scaled picture and bar graphs.
- Solve one- and two-step story problems using addition and subtraction.

- Represent and solve multiplication problems involving equal groups.
- Understand multiplication in terms of equal groups.
- Represent and solve multiplication problems involving arrays.

## Content

In this unit, students interpret and represent data on scaled picture graphs and scaled bar graphs. Then, they learn the concept of multiplication.

This is the first of four units that focus on multiplication. In this unit, students explore scaled picture graphs and bar graphs as an entry point for learning about equal-size groups and multiplication.

In grade 2, students analyzed picture graphs in which one picture represented one object and bar graphs that were scaled by single units. Here, students encounter picture graphs in which each picture represents more than one object and bar graphs that were scaled by 2 or 5 units. The idea that one picture can represent multiple objects helps to introduce the idea of equal-size groups.

Students learn that multiplication can mean finding the total number of objects in a groups of  $b$  objects each, and can be represented by  $a \times b$ . They then relate the idea of equal groups and the expression  $a \times b$  to the rows and columns of an array. In working with arrays, students begin to notice the commutative property of multiplication. In all cases, students make sense of the meaning of multiplication expressions before finding their value, and before writing equations that relate two factors and a product.

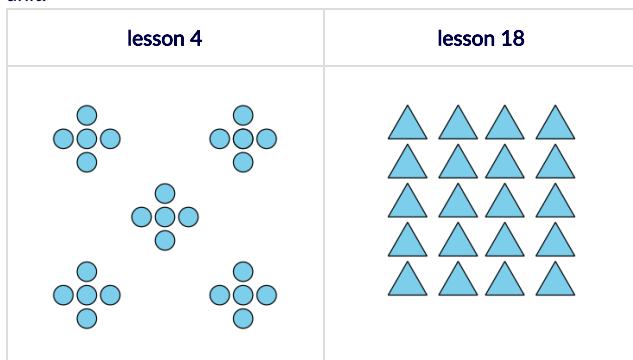
Later in the unit, students see situations in which the total number of objects is known but either the number of groups or the size of each group is not known. Problems with a missing factor offer students a preview to division.

Throughout the unit, provide access to connecting cubes or counters, as students may choose to use them to represent and solve problems.

Throughout the unit

Students work toward fluency in multiplying by 2, 5, and 10. The How Many Do You See routine is used to encourage students to look for equal groups. It prompts students to subitize a group of dots as one unit, see the iterations of the groups, and skip-count to say the total number of dots they see in the image. This routine progresses from dots to drawings of equal groups to array formations.

Here is a sampling of the How Many Do You See warm-ups in the unit.



Number Talks are likewise designed to help students build fluency with equal groups and multiplication expressions. The sequence of expressions encourages students to relate multiplication to skip-counting. For example, in the sequence  $1 \times 10$ ,  $2 \times 10$ ,  $3 \times 10$ ,  $4 \times 10$ ,

## Skills

### Section A Goals

- Interpret scaled picture and bar graphs.
- Represent data using scaled picture and bar graphs.
- Solve one- and two-step story problems using addition and subtraction.

### Section B Goals

- Represent and solve multiplication problems involving equal groups.
- Understand multiplication in terms of equal groups.

### Section C Goals

- Represent and solve multiplication problems involving arrays.

students can discover that the products increase in the same way as in skip-counting by 10. Some Number Talks elicit students' understanding of addition and subtraction within 100 in preparation for the work in an upcoming unit.

Here is a sampling of the Number Talk warm-ups in the unit.

lesson 5	lesson 15	lesson 19	lesson 20
$2+2+2+2$	$1\times 10$	$10\times 2$	$70-10$
$2+2+2+2+2+2+2+2$	$2\times 10$	$9\times 2$	$68-10$
$5+5+5+5$	$3\times 103\times 10$	$8\times 28\times 2$	$70-12$
$5+5+5+5+5+5+5+5$	$4\times 104\times 10$	$7\times 27\times 2$	$68-12$

## How will you gauge student learning?

### Assessments

#### 3.1 End of Unit Assessment | Summative | Written Test

[Grade3-1-End-of-Unit-Assessment-assessment.pdf](#)

4 State Standards Assessed

## How will students learn?

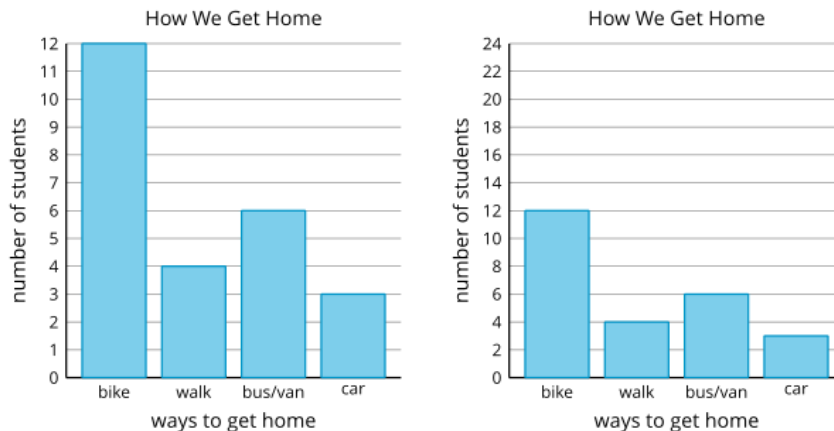
### Learning Activities

#### Section A:

In this section, students interpret and draw picture graphs and bar graphs to represent data, building on their experience with data representation and with skip-counting by 2, 5, and 10 in grade 2.

Students see that each picture in a picture graph and each line or increment in a bar graph can represent more than one object. They work with familiar number scales of 2, 5, and 10.

#### bar graph scaled bar graph



Students use the information in scaled bar graphs to solve one- and two-step "how many more" and "how many fewer" problems within 100. This work allows teachers to formatively assess students' fluency with addition and subtraction within 100, a grade 2 expectation.

#### Section B:

In this section, students make sense of multiplication in terms of equal groups of objects. They use discrete drawings and tape diagrams that show equal groups to represent multiplication, and then relate these representations to expressions such as  $3\times 23\times 2$ , interpreting them to mean "3 groups of 2."



2	2	2
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Note that expressions of the form  $a \times b$  could be interpreted to mean  $a$  groups of  $b$  or  $b$  groups of  $a$ . Because we tend to say “\_\_\_ groups of \_\_\_” when referring to equal groups, however, in these materials we write multiplication expressions in that order:

number of groups  $\times$  size of each group

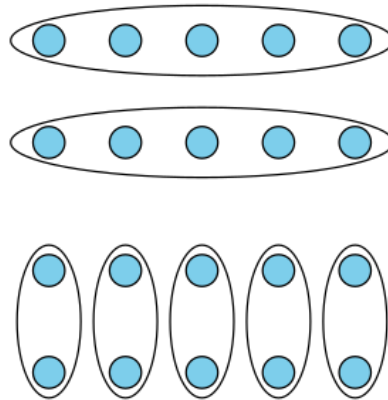
It is not necessary for students to use this convention as long as they can explain what each number in their expression represents.

Later, students write equations to represent multiplication situations and find unknown products or factors. In reasoning about the latter, they begin to make sense of the relationship between multiplication and division, without formally using the language of division.

#### Section C:

In this section, students relate the idea of equal groups to the structure of an array, a representation introduced in grade 2.

Students see that the rows and columns of an array represent equal groups. The number of rows (or columns), the number of items in each row (or column), and the total number of objects in an array can therefore be represented with a multiplication equation. The equations may involve an unknown value, be it one of the factors or the product. As students reason about arrays, they also notice that multiplication is commutative.




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Differentiated Instruction

Technology Integration

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21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

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Resources

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Teacher Notes and Reflections

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