3rd

Topic 7: Meaning of Division

Lessons 1-6

MDIS:

7-1 B57
7-2 B57
7-3 A76
7-4 E26, E27
7-5 B58
7-6 E22

Guided Practice

- Students experiencing difficulty in understanding the meaning of division will benefit from numerous opportunities designed to reinforce understanding of division as sharing.
- Provide students with opportunities using tactile objects to reinforce dividing a whole number into equal groups. As you demonstrate, use terminology such as divide, division, and equal groups.

Reinforce

Envision Math Games:

Topic Game: NA

envision Online Games
Dividing by one digit divisors
Division concepts
Math facts practice
Using objects to divide
Abra-ca-rabbits
Relationships
Find a rule

Symbaloo

Assessments

3rd

Topic 7: Meanings of Division

Lesson 7-1

Division as Sharing

Quick and Easy Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Students will use models to solve division problems involving sharing and record solutions using division number sentences.	Some real-world problems involving joining or separating equal groups or comparison can be solved using division. Sharing involves separating equal groups and is one way to think about division.	**division**	Two-color counters (Teaching Tool 17); Teaching Tool 41

PROFESSIONAL DEVELOPMENT

Math Background

Research says ... instruction that uses situations from daily life helps children develop a better understanding of **division** (Kouba & Franklin, 1993). In this lesson, children work with various real-life examples of division. Sharing is one way to think about division.

In sharing division, students are given a total number of items and the number of equal groups.

Five friends are sharing 40 crackers equally. How many crackers will each friend get?

Students model division by dividing the items into equal groups, then counting the number of items in each group.

There are 8 in each group, so 40 ÷ 5 = 8. Each friend gets 8 crackers.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that sharing equally means that each person or group has the same number of items or objects.

Exercise 4

Error Intervention

If students think 5 children can equally share 12 grapes,

then ask: *If you place one grape at a time into 5 groups, how many are left over?* [2 grapes] *What happens if you try to put those two grapes into some of the groups?* [Two children will have more grapes than the others.]

Reteaching Demonstrate for students how to show 24 pencils shared equally among 6 students. Ask how many pencils each student has. For another example and more practice, assign **Reteaching** Set A on p. 184.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Represent and solve problems involving multiplication and division.

Standard

3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. . . . Also, **3.OA.3, 3.OA.4**

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
- ○ Reason abstractly and quantitatively.
- ✔ Construct viable arguments and critique the reasoning of others.
- ✔ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ○ Attend to precision.
- ○ Look for and make use of structure.
- ○ Look for and express regularity in repeated reasoning.

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Topic 7: Meanings of Division

Lesson 7-2

Division as Repeated Subtraction

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will use models to solve division problems involving repeated subtraction and record solutions using division number sentences.	Some real-world problems involving joining or separating equal groups or comparison can be solved using division. Repeated subtraction involves separating equal groups and is one way to think about division.		Two-color counters (Teaching Tool 17)

PROFESSIONAL DEVELOPMENT

Math Background

Repeated subtraction is another way to think about division. Students are given a total number of items and the number in each group. They model division by repeatedly subtracting a group of objects, then counting to find the number of groups.

Liz has 28 blocks. She can build a wall with 7 blocks. How many walls can she build?

One way to solve this problem is to subtract groups of 7 from 28 until you reach 0. There are 4 groups of 7 in 28, so 28 ÷ 7 = 4.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that repeated subtraction of the number of objects or items in each group will help them find the number of groups.

Exercise 4

Error Intervention

If students stop after the first subtraction and give that difference as the answer,

then ask: *How many are left after subtracting 1 group of 4?* [16] *How many are left after subtracting another group of 4?* [12] *Continue subtracting groups of 4 until the difference is 0. How many groups of 4 did you subtract?* [5 groups]

Reteaching Show students how to use repeated subtraction to solve the following problem: Simon has 27 carrots to serve at a picnic. If each person eats 3 carrots, how many people can Simon serve? For another example and more practice, assign **Reteaching** Set A on p. 184.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Represent and solve problems involving multiplication and division.

Standard

3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. . . .
Also **3.OA.3, 3.OA.4**

Mathematical Practices

- ○ Make sense of problems and persevere in solving them.
- ✔ Reason abstractly and quantitatively.
- ○ Construct viable arguments and critique the reasoning of others.
- ✔ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ✔ Attend to precision.
- ○ Look for and make use of structure.
- ○ Look for and express regularity in repeated reasoning.

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Topic 7: Meanings of Division

Lesson 7-3

Finding Missing Numbers in a Multiplication Table

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will use multiplication tables to find answers to division problems.	Any division problem can be thought of as a multiplication fact showing a missing factor. Then, an answer can be found using a multiplication table.		Multiplication table (Teaching Tool 9)

PROFESSIONAL DEVELOPMENT

Math Background

Multiplication and division are inverse operations. In their most elementary meaning, they both involve a number of groups, a number in each group, and a total number.

Number of groups × Number in each group = Total Number

With a multiplication fact, both the number of groups and the number in each group are usually known, but the total number needs to be found. With division, **either** the number of groups **or** the number in each group and the total number are usually known. The unknown number needs to be found.

As a result of this relationship, a table that shows all of the multiplication facts can be used to find division facts. Just locate the known factor in the first column, go across the row until you find the product that you know, and then look to the top of that column to see the unknown factor.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that they can think of the result of the division as a factor missing from a multiplication sentence. To find the answer to the division problem, they need to find in the multiplication table the factor missing from the multiplication sentence.

Exercise 1

Error Intervention

If students are having difficulty tracking the numbers in the rows across the table,

then suggest that they place a ruler along the bottom of the row they are tracking.

Reteaching Have students use a multiplication table to find 3 × 4. Then have them use the table to find 12 ÷ 3 and 12 ÷ 4. For another example and more practice, assign **Reteaching** Set B on p. 184.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Understand properties of multiplication and the relationship between multiplication and division.

Standard

3.OA.6 Understand division as an unknown-factor problem. . . .
Also **3.OA.4, 3.OA.9**

Mathematical Practices

- ○ Make sense of problems and persevere in solving them.
- ✔ Reason abstractly and quantitatively.
- ✔ Construct viable arguments and critique the reasoning of others.
- ○ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ○ Attend to precision.
- ✔ Look for and make use of structure.
- ○ Look for and express regularity in repeated reasoning.

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Topic 7: Meanings of Division

Lesson 7-4

Problem Solving: Choose an Appropriate Equation

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will solve word problems by writing equations that represent the problem situations.	Frequently word problems can be solved by writing equations that represent the quantitative relationships involved.		

PROFESSIONAL DEVELOPMENT

Math Background

Students have learned how to use the problem-solving strategy ***Draw a Picture*** to show information given in a problem. In this lesson, students will learn how to use the strategy ***Write an Equation***. This strategy requires students to use their understanding of each of the four basic arithmetic operations to identify the essence of given real-world situations and to establish the relationships among the quantities involved. They should use the following ideas to help them do that.

Addition and Subtraction

Add to

Take from

Put together/Take apart

Compare

Multiplication and Division

Equal groups

Moreover, students should be beginning to feel comfortable with the "unknown" number in any equation being in any position.

$8 \times n = 24$, $4 = 32 \div n$, $4 \times 3 = n$

2 Guided Practice

MATHEMATICAL PRACTICES

The problem-solving strategies ***Draw a Picture*** and ***Write an Equation*** can be helpful in determining which equation to choose to solve a problem. To review these strategies, refer students to the Problem-Solving Handbook.

Exercise 2

Error Intervention

If students are having difficulty writing a different equation that could be used to solve Problem 1

then ask: *You know the total and the number in each group. How can you find the number of groups?* [You could divide.] *Write a division equation to represent the situation.* [$20 \div 4 = n$]

For another example and more practice, assign **Reteaching** Set C on p. 184.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Represent and solve problems involving multiplication and division.

Standard

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. . . .
Also **3.OA.6**

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
- ✔ Reason abstractly and quantitatively.
- ○ Construct viable arguments and critique the reasoning of others.
- ○ Model with mathematics.
- ○ Use appropriate tools strategically.
- ○ Attend to precision.
- ✔ Look for and make use of structure.
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Topic 7: Meanings of Division

Lesson 7-5

Writing Division Stories

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will write and solve number stories involving division.	Some real-world problems involving joining or separating equal groups or comparison can be solved using division. Sharing and repeated subtraction both involve separating equal groups and are two ways to think about division.		Two-color counters (Teaching Tool 17); division sentence cards (*1 per group*)

PROFESSIONAL DEVELOPMENT

Math Background

In this lesson, students learn to recognize situations in which division can be used to find the number of equal groups or the number in each group. As students write a division story, they are demonstrating their understanding of the meaning of division. Ask them to think about why their problem can be solved using division.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Represent and solve problems involving multiplication and division.

Standard

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities,...
Also **3.OA.4**

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
- ✔ Reason abstractly and quantitatively.
- ✔ Construct viable arguments and critique the reasoning of others.
- ✔ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ○ Attend to precision.
- ○ Look for and make use of structure.
- ✔ Look for and express regularity in repeated reasoning.

2 Guided Practice

MATHEMATICAL PRACTICES

Remind students that a number can be divided by the number of groups or the number of objects in each group.

Exercise 5

Error Intervention

If students cannot explain how the stories are different,

then ask: ***How many groups and how many objects are in each group for Mike's and Kia's stories?*** [Mike's story is about 3 groups (vases) of 5 roses each. Kia's story is about 5 groups (vases) of 3 roses each.] ***Which type of division does each story show?*** [Mike's story shows sharing; Kia's story shows repeated subtraction.]

Reteaching Tell two different division stories for 24 ÷ 8 = ? One should show sharing and one should show repeated subtraction. Then use each method to solve the problem. For another example and more practice, assign **Reteaching** Set D on p. 185.

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Topic 7: Meanings of Division

Lesson 7-6

Problem Solving: Use Objects and Draw a Picture

Quick and Easy **Lesson Overview**

Objective	Essential Understanding	Vocabulary	Materials
Students will solve problems by using objects and drawing a picture.	Information in a problem can often be shown by using objects to act it out or by using a picture or diagram in order to understand and solve the problem.		Teaching Tool 42; Two-color tiles (Teaching Tool 16)

PROFESSIONAL DEVELOPMENT

Math Background

Students have learned how to use objects to act out situations in earlier grades and how to use models to add, subtract, multiply, and divide numbers. In this lesson, students will learn how to use the companion strategy of ***Draw a Picture.***

This strategy helps students move from using concrete models to act out situations to drawing and using pictures. Students have learned how to use the problem-solving strategy of *Draw a Picture* for problems that can be solved using addition or subtraction. Here, students will continue their learning about the *Draw a Picture* strategy and advance their understanding for problems that can be solved using multiplication and division.

In this lesson, students will use objects and draw pictures to complete arrays. They are given information about the number of rows and the total number of units. After modeling the given information, students find that they can use their knowledge of equal groups to complete the arrays and solve the problems.

2 Guided Practice

MATHEMATICAL PRACTICES

The problem-solving strategies ***Use Objects*** and ***Draw a Picture*** can be helpful in showing information and completing figures to solve a problem. To review this strategy, refer students to the Problem-Solving Handbook.

Exercise 1

Error Intervention

If students are having difficulty completing the tile floor,

then help students find the needed information to solve the problem. ***What information about the tile floor can you show with objects or a drawing?*** [You can see 4 rows with 1 tile in each row.] ***What do you know about the whole floor?*** [The tile floor is in the shape of a square. There are 16 tiles total.] ***What do you know about squares?*** [The length of each side is the same.] ***So how many tiles should there be in each row?*** [4 tiles]

Reteaching For another example and more practice, assign **Reteaching** Set E on p. 185.

Common Core

Domain

Operations and Algebraic Thinking

Cluster

Represent and solve problems involving multiplication and division.

Standard

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities,... Also **3.OA.4, 3.OA.6**

Mathematical Practices

- ✔ Make sense of problems and persevere in solving them.
- ○ Reason abstractly and quantitatively.
- ✔ Construct viable arguments and critique the reasoning of others.
- ✔ Model with mathematics.
- ✔ Use appropriate tools strategically.
- ○ Attend to precision.
- ✔ Look for and make use of structure.
- ○ Look for and express regularity in repeated reasoning.