MA.3.AR.2.1

Overarching Standard: MA.3.AR.2 *Develop an understanding of equality and multiplication and division.*

Benchmark of Focus

MA.AR.2.1: Restate a division problem as a missing factor problem using the relationship between multiplication and division.

Example: The equation $56 \div 7 = ?$ can be restated as $7 \times ? = 56$ to determine the quotient is 8.

Benchmark Clarifications:

Clarification 1: Multiplication is limited to factors within 12 and related division facts.

Clarification 2: Within this benchmark, the symbolic representation of the missing factor uses any symbol or a letter.

Related Benchmark/Horizontal Alignment
- MA.3.NSO.2.2/2.4
- MA.3.AR.1.2

Vertical Alignment

Previous Benchmarks	**Next Benchmarks**
MA.1.AR.2.1	MA.4.AR.2.1
MA.2.AR.2.1	

Terms from the K-12 Glossary
- equation
- factor

Purpose and Instructional Strategies
The purpose of this benchmark is to build students' fluency with division facts by relating them to known multiplication facts. Division is often more challenging for students than multiplication, so relating division to multiplication helps to determine quotients. Students learned a similar strategy when relating subtraction to addition in Grade 1 (MA.1.AR.2.1).

- Instruction should have students build and use fact families to relate division and multiplication equations. It is important for students to understand that multiplication and division are inverse operations. During instruction, students should have practice with solving and explaining division problems that can also be represented as an unknown factor in multiplication problems (MTR.3.1, MTR.5.1).

- To help students understand the relationships between division problems and unknown factor problems conceptually (and to build understanding about fact families), teachers should utilize arrays that show 4 related multiplication and division facts. In addition to arrays, instruction of this standard pairs well with MA.3.AR.1.2 while students solve one- and two-step real-world problems. When students translate problem contexts to division equations,

this benchmark helps students find solutions (MTR.3.1, MTR.5.1).

Common Misconceptions or Errors
- Students may have difficulty understanding that the quotient of a division equation will become a factor in a multiplication equation. Allowing students to use an array model and/or reinforcing fact families may help to clarify the relationship.

Strategies to Support Tiered Instruction
- Instruction includes opportunities to use array models to practice relating multiplication and division as inverse operations. The teacher shows an array model and guides students to identify the factors and the product, having them assist in writing the corresponding equation. The teacher guides students to complete the fact family using prompts as needed, reminding them that multiplication and division are inverse operations. After practicing with several examples, students practice completing fact families without arrays, solving for an unknown factor.
  - For example, students draw an array model to show 3 X 7.

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    $$3 \times 7 = 21$$
    $$7 \times 3 = 21$$
    $$21 \div 7 = 3$$
    $$21 \div 3 = 7$$

  - For example, the students write the fact family and solve for $42 \div 6$.

$42 \div 6 =$	$42 \div 6 = 7$
$42 \div \_\_ = 6$	$42 \div 7 = 6$
$6 \times \_\_ = 42$	$6 \times 7 = 42$
$\_\_ \times 6 = 42$	$7 \times 6 = 42$

- Teacher provides opportunities to use manipulatives to practice relating multiplication and division as inverse operations. The teacher guides students to develop a model using manipulatives (e.g., counters or base-ten blocks) and uses explicit instruction and questioning to help students to identify the related equation. Additionally, the teacher guides students to complete the fact family using explicit instruction, verbal prompts and nonverbal cues while reminding students that multiplication and division are inverse operations. After practicing with several examples, students practice completing fact families without arrays, solving for an unknown factor with the support of number cards.

- For example, the teacher uses counters to show an array to represent 4 × 8 and asks guiding questions to help students build the array. With prompting, the teacher guides students to identify the product and write the complete fact family.

$$4 \times 8 = 32$$

$$8 \times 4 = 32$$

$$32 \div 8 = 4$$

$$32 \div 4 = 8$$

- For example, students use number cards to rearrange equations to create all four parts to the fact family and solve for a missing factor. Students may also write on notecards for this activity. One card should have the multiplication symbol on one side and the division symbol on the other. The teacher uses a blank card for the missing factor until the students solve. Students move each card to a different location to build the entire fact family and record each equation on a sheet of paper or mini white board as they manipulate the cards.

Questions to ask students:

- As students are solving division problems, ask students how they could use multiplication to solve a division problem.

  - Sample answer that indicates understanding: *I know that 4 × 8 = 32 so, 32 ÷ 4 = 8. I can use multiplication facts to solve division problems, because they are inverse/opposite operations. In division I know the total and I am trying to solve for the number of groups or things in each group, and in multiplication I know the number of groups and things in each group, but I am trying to find the total.*

- Ask students how they could represent a division problem as a multiplication equation with a missing factor.

  - Sample answer that indicates understanding: *To solve 32 ÷ 4 = n, I could use the equation 4 × n = 32.*

Instructional Tasks

Instructional Task 1

Part A. Write a multiplication equation that can be used to find the quotient 48 ÷ 12. Use n to represent the unknown factor.

Part B. What is the quotient?

Instructional Items

Instructional Item 1

Which of the following equations can be used to find the quotient $72 \div 8$?

    a. $8 \times ? = 72$

    b. $72 \times 8 = ?$

    c. $72 - 8 = ?$

    d. $? + 8 = 72$

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.3.AR.2.1 Restate a division problem as a missing factor problem using the relationship between multiplication and division. Example: The equation 56 ÷ 7 =? can be restated as 7 ×? = 56 to determine the quotient is 8. Clarification 1: Multiplication is limited to factors within 12 and related division facts. Clarification 2: Within this benchmark, the symbolic representation of the missing factor uses any symbol or a letter	Mathematical	N/A

ALD 2	ALD 3	ALD 4	ALD 5
estates multiplication equations to solve division problems with unknown factors where one of the factors is 1, 2, or 5. determines the unknown whole number in a multiplication or division equation when the unknown number is the product or quotient (where one of the factors is 1, 2, or 5).	restates a division problem as a missing factor problem using the relationship between multiplication and division where the factors are less than or equal to 10. determines the unknown whole number in a multiplication or division equation when the unknown number is the multiplier or divisor.	restates a division problem as a missing factor problem using the relationship between multiplication and division. determines the unknown whole number in a multiplication or division equation, relating three whole numbers, with the unknown in any position.	N/A

Additional Resources:

[CPALMS Resources](#)

[Khan Academy Video: Relating Division to Multiplication](#)

Resources/Tasks to Support Your Child at Home:

When presenting your child with a division problem, try to ask problems related to multiplication facts they are already familiar with. Ask them to identify a multiplication fact that could help them find the missing number of groups or items in each group.

Ask your child to represent division problems with a division equation and as a multiplication equation with an unknown factor. This will encourage your child to think about how they can use multiplication facts to efficiently solve division problems.

[Learnzillion: Interpret Division as an Unknown Factor Problem Using Arrays](#)

[Learnzillion: Understand Multiplication and Division Relationships](#)