



Build Expressions

Grade 3

Multiplication and Division Relationships

3 levels

Probing Questions

- How does this symbol relate to which way you move the cursor?
- What do these groups represent?

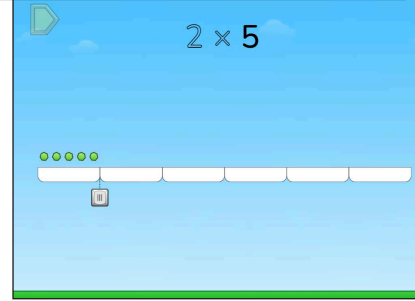
What's Important Here?

Paired problems throughout this game illustrate the inverse relationship between multiplication and division. Projecting the games and drawing this out in class will help students solidify this understanding.

The Bigger Picture

Using small numbers helps students focus on the inverse relationship of multiplication and division rather than on computing answers.

This version of the game focuses on the difference between multiplication and division.



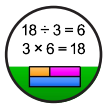
Using factors of 2, 3, 4, and 5 keeps the focus on relationships.



Multiplication and Division Relationships - 1

STMath.

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Multiplication Division Fact Family

Grade 3

Multiplication and Division Relationships

4 levels

Probing Questions

- What true equations can you write?
- What will you see in the animation?
- How will you decide which number to use first?

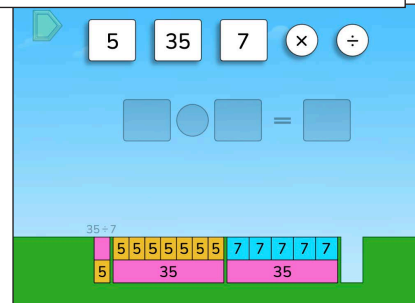
Research is Clear

Students tend to overgeneralize the commutative property and apply it to division. For example, while $a \times b = b \times a$, $a \div b \neq b \div a$.

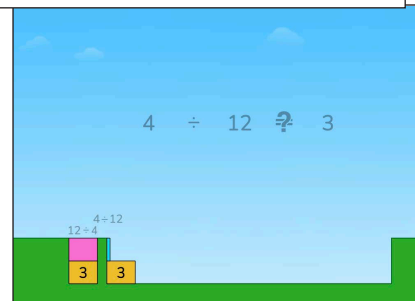
Supporting Struggling Students

Ask students to read the equations as they create them and to evaluate if it is viable. Use the scrub bar to pause and examine the model of their equation. This will help them understand the difference between $12 \div 3$ and $3 \div 12$.

Look at what has been completed to determine what equation is missing.



Examining errors helps students understand how to write division equations.



Multiplication and Division Relationships - 2

STMath.

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Answer Check

Grade 3

Multiplication and Division Relationships

4 levels

Probing Questions

- What is this game asking you to do?
- How do you determine which expression to use?

Classroom Connection

Lead a classroom discussion about inverse operations and how to use them to check answers.

Something to Think About

Students often have a conceptual understanding but have difficulty applying it. Frequent discussions can help students make those connections.

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Early levels offer just two choices.

$$5 \times 2 = 10$$

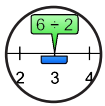
$$10 \div 2 \quad 10 \times 2$$

Answer choices require careful examination.

$$4 \times 5 = 20$$

$$20 \div 4 \quad 20 \times 5 \quad 20 \div 5 \quad 20 \times 4$$

Multiplication and Division Relationships - 3



Number Line Division

Grade 3

Multiplication and Division Relationships

4 levels

Probing Questions

- How will this problem be illustrated on the number line?
- How can knowing multiplication help you with division?

What's Important Here?

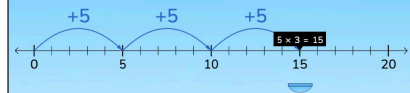
Calling out the paired problems might help students solve division as a missing factor problem. Project the puzzles and ask students to see how the two puzzles connect. Ask how knowing the multiplication can help with the division.

Something to Think About

Use the number line to show operations rather than just identifying numbers. Students can generate their own number line models of the expressions.

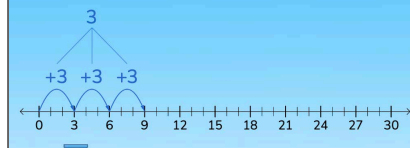
The animation shows multiplication as repeated addition.

$$5 \times 3$$



Discuss division as repeated subtraction.

$$9 \div 3$$



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Multiplication and Division Relationships - 4



Select Box

Grade 3

Multiplication and Division Relationships

4 levels

Probing Questions

- What does this puzzle ask you to find?
- How are you finding the unknown?

What's Important Here?

Levels 3 and 4 pair a missing factor problem with a division problem using the same numbers. Discuss these in class to help students deepen their understanding of the inverse relationship between the two operations.

What Strategies Are Being Used?

Some students may see the division as finding the number of groups rather than the size of the groups as shown in the animation. Encourage them to use whichever definition works best for them for the given problem.

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The unknown changes throughout this game.

3 × = 6

0 1 2 3 4 5 6 7 8 9

Levels 3 and 4 use paired problems.

6 ÷ 3

Multiplication and Division Relationships - 5