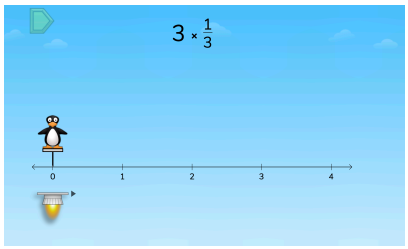
# PUZZLE TALK

**Fifth Grade** | **Fraction Multiplication** | **Unit Multiplication On the Number Line**

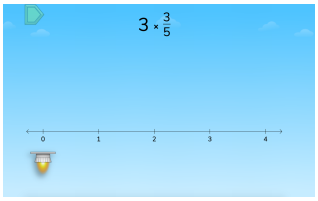
## Materials

Fractions Number Lines 3-5 Game Mat (0 to 5)
whiteboard, dry erase marker and
fraction tools such as fraction strips, Cuisenaire rods, etc.

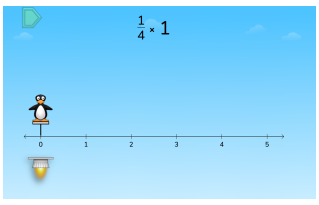
## Directions




- Give students a Fractions Number Lines 3-5 Game Mat (0 to 5), a whiteboard, dry erase marker and fraction tools, such as fraction strips, Cuisenaire rods, etc. Display the first puzzle from Level 1. Ask students, "What do you notice? Where do you think we need to place JiJi's rocket? Why?"
- Have students use the Fractions Number Lines 3-5 Game Mat (0 to 5) and work with a partner to use their math tools and determine where to place JiJi's rocket.
- Have a student share their solution. Ask, "What is happening in this equation? What size are the jumps JiJi makes? How many jumps does JiJi make?" (e.g., 6 x 1/3 would represent 6 groups of 1/3 or 6 jumps of 1/3 each). Try a student's solution and watch the feedback.
- Ask students to represent the feedback by writing a repeated addition sentence. Connect the whole number times a fraction repeated addition sentence (e.g., 1/3 + 1/3 + 1/3 + 1/3 + 1/3 + 1/3) to a whole number multiplication repeated addition sentence (e.g., 6 x 3 would be 3 + 3 + 3 + 3 + 3 + 3). Say to students, "This equation represents ___ groups of ___ (e.g., 6 groups of 1/3). Repeat with a few more puzzles from Level 1.




- Display the first puzzle in Level 2. Ask students, "How is this puzzle different from the ones in Level 1? If the fraction is the first number in the equation, how does that change the way we model this equation?"
- Have students Think, Pair, Share their ideas with a partner. Ask students to record JiJi's jumps on their number line and solve the puzzle.
- Share students' solutions and ask them about their strategy for solving the puzzle.
- Ask students, "What size are the jumps JiJi makes? How many jumps does JiJi make? How could we think about what is happening in this puzzle?" Share students' thinking.
- Say to students, "Does order matter when we multiply? In other words, is 5 x 6 equal to the same product as 6 x 5? How could we use the commutative property to solve this problem?"
- Have students share their ideas. Prove that the commutative property could be used (e.g., 1/3 x 6 is equal to the same product as 6 x 1/3).
- Display the next puzzle in Level 2. Say to students, "Another way to think about this puzzle as ___ of ___ (e.g., 1/3 x 5 is the same as 1/3 of 5). Model for students how to draw rectangles to represent the whole number and then partition each whole into the given fraction (e.g., for 1/3 x 5, draw 5 rectangles, partion each rectangle into thirds and shade in 1/3 of each rectangle). Ask students to use the model to find the product. Solve the puzzle and watch the feedback.
- Repeat with the remaining puzzles in Level 2 and a few puzzles in Level 3.




## Sample Questions

- What does this equation represent?
- What size jumps does JiJi make?
- How many jumps does JiJi make?
- How did you determine how to partition your number line?
- How could we represent this puzzle with a repeated addition sentence?
- How could we think of this equation as a division problem?
- How could we use the commutative property to help us solve this equation?
- What stratey did you use to solve this puzzle?

# PUZZLE TALK

| What to look for | How does the student:<br>• determine how to partition the number line?<br>• determine the size and number of jumps to make?<br>• represent an a/b fraction times a whole number on a number line?<br>• represent a whole number times an a/b fraction on a number line?<br>• use the commutative property as a strategy?<br>• explain an a/b fraction times a whole number problem as a division situation? |
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