



Grade 5 | Module 5

Topic: Solve problems involving dividing by fractions

[Module 5 Resources](#)

Students divide whole numbers by fractions and fractions by whole numbers. Use models and symbols to divide whole numbers by unit fractions. Explore the relationship between multiplying and dividing fractions.

Module 5 at a Glance

Printed Resources

- **Bookmarks**
 - Problem Solving Process Bookmark
 - Problem Solving Facilitation Bookmark
- **Problem Solving Journal** (pages 26-28)
 - My Thinking Path
 - Problem of the Day
- **Mini-Math Game Design Booklet**
- **ST Math Immersion Debriefing Bookmark**
- **Learning Showcase & Celebration Invitation**

Optional Printed Resources

- Accomplishments Log
- ST Math Activity Pages
- Post Assessment
- Pre/Post Quizzes

Teacher Resources

- Teacher Planner
- Reflection Poster Guide
- Mini-Math Game Design Guide
- Learning Showcase and Celebration Guide

Immersion Slide Deck (slides 54–72)

- The Immersion Slide Deck is intended to be projected to the class in a whole group setting.

Supplies Needed for Students

- 1 poster board or large sheet of construction paper per student for Reflection Poster on Day 3
- Various supplies for Mini Math Game Design on Day 3.

My Thinking Path

- Daily reflection time for students on solving problems involving dividing by fractions.

ST Math Puzzle Talks

- Select Peanuts per Elephant
- Select Peanut or Elephant Multiplier

Problem Solving

Day 1:

- **Problem of the Day** - My dog's food comes in 8 pound bags. My dog eats $\frac{1}{4}$ of a pound of food each meal. How many meals will one bag of dog food serve?

Day 2:

- **Problem of the Day** - The art teacher had 6 cups of sparkles for an art project. He gave each student in Ms. Clark's class $\frac{1}{3}$ of a cup of sparkles to use. How many students are there in Ms. Clark's class?

Instructional Stations

Students will only have Instructional Stations on Day 1 & 2 of this module and will only have 2 stations. Use this time to give the Post-Assessment and/or Quizzes. They should rotate through both stations each day.

Station 1: Small Group Instruction

- Administer the Post-Assessment and/or Quizzes.
- Students will review Problem Solving Journal.
- Begin discussion around Mini-Game Design.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
 - Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- OR**
- Have students solve the Sudoku puzzles.

Day 3 Thinking and Reflecting Time

PART 1: Reflection Poster

- Students are going to create a [poster](#) that represents the learning they have gained. The poster should reflect how their thinking and understanding has grown. It should be an opportunity for students to show what they know.
- Work with students to review the thinking they have recorded in their Problem Solving Journal (My Thinking Path, Problem of the Day, Exit Tickets, and ST Math Puzzle Reflections) and discuss what they have learned during Immersion.

The Reflection Poster is best done as a small group project because that allows students to engage in higher order thinking skills (e.g., evaluating their learning and the ideas of others, synthesizing their thoughts and the thoughts of others, reaching consensus, and working together). It can however, be done as an individual project.

PART 2: Mini-Math Game Design

- Students will create a game similar to the Table Games they have played throughout the program.
- Use the slide deck and the Mini-Math Game Design Booklet to guide students through the process. They will begin with brainstorming games they are familiar with and end by working in small groups to create a game. See Mini-Math Game Design Guide.

Day 4 Learning Showcase and Celebration

The [Learning Showcase and Celebration](#) occurs on the final day of ST Math Immersion. It will serve as a time for students to showcase their learning. It will also serve as a debrief as students share their projects and respond to questions from those attending the event.

- Parents, board members, and community partners can be [invited to attend](#). This is a great opportunity for students to showcase their learning from the Immersion program.
 - Provide students time to make any final adjustments to their game and notes for the presentation of their games.
 - Have groups present their posters and introduce their games to the class.
 - Provide an opportunity for the students to play each other's games.
 - Provide each visitor with an [Immersion Debriefing Bookmark](#) of questions to ask the students.



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My Thinking Path (10 minutes)

- Have students write in the topic, “Solving problems involving dividing by fractions.”
- Have students begin working on the My Thinking Path page.
- Discuss their ideas, and allow students to add to their paper any additional thoughts they have.
- Have students complete the Pre-Quiz (optional).

Puzzle Talk: Select Peanuts per Elephant (20 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.

Notice and Wonder

- Display the first puzzle in Level 1. Ask: “What do you notice? What do you wonder? What is known and unknown?” Allow a few students to share out.

Predict and Justify

- Have students make a prediction of how to solve this puzzle.
- Have students share out predictions and strategies.
- Select one of the students’ strategies. Ask the students to think about if they agree/disagree with the strategy and why. How does it relate to their own strategy?

Test and Observe

- Try a student’s solution, and watch the feedback. Ask students to describe what happened.

Analyze and Learn

- Ask students to think about what they learned from the feedback. How does this affect their strategy?
- Show the next puzzle in Level 1. Ask students: “How could we represent this puzzle with an equation? What is happening in this puzzle?” Work together to write a division equation to represent the puzzle (e.g., If we have 6 peanuts and we want to fair share them with 2 elephants, how many peanuts does 1 elephant eat? $6 \div 2 = 3$).
- Ask students: “What does each number in this equation represent?” Repeat with a few other puzzles from Level 1.

Connect and Extend

- Display the first puzzle in Level 2 and ask students: “What do you notice? What is different about this puzzle? How many equal parts has the elephant been partitioned into?”
- Have students discuss what they know in the puzzle and what is unknown with a partner.
- Try a student’s solution, and watch the feedback to ask: “How do we know how many peanuts to feed one elephant? Can we write an equation for it?” For example, if the puzzle shows that 4 peanuts feed $\frac{1}{3}$ of an elephant, how did students determine how many peanuts are needed to feed 1 elephant? Did they think of 1 as $\frac{3}{3}$, so $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3}$ and in this puzzle each $\frac{1}{3}$ is 4 peanuts, so $4 + 4 + 4 = 12$? Make the connection of how multiplication is the opposite of division and determine that $4 \div \frac{1}{3} = 12$ because $12 \times \frac{1}{3} = 4$.
- Repeat with additional puzzles in Level 2.

How does the student:

- determine how many peanuts 1 elephant eats given the number of elephants fed and the total number of peanuts?
- explain their strategy for solving the puzzle?
- represent the puzzle with an equation?
- explain what each number in the equation represents?
- determine if the puzzle represents a whole number divided by a fraction or a whole number divided by a whole number?

Problem Solving (20 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem of the Day

- My dog's food comes in 8 pound bags. My dog eats $\frac{1}{4}$ of a pound of food each meal. How many meals will one bag of dog food serve?

Instructional Stations (40 minutes)

Students will visit both stations today (20 minutes per station). Instructional Stations will only take place on the first two days of this last module.

Station 1: Small Group Instruction

- Work with students going through their journals, My Thinking Path, Exit Tickets, PODs, Puzzle Reflection, etc., and discuss what they have learned during ST Math Puzzles Immersion.
- Discuss major concepts and vocabulary they learned and used during ST Math Immersion.
- Have students add to their journal as you discuss things they have learned but may have not yet included in their journal.
- This will prepare the students to complete their Reflection Poster on Day 3.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
 - Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- OR**
- Have students solve the Sudoku puzzles.



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My Thinking Path (10 minutes)

- Have students reflect on what they have learned about solving problems involving dividing by fractions. Students should complete the My Thinking Path reflection page in their journal.

Puzzle Talk: Select Peanut or Elephant Multiplier (20 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Give students centimeter cubes to use to represent their solutions.

Notice and Wonder

- Display the first puzzle in Level 1. Ask: “What do you notice? What is known in this puzzle? What is unknown? How do you think we solve this puzzle?”
- Discuss what students see on the screen and what they are able to select.
- Allow a few students to share out.

Predict and Justify

- Do a think-pair-share about what they would like to try, what will happen when they try it, and why they think it will work.
- Have students share out their predictions and related strategies
- Select one of the students’ strategies. Ask the students to think about if they agree/disagree with the strategy and why. How does it relate to their own strategy?

Test and Observe

- Try a student’s solution, and watch the feedback. Ask students to describe what happened.

Analyze and Learn

- Ask students to think about what they saw, and if it affects their strategy.
- Show the next puzzle in Level 1, and ask: “What equation can we write? Does this puzzle represent multiplication or division? How do you know?” Work together to write a multiplication equation to represent the puzzle (e.g., If 1 elephant eats 4 peanuts, how many peanuts do 3 elephants eat?).
- Ask students: “What does each number in this equation represent?” Repeat with a few other puzzles from Level 1 until the first puzzle with a fraction.
- Ask students: “How is this puzzle different? What is happening in this puzzle? How could we represent this puzzle with an equation?” (For example, if 1 elephant eats 12 peanuts, how many peanuts does $\frac{1}{3}$ elephant eat? $\frac{1}{3} \times 12 = 4$ or $12 \times \frac{1}{3} = 4$.) Solve additional puzzles in Level 1.

Connect and Extend

- Display a puzzle from Level 2. Ask students the same questions as above to guide their problem solving process.
- Try a student’s solution, and watch the feedback. Say to students, “What is happening in this puzzle? How did you determine how many elephants to select?” (For example, if each elephant eats 5 peanuts and we have 20 peanuts total, how many elephants can we feed? How do you know?)
- Continue to have students work together to write equations to represent each elephant puzzle. Repeat with puzzles in Level 2 until you come to a puzzle with a partitioned elephant.
- Ask students: “How has the puzzle changed? The elephants have been partitioned into how many equal parts? Why?” Compare this puzzle to whole number by whole number division and represent the puzzle with an equation (e.g., $2 \div 3 = \frac{2}{3}$).

How does the student:

- determine what is known and unknown in the problem?
- explain whether the puzzle represents multiplication or division?
- explain the strategy used to solve the puzzle?
- represent the puzzle with an equation?
- explain what each number in the equation represents?
- discuss the relationship between multiplication and division and the role of the numerator and denominator in determining the solution?

Problem Solving (20 minutes)

Engage students in problem solving discussions. Read and discuss the problem, share student work, compare strategies, and make connections.

Problem of the Day

- The art teacher had 6 cups of sparkles for an art project. He gave each student in Ms. Clark's class $\frac{1}{3}$ of a cup of sparkles to use. How many students are there in Ms. Clark's class? (Note: Ms. Clark used all the sparkles.)

Instructional Stations (40 minutes)

Students will visit both stations today (20 minutes per station). Instructional Stations will only take place on the first two days of this last module.

Station 1: Small Group Instruction

- Hand out the Post-Assessment and/or Post-Quiz to students.
- Begin a discussion around the Mini-Game Design students will be doing on Day 3.
- If students finish early, they can sign in and play ST Math puzzles or any of the Table Games.

Station 2: ST Math Puzzles

- Have students sign in and play ST Math puzzles.
 - Remind students to use manipulatives and/or paper and pencil to help them solve problems.
- OR**
- Have students solve the Sudoku puzzles.



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Reflection Poster (30 minutes)

Students are going to create a [Reflection Poster](#) that represents the learning they have gained. The poster should reflect how their thinking and understanding has grown. It should be an opportunity for students to show what they know.

- With the whole class, brainstorm a list of all the things they have learned this summer. Record their ideas on chart paper.
- Discuss major concepts and vocabulary they learned and used during Immersion.
- Work with students to review the thinking they have recorded in their journals (My Thinking Path, Exit Tickets, PODs, Puzzle Reflection) and discuss what they have learned during Immersion.
- Have students add to their journal as you discuss things they have learned but may have not yet included in their journal. This will prepare the students to complete their poster.
- Ask students to work with their group to see what they might want to include on their poster.
- Instruct groups to make their posters colorful, interesting, and informative so students in other classes will see what they have accomplished in the past few modules.
- Give students time to work on their posters.
- The posters will be displayed for the entire school and parents to see on Day 4.

The Reflection Poster is best done as a small group project because that allows students to engage in higher order thinking skills (e.g., evaluating their learning and the ideas of others, synthesizing their thoughts and the thoughts of others, reaching consensus, and working together). It can however, be done as an individual project. Have students think about all of the things that they have learned and make a poster to share what they have learned.

Mini-Math Game Design (Teacher-led, 50 minutes)

Design Process (20 minutes)

See [Mini-Math Game Design Guide](#).

During this time, students will be creating their own game. Display the slide deck and have them complete the [Mini-Math Game Design Booklet](#) to guide them through the process.

- Brainstorm a list of games they have played. Include both the Table Games in Immersion and any other board game they are familiar with. Record the list on a whiteboard or chart paper
- Take the opportunity to discuss the games that students have learned to play. Compare and contrast the games and share opinions, strategies, and experiences. Discuss the impact any of the games have had on the games students are designing.
 - Race to 2
 - Five for Twenty-Five
 - Traffic Lights Tic-Tac-Toe
 - Dara
 - Equivalent Fraction Concentration
 - Multiplication Connect Four
 - Number Line Fraction Bingo
 - Final Countdown
 - Sudoku Puzzles
- When thinking about the game they would like to design, ask students what math concepts they will include.

Mini-Math Game Design (continued)

Making the Game (30 minutes)

During this time, students will be making their game.

- As students are designing their game, they should decide on a game name and directions and rules for their game.
- Students will work in small groups to create a game. Provide them with the supplies needed. The list below are samples of items that could be used.
 - Dice or number cubes
 - Construction paper
 - Scissors
 - Poster board
 - Manila folders
 - Index Cards
 - Egg cartons
 - Water bottles
 - Pizza circles
 - Paper towel rolls
 - Buttons
 - Other creative items
- Once students have a game created, they should test it out with their classmates and make any changes needed. They should complete page 3 in the Mini-Math Game Design booklet.
- The students will be presenting their games at the Learning Showcase and Celebration on Day 4. They will be given the opportunity to play games with the guests.

Prepare for Tomorrow (10 minutes)

- Discuss what students will need to do tomorrow during the Showcase. Include details about:
 - Organizing games and displays
 - Setting up posters
 - Expectations for the day



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Learning Showcase and Celebration (Final Day of Program)

Parents, board members, and community partners can be [invited](#) to attend. This is a great opportunity for students to showcase their learning from the Immersion program.

- Provide students time to make any final adjustments to their game and notes for the presentation of their games.
- Have groups present their Reflection Posters and introduce their games to the class.
- Provide invited guests a copy of the [Immersion Debriefing Bookmark](#). They should ask students those questions as they visit with each group.
- Provide an opportunity for the students to play each other's games.
- Reflection Poster Gallery Walk (See [Learning Showcase and Celebration Information](#)).

Optional: ST Math Activity Page

ST Math Activity Page

Students will have one final activity page left in their Activity Pages. Encourage students to keep practicing their math skills by continuing to play ST Math Puzzles at home and by completing this final activity page.

Closing

Thinking and Reflecting Time

- Have students complete the Post-Quiz (optional).
- Engage students in discussions about what they have learned this summer, what they have questions about, and what they would like to learn more about.