



Grade 5 | Module 4

Topic: Dividing by Fractions

Module 4 Resources

Students work with puzzles involving multiplication and division of fractions and whole numbers. They work a series of puzzles that help them understand the relationship of multiplication and division.

Module 4 at a Glance

Printed Resources

- **Bookmarks**
 - Problem Solving Process Bookmark
 - Problem Solving Facilitation Bookmark
- **Grades 3–5 Table Game Directions**
 - Race to 2
 - Five for Twenty-Five
 - *Traffic Lights Tic-Tac-Toe (optional)*
 - *Dara (optional)*
 - *Equivalent Fraction Concentration (optional)*
 - *Multiplication Connect Four (optional)*
 - *Number Line Fraction Bingo (optional)*
 - *Final Countdown (optional)*
 - Sudoku Puzzles (Day 5)
- **Game Mat**
 - Fruit Monster Game Mat

- **Problem Solving Journal** (pages 20–25)
 - My Thinking Path
 - Problem of the Day
 - Exit Tickets
 - ST Math Reflection
- **Design Challenge Station Booklet**
 - Page 16

Resources

- Teacher Planner

Optional Printed Resources

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

Immersion Slide Deck (slides 41–53)

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

Supplies for Table Games (per group)

- **Race to 2** - 1 set of fraction cards, number line 0 to 2 for each player, 1 small game piece for each player
- **Five for Twenty-Five** - 1 deck of cards

My Thinking Path

- Daily reflection time for students on multiplying and dividing fractions and whole numbers.

ST Math Puzzle Talks

- Fruit Monster
- Select Peanuts
- Select Elephants

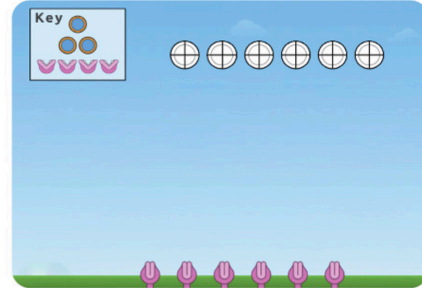
Problem Solving

Day 1:

- **Problem of the Day Task** - Bill, Jack, and Jill took a total of 2 pails of water up the hill. If they each carried the same amount of water, how much water did each friend carry? Prove that the total amount of water they carried equals two pails of water.

Day 2:

- **Problem of the Day** - How many pies will 6 monsters eat? Write an equation to show you could solve the problem.



Day 3:

- **Problem of the Day** - Ibrahim did $\frac{1}{5}$ of his homework problems on his bus ride home. He completed 3 problems. How many problems did Ibrahim have for homework?

Day 4:

- **Problem of the Day** - Mylo eats a cup of cereal a day. He ate $\frac{1}{3}$ of a box in 6 days. How many cups of cereal were in the full box?

Instructional Stations

On Days 1–4, each student will visit two Instructional Stations a day for 20 minutes each. On Day 5, students do not rotate. They can either be assigned to a station or allowed to choose which one to go to. Consider assigning students who need additional support to Station 1 to work with the teacher on concepts they are struggling with.

Station 1: Small Group Instruction

- Engage students in a math conversation about math concepts using a rich problem.

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.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Race to 2 or Five for Twenty-Five
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Days 1-4: Students will continue to make changes to their games, finalize their rules, and directions.

Day 5: Design Challenge (Whole Group)

- Have the students test their games with the other students, get feedback, and then see what additional improvements they need to do to improve their games.
- As students are playing games, monitor student gameplay and use facilitation questions to help support their thinking about games and about math.



Grade 5 | Module 4 | Day 1

My Thinking Path (5-10 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: Fruit Monster (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with whiteboards/dry erase markers.
- Provide students with the [Fruit Monster Game Mat](#).

Notice and Wonder

- Display the first puzzle in Level 1. Ask: “What do you notice? What do you wonder? What do you think you need to do to solve this puzzle?” Allow a few students to share out.

Predict and Justify

- Have students make a prediction and discuss during a think-pair-share.
- 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: “How much fruit does 1 Fruit Monster eat? What did you learn that helps you know how many pieces of fruit to select? What do you know about the relationship between the Fruit Monster and the amount of fruit the Fruit Monster eats?”
- Give students a Fruit Monster Game Mat. Show a puzzle from Level 2.
- Ask students: “How is this puzzle different from the puzzles we solved in Level 1? What do you notice about the Fruit Monster in this puzzle?”
- Pull up another puzzle (e.g., The Fruit Monster card tells us that 2 Fruit Monsters eat 1 whole pie) and ask: “How much pie does 1 Fruit Monster eat? How do you know?”
- Have students model the puzzle on their game mat and solve. They can turn and talk to their partner to share strategies.
- Try a student’s solution, and watch the feedback. Ask students to express the solution as a fraction and a mixed number.
- Display the next puzzle. Say to students: “If the Fruit Monster card hasn’t changed, how much pie will ____ Fruit Monsters eat? How could we represent what is happening in this puzzle with an equation?” Share students’ solutions and equations. Prove that the equation represents the puzzle.
- Repeat with 2-3 more puzzles in Level 2.

How does the student:

- determine how many pies one monster would eat given a number of pies for 2 or more monsters?
- determine how many pies are needed to feed the given number of monsters?
- write equations to represent the puzzles?
- write the solution as both a fraction and a mixed number?

Problem Solving (20-25 minutes)

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

Problem of the Day

- Bill, Jack, and Jill took a total of 2 pails of water up the hill. If they each carried the same amount of water, how much water did each friend carry? Prove that the total amount of water they carried equals two pails of water.

Instructional Stations (40 minutes)

Students will visit two Instructional Stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Give students problems similar to the journal and puzzle problems. Have students solve the problems.
 - For example, Barb, Frank, and Gail shared 2 candy bars equally. How much candy bar did each receive?
- Discuss what they know in the problem and what they need to know to solve the problem.
- Allow students to draw pictures or use equations. Have students explain and defend their answers.

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.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Race to 2 or Five for Twenty-Five.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Students will finalize their rules on page 13 of their Design Challenge Station Booklet.
- Have students work on creating an advertisement for their game.
- What is the name of the game?
- What math does it teach?
- What do they want people to know about their game?



Grade 5 | Module 4 | Day 2

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems involving dividing by fractions.

Puzzle Talk: Fruit Monster (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with [Fruit Monster Game Mat](#) and whiteboards/dry erase markers.

Notice and Wonder

- Display the first puzzle in Level 3, and provide students the Fruit Monster Game Mat. Ask: “What do you notice that is similar/different to the puzzles we solved yesterday?”

Predict and Justify

- Have students model the puzzle and their solution strategy on the game mat.
- Have students think-pair-share their model, solution strategy, and reasoning. What prediction are they making about how to solve this puzzle, and what is their reasoning behind it?
- Say to students: “The Fruit Monster card tells us that for every 4 Fruit Monsters, 1 whole pie is eaten. If this puzzle has ___ Fruit Monsters, what is the total amount of pie that will be eaten? How do you know?” Ask students to record their solution. Have students share out their predictions and related strategy.
- 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. Ask students to express the solution as a fraction and a mixed number.

Analyze and Learn

- What did they learn from the feedback? Compare the fraction and mixed number to the model and what they saw in the animation. Use annotation and animation tools to help highlight any misconceptions.

Connect and Extend

- Repeat this same process with additional puzzles in Levels 3-5. Ask students to write an equation to represent the Fruit Monster puzzles, using fractions and/or mixed numbers.

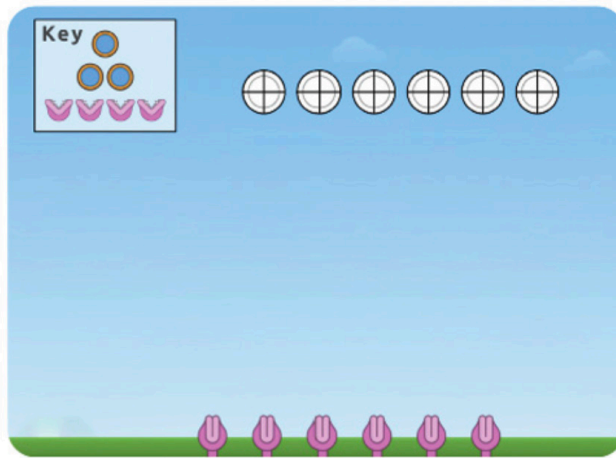
How does the student:

- determine how many pies one monster would eat given a number of pies for two or more monsters?
- determine how many pies are needed to feed the given number of monsters?
- write equations to represent the puzzles?
- write the solution as both a fraction and a mixed number?

Problem Solving (20-25 minutes)

Problem of the Day

- How many pies will 6 monsters eat?
- Write an equation to show you could solve the problem.



Instructional Stations (40 minutes)

Students will visit two Instructional Stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Give students problems similar to the journal and puzzle problems. Have students solve the problems. For example, Barb, Frank, and Gail shared 2 candy bars equally. How much candy bar did each receive?
- Discuss what they know in the problem and what they need to know to solve the problem.
- Allow students to draw pictures or use equations. Have students explain and defend their answers.

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.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Race to 2 or Five for Twenty-Five.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Students will finalize their rules on page 13 of their Design Station Booklet.
- Have students work on creating an advertisement for their game.
- What is the name of the game?
- What math does it teach?
- What do they want people to know about their game?



Grade 5 | Module 4 | Day 3

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems involving dividing by fractions.

Puzzle Talk: Select Peanuts (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with whiteboards/dry erase markers.

Notice and Wonder

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

Predict and Justify

- Ask: “What do you think you need to do to solve this puzzle?” Have students make a prediction. After some think time, do a think-pair-share about their strategies. Discuss what they know about the elephant on the left.
 - How many pieces does that one elephant eat? Discuss how many elephants they see on the right.
 - Ask students: “How many peanuts will we need to feed ___ elephants if each elephant eats ___ peanuts?”
- Select one of the students’ strategies. Ask the students to think about if they agree/disagree and why. How does it relate to their own?

Test and Observe

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

Analyze and Learn

- Try a student’s solution, and watch the feedback. Work together with students to write a multiplication equation. For example, if each elephant eats 2 peanuts and there are 3 elephants, then 3 groups of 2 peanuts would mean that the elephants would eat 6 peanuts total or $3 \times 2 = 6$.
- Ask students: “What does each number in this equation represent?”
- Repeat with additional puzzles from Level 1. Discuss how the peanuts in the sky are divided among the elephants at the bottom.

Connect and Extend

- Display the first puzzle in Level 2. Ask students: “What do you notice? What is different about this puzzle? How many equal parts have the elephants been partitioned into?”
- Now, discuss the elephant on the left (e.g., If each elephant on the left eats 2 peanuts, how many peanuts will $1 \frac{1}{2}$ elephants eat? How do you know?)
- Display a new puzzle, and have students work in pairs for the task of discussing how the peanuts in the sky are divided among the elephants at the bottom. Have them write an equation (e.g., If each elephant eats 2 peanuts and there are $1 \frac{1}{2}$ elephants, then $1 \frac{1}{2}$ groups of 2 would eat 3 peanuts or $2 \times 1 \frac{1}{2} = 3$ or $2 \times \frac{3}{2} = 3$).
- Do a whole group share as a check for understanding. Repeat with additional puzzles in Level 2.
- Display the first puzzle in Level 3 that does not show a unit fraction. Repeat the same questions as above to prompt students (e.g., If each elephant eats 6 peanuts, how many peanuts will $\frac{2}{3}$ elephants eat? How do you know?).

- Have students talk with a partner about how they could represent this puzzle using multiplication (e.g., If each elephant eats 6 peanuts and there are $\frac{2}{3}$ elephants, then $\frac{2}{3}$ of 1 elephant would eat 4 peanuts or $\frac{2}{3}$ groups of 6 = 4 or $\frac{2}{3} \times 6 = 4$).
- Repeat with additional puzzles in Level 3.

How does the student:

- given the number of peanuts per elephant, determine how many peanuts are needed to feed the given number of whole or partial elephants?
- write equations to represent the puzzle?
- discuss what each number in the equation represents in the puzzle?
- represent a whole number times a fraction or a whole number times whole number?

Problem Solving (20-25 minutes)

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

Problem of the Day

- Ibrahim did $\frac{1}{5}$ of his homework problems on his bus ride home. He completed 3 problems. How many problems did Ibrahim have for homework?

Instructional Stations (40 minutes)

Students will visit two Instructional Stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Work with students on the Problem of the Day or a similar problem. Have students draw a picture or write an equation to prove the solution. Discuss how the equation and picture (or manipulatives) compare.

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.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Race to 2 or Five for Twenty-Five.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Students will finalize their game rules.
- Students who have completed their game can work on creating an advertisement for their game.
- What is the name of the game?
- What math does it teach?
- What do they want people to know about their game?



Grade 5 | Module 4 | Day 4

My Thinking Path (5-10 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 Elephants (20-25 minutes)

- Focus on student thinking and developing problem solving skills using the Problem Solving Process.
- Provide students with whiteboards/dry erase markers.

Notice and Wonder

- Display the first puzzle in Level 1. Ask: “What do you notice? What do you wonder?” Discuss how these puzzles compare to the puzzles in Select Peanuts, and have students tell you about what they know about the elephants and the number of peanuts they see.

Predict and Justify

- Have students make a prediction with a partner and then do a whole group share out.
- 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 how what they saw happen compares to their prediction.
- Show the next puzzle in Level 1. Say to students: “How could we represent this puzzle with an equation? What is happening in this puzzle?” Work together to write a division sentence to represent the puzzle (e.g., If each elephant eats 5 peanuts and there are 15 peanuts, then 3 elephants can be fed because $15 \div 5 = 3$).
- Try a student’s solution and watch the feedback and discuss.
- Show the first puzzle in Level 2 that shows fewer peanuts in the sky than what 1 elephant eats.
- Ask students: “What do you notice? What is different about this puzzle? How many equal parts has the elephant been partitioned into?” For example, if each elephant eats 2 peanuts and there is 1 peanut, then 1 peanut would feed $1/2$ elephants or $1 \div 2 = 1/2$.) Repeat the problem solving process so students can continue to discuss division and write equations. Ask students:
 - What does each number in this equation represent? How did you determine what denominator to use for the fraction in this equation?
 - What do you notice about the division equation and the answer? Help students to see that another way to read the fraction $1/2$ is “1 divided by 2” or $1/4$ is the same as “1 divided by 4.”

Connect and Extend

- Display the first puzzle in Level 3 that shows more peanuts in the sky than 1 elephant eats (e.g., If each elephant eats 4 peanuts, how many elephants will 6 peanuts feed? How do you know?).
- Have students talk with a partner and determine their solution.
- Try a student’s solution, and watch the feedback to check if the equations students created are correct (e.g., If each elephant eats 4 peanuts, how many elephants will 6 peanuts feed? $6 \div 4 = 6/4$).

Some Extra Challenge

- Ask students: "What does each number in this equation represent? How did you represent your solution if the elephants were not partitioned into the denominator of your solution?" (For example, the solution was $\frac{12}{8}$, but the elephant is partitioned into fourths. Students must understand that it takes 2 one-eighths to make one $\frac{1}{4}$, so $\frac{12}{8}$ would be the same as $\frac{6}{4}$.)
- Discuss students' strategies for determining an equivalent fraction as needed.

How does the student:

- determine the number of elephants that can be fed with the given number of peanuts?
- explain why the solution is a whole number or a fraction?
- represent the puzzle with an equation?
- explain what the denominator of the fraction in their equation represents?
- explain that the puzzles represent a whole number divided by a whole number?

Problem Solving (20-25 minutes)

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

Problem of the Day

- Mylo eats a cup of cereal a day. He ate $\frac{1}{3}$ of a box in 6 days. How many cups of cereal were in the full box?

Instructional Stations (40 minutes)

Students will visit two Instructional Stations today (20 minutes in each station). They will visit the other two tomorrow.

Station 1: Small Group Instruction

- Work with students on the Problem of the Day or a similar problem. Have students draw a picture or write an equation to prove the solution. Discuss how the equation and picture (or manipulatives) compare.

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.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Select Race to 2 or Five for Twenty-Five.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Students will finalize their game rules.
- Students who have completed their game can work on creating an advertisement for their game.
- What is the name of the game?
- What math does it teach?
- What do they want people to know about their game?



Grade 5 | Module 4 | Day 5

Design Challenge (30-40 minutes)

- Have the students test their games on the other students, get feedback, and then see what additional improvements they need to do to improve their games.
- Divide the students into groups. Rotate the games that the students created through the groups (there should be one person in each group who helped create the game).
- Give students 10-15 minutes to play the game.
- When students are done playing the game, ask them to rate the game using the [Game Tester Report](#). You may want to have some students share their thoughts.
- Rotate the games so the group will get a new game. Have students play that game and then complete a feedback sheet.
- As students are playing games, monitor student gameplay and use facilitation questions to help support their thinking about games and about math.
- Have students answer the Game Feedback Form on page 16 in their Design Challenge Station Booklet.

Whole Group Table Games (15-20 minutes)

During this time you will introduce JiJi Sudoku. Students will play these games in the next module in Station 3.

- Introduce JiJi Sudoku using the simple picture game boards.
- Allow students to work together to solve the picture puzzles.
- If there's time, explain that Sudoku is usually played with numbers, and share one or two of the additional numeric Sudoku puzzles.

Optional: ST Math Activity Page (15 minutes)

ST Math Activity Page

- Project the ST Math game, *Fruit Monster*.
- Play a few puzzles to help students understand the game.
- Have students turn to the ST Math Activity Page: *Fruit Monster*.
- Ask students what they notice about the content on the page. What do they wonder? Where do they want to start on the page?
- Give them time to complete the page.
- Discuss the page, and have students share their thinking.
- Take the time to compare strategies, and have students share their work.
- Make connections to the game.

Instructional Stations (20 minutes)

Focused Instructional Time

- During this station time, students do not rotate. They can either be assigned to a station or allowed to choose one to go to.
- This is an excellent opportunity to pull students who need additional support to Station 1: Small Group Instruction, where they can work with the teacher on concepts they are struggling with. Use the [Teacher Planner](#) to help target this time with students.

Station 1: Small Group Instruction

- Identify specific students for intervention or extension.
- Choose the ST Math puzzle or problem solving question that the students struggled with.
- You may choose to use the Teacher Planner to help you plan your instruction.

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. They can ask themselves the questions that are on the Problem Solving Process Poster.
- With 5 minutes left, have students stop playing and complete their Puzzle Reflection and Accomplishments Log.

Station 3: Table Games

- Allow students to choose one of the games they have learned.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Have students continue to build their games.
- Once they have finished building their games, they will play the games with a group to test them out. Have students complete page 16 in the Design Challenge Station Booklet.
- After they test their games, students can make any changes to their games they see are needed. The goal is to have them done so other students can play their games on Day 5 to test them out.

Closing (10 minutes)

Thinking and Reflecting Time

- Have students complete the Post-Quiz (optional).
- Have students review their ST Math Puzzle Reflections, Exit Tickets, and Problem Solving work.
- Engage students in discussions about what they have learned this module, what they have questions about, and what they would like to learn more about.