



Grade 4 | Module 3

Topic: Adding and subtracting fractions and mixed numbers

[Module 3 Resources](#)

Students work with area models and number line models to add and subtract fractions and mixed numbers. Students use a number line to represent addition and subtraction of fractions as jumps to the right or left. They relate this to addition and subtraction of whole numbers. Students solve rich problems involving addition and subtraction of fractions.

Module 3 at a Glance

Printed Resources

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

- **Problem Solving Journal** (pages 14–19)
 - My Thinking Path
 - Problem of the Day
 - Exit Tickets
 - ST Math Reflections
- **Design Challenge Station Booklet**
 - Pages 10-15

Optional Printed Resources

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

Teacher Resources

- Teacher Planner

Immersion Slide Deck (slides 28–40)

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

Supplies for Table Games (per group)

- **Number Line Fraction Bingo** - 1 set of fraction cards, number line for each player, 4 centimeter cubes for each player
- **Final Countdown** - deck of cards, 3 game pieces per player to be used as Multiplication Chips

My Thinking Path

- Daily reflection time for students on adding and subtracting fractions and mixed numbers

ST Math Puzzle Talks

- Alien Bridge
- Scale Fraction Addition and Subtraction
- JiJi Cycle Select Basket
- Pie Monster

Problem Solving

Day 1:

- **Problem of the Day** - Keyton wanted to make 2 gallons of punch to take to the school picnic. He found a recipe that called for $\frac{3}{4}$ gallon of fruit punch, 2 quarts of orange juice, 3 quarts of lime soda, and $\frac{1}{2}$ gallon of water. If Keyton makes this recipe, will he have as much punch as he wants? Justify your solution.

Day 2:

- **Problem of the Day** - Fill in the blank with the correct symbol (i.e., $>$, $<$, $=$) for this equation/inequality: $\frac{3}{6} + \frac{4}{6}$ ____ $\frac{2}{3} + \frac{2}{3}$. Explain how you determined the symbol to use. Then use a number line to compare these two addition expressions.

Day 3:

- **Problem of the Day** - Joan and Brett were decorating picture frames for a class store project. They needed $3\frac{1}{4}$ feet of ribbon to decorate all their frames. Joan had $2\frac{1}{2}$ feet of ribbon but used $\frac{3}{4}$ of a foot of her ribbon for another project. Brett had $2\frac{3}{4}$ feet of ribbon but used $\frac{5}{4}$ of a foot of his ribbon for another project. Do they have enough ribbon for their project? Justify your solution.

Day 4:

- **Problem of the Day** - Iris and her brother needed $2\frac{1}{2}$ bags of popcorn kernels to make enough popcorn to sell at the school bake sale. Iris had $1\frac{1}{4}$ bags and her brother had $1\frac{3}{8}$ bags. Do they have enough bags of popcorn kernels? Explain how you know.

Instructional Stations

On Days 1–4, each student will visit two 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 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

- Days 1 & 2: Have students decompose fractions into sums of fractions.
 - Discuss how decomposing fractions can help them add and subtract fractions. $\frac{8}{8}$, $\frac{5}{4}$, $\frac{7}{2}$, $\frac{6}{10}$
- Days 3 & 4: Work with students in small groups discussing the Enough Ribbon 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 Number Line Fraction Bingo or Final Countdown.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints, they can begin to assign the task of building the game to different members of their team.
- Students can start building their games. (Students need to share their blueprints with their teachers before building.)

Day 5: Design Challenge (Whole Group)

- This will be focused building time for the students. They need to complete the following tasks:
 - Complete their games.
 - Write clear rules.



Grade 4 | Module 3 | Day 1

My Thinking Path (5-10 minutes)

- Have students write in the topic: “Adding and subtracting fractions and mixed numbers.”
- Have students work on the My Thinking Path page in their journals.
- 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: Alien Bridge (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? What is the name of each fraction in the alien ship?” Allow a few students to share out.
- Move the cursor along the bottom of the puzzle, and ask: “What is happening as we move the cursor? What does the denominator tell us? The numerator? How do you know which denominator to choose?”

Predict and Justify

- Have students make a prediction about how they will solve the puzzle. Think-pair-share their prediction.
- Allow some students to share whole group and discuss.

Test and Observe

- Try one of the student’s solution strategies. Before trying the strategy, discuss it with the other students (agree/disagree; what do they think will happen).

Analyze and Learn

- Ask students to think about how what they saw happen compares to their prediction. What did the feedback tell them? How many total equal pieces do we have? Do we have more or less pieces than we started with? Why or why not?
- Show the next puzzle. Say to students, “Name the two fractions you see in the alien ships on your whiteboard. What do you think happens when we add these two fractions together?”
- Try one of the students' solution strategies. Pause the animation, and discuss.

Connect and Extend

- Share with the students, “The denominator is the cutting number. It tells us how many equal pieces our whole has been cut into. How many equal pieces has each of the circles been cut into? What should our denominator be?” Write the correct denominator.
- Display the whole addition equation, and read the equation out loud (e.g., one third plus one third is two thirds). Ask students: “Why did the numerator change but the denominator did not? How is adding fractions like adding whole numbers? If we add $2 + 2$ or $2/3 + 2/3$, how are those the same and different?”
- Review the meaning of the numerator and denominator in the solution. Remind students that the numerator is the counting number and the denominator is the cutting number.
- Repeat with the remaining puzzles in Level 1.

How does the student:

- name the fractions in the alien ship?
- explain the role of the numerator and denominator?
- discuss different strategies for solving the puzzles?
- discuss counting by unit fractions and the similarity to adding whole numbers?

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

- Keyton wanted to make 2 gallons of punch to take to the school picnic. He found a recipe that called for $\frac{3}{4}$ gallon of fruit punch, 2 quarts of orange juice, 3 quarts of lime soda, and $\frac{1}{2}$ gallon of water. If Keyton makes this recipe, will he have as much punch as he wants? Justify your solution.

Instructional Stations (40 minutes)

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

Station 1: Small Group Instruction

- Have students decompose fractions into sums of fractions.
- Discuss how decomposing fractions can help them add and subtract fractions such as: $\frac{8}{8}$, $\frac{5}{4}$, $\frac{7}{2}$, $\frac{6}{10}$.

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 Number Line Fraction Bingo or Final Countdown.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Allow students to continue to work on their blueprints on pages 10-14 in their Design Challenge Station Booklet.
- Once students have completed their blueprints, they can begin to assign the task of building the game to different members of their team.
- Students can start building their games (students need to share their blueprints with their teachers before building).



Grade 4 | Module 3 | Day 2

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems involving adding and subtracting fractions and mixed numbers.

Puzzle Talk: Scale Fraction Addition and Subtraction (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

- Have some students share their predictions.

Test and Observe

- Try a student's solution and watch the feedback. Talk with students about what happened as they solved the puzzle.
- Ask students to think about how what they saw happen compares to their prediction.

Analyze and Learn

- Replay the puzzle with the same solution. Pause the animation. Ask students to explain what is happening with the bars and the number line.
- Display the next puzzle. Ask students to write an equation to represent the bars at the top and then solve the puzzle. How does the model (bars) relate to the number line? What are some things you need to understand about unit fractions to be able to solve this puzzle? How did you know where to place the dot on the number line?
- Have students share their answers and strategies. Ask students if whether whole numbers or fractions need to be answered first. Either answer is fine if the student can justify it. Solve the puzzle. How does the model (bars) relate to the number line? What are some things you need to understand about unit fractions to be able to solve this puzzle?
- Continue with some puzzles from Level 2.
- Discuss how this puzzle is similar/different than the previous level. Try to show a few incorrect solutions and discuss why.

Connect and Extend

- Display the first puzzle in Level 3. Ask: "How is this puzzle different from the ones we just solved? How can you use what you know from the other puzzles to help you solve this one?" Have students think, ink (write their solution), pair, share.
- Share students' solutions. Discuss their strategies for subtracting fractions.
- Ask students to write an equation to represent what is happening with the bars. Repeat with the remaining puzzles in Level 3 pushing them to evaluate: "How does adding and subtracting whole numbers compare to adding and subtracting fractions?"

How does the student:

- explain the fractions they see in the visual model? (Can they see wholes and parts in the model? On the number line?)
- understand the relationship between mixed numbers and fractions greater than 1? (Do they understand that $1\frac{1}{4}$ would be $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$?)
- represent addition and subtraction on the number line?
- explain the relationship between the visual model representation and the number line representation?

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

- Fill in the blank with the correct symbol ($>$, $<$, $=$) for this equation/inequality: $\frac{3}{6} + \frac{4}{6}$ _____ $\frac{2}{3} + \frac{2}{3}$. Explain how you determined the symbol to use. Then use a number line to compare these two addition expressions.

Instructional Stations (40 minutes)

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

Station 1: Small Group Instruction

- Have students decompose fractions into sums of fractions.
- Discuss how decomposing fractions can help them add and subtract fractions such as: $\frac{8}{8}$, $\frac{5}{4}$, $\frac{7}{2}$, $\frac{6}{10}$.

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 Number Line Fraction Bingo or Final Countdown.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Allow students to continue to work on their blueprints on pages 10-14 in their Design Challenge Station Booklet.
- Once students have completed their blueprints, they can begin to assign the task of building the game to different members of their team.
- Students can start building their games. (Students need to share their blueprints with their teachers before building.)



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My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems involving adding and subtracting fractions and mixed numbers.

Puzzle Talk: JiJi Cycle Select Basket (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?” Have students discuss first with a partner and then as a whole group.

Predict and Justify

- Discuss solution strategies. Have students discuss in pairs and then whole group solutions they want to try. Ask students to visualize what they think will happen. Have some students share their predictions.

Test and Observe

- Try a student’s solution, and watch the feedback. Talk with students about what happened as they solved the puzzle.

Analyze and Learn

- Ask students to think about how what they saw happen compares to their prediction.
- Replay the puzzle with the same solution. Pause the animation. Ask students to explain what is happening with the cycle and the number line.
- Display the next puzzle. Ask students to write an equation to represent the wheels. How did you know where to place the basket on the number line?
- Have students share their answers and strategies. Ask students if whole numbers or fractions need to be answered first. Either answer is fine, if the student can justify it. Solve the puzzle. How does the model (wheels) relate to the number line? What are some things you need to understand about unit fractions to be able to solve this puzzle?
- Continue with some puzzles from Level 2.
- Discuss how this puzzle is similar/different from the previous level. Try to show a few incorrect solutions and discuss why.

Connect and Extend

- Display the first puzzle in Level 3. Ask: "How is this puzzle different from the ones we just solved? How can you use what you know from the other puzzles to help you solve this one?" Have students think, ink (write their solution), pair, share.
- Share students’ solutions. Discuss their strategies for subtracting fractions.
- Ask students to write an equation to represent what is happening with the bars. Repeat with the remaining puzzles in Level 3, pushing them to evaluate. Ask: "How does adding and subtracting whole numbers compare to adding and subtracting fractions?"

How does the student:

- name the fractions shown in the puzzle?
- determine whether the puzzle is an addition or subtraction situation?
- show the action of adding and subtracting fractions as jumps on a number line?
- write equations to represent the puzzle?
- write fractions greater than one as fractions and mixed numbers?

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

- Joan and Brett were decorating picture frames for a class store project. They needed $3\frac{1}{4}$ feet of ribbon to decorate all their frames. Joan had $2\frac{1}{2}$ feet of ribbon but used $\frac{3}{4}$ of a foot of her ribbon for another project. Brett had $2\frac{3}{4}$ feet of ribbon but used $\frac{5}{4}$ of a foot of his ribbon for another project. Do they have enough ribbon for their project? Justify your solution.

Instructional Stations (40 minutes)

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

Station 1: Small Group Instruction

- Work with students in small groups discussing the Enough Ribbon problem.
- First give them a chance to redo their work. (Do not erase or cross out original work. Just draw a line, and start the new work.)
- Discuss any misconceptions students exhibited in their work.

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 Number Line Fraction Bingo or Final Countdown.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints, they can begin to assign the task of building the game to different members of their team.
- Students can start building their games. (Students need to share their blueprints with their teachers before building.)



Grade 4 | Module 3 | Day 4

My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about solving problems involving adding and subtracting fractions and mixed numbers. Students should complete the My Thinking Path reflection page in their journal.

Puzzle Talk: Pie Monster (20-25 minutes)

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

Notice and Wonder

- Display the first puzzle in Level 1. Ask: "What do you notice? What do you wonder?" Have a few students share.

Predict and Justify

- Ask students, "What do you think you need to do to solve this puzzle?" Have them model the puzzle and their solution on their game mat.
- Allow a few students to share out how many pies the Pie Monster needs.
- Have students think-pair-share about what they would like to try, what will happen when they try it, and why they think it will work. What do they think will happen if they don't choose the right amount of pies?

Test and Observe

- Select one of the students' strategies. Ask the students to think about if they agree or disagree with the strategy and why.
- You may also ask students turn to their neighbor and make a story about the Pie Monster for the current puzzle.

Analyze and Learn

- Play the feedback. Ask if it was it what they were expecting. If not, ask if this affects their strategy to try again.
- Solve additional puzzles from Level 1. Be sure to analyze the feedback in both correct and incorrect solutions.
- Show a puzzle from Level 2. Have students discuss what they notice with a partner.

Connect and Extend

- Select a puzzle or two from Level 3 for students to represent on their Pie Monster Game Mat. Discuss the fractions in it, and ask: "Is this an addition or subtraction situation? How do you know? Can you represent this puzzle with an equation?"
- Show a puzzle from Level 4, and how it compares to Level 3. Discuss the fractions for each, and have students represent the puzzles with equations. What fraction of pies is on the conveyor belt (i.e., $0/3$ or $0/4$)? What equation can they write?

How does the student:

- explain the fractions they see in the visual model?
- name the fractions shown in the puzzle?
- determine whether the puzzle is an addition or subtraction situation?
- understand the relationship between mixed numbers and fractions greater than 1? (Do they understand that $1 \frac{1}{4}$ is $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$?)

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

- Iris and her brother needed $2 \frac{1}{2}$ bags of popcorn kernels to make enough popcorn to sell at the school bake sale. Iris had $1 \frac{1}{4}$ bags, and her brother had $1 \frac{3}{8}$ bags. Do they have enough bags of popcorn kernels? Explain how you know.

Instructional Stations (40 minutes)

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

Station 1: Small Group Instruction

- Work with students in small groups discussing the Enough Ribbon problem.
- First give them a chance to redo their work. (Do not erase or cross out original work. Just draw a line, and start the new work.)
- Discuss any misconceptions students exhibited in their work.

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 Number Line Fraction Bingo or Final Countdown.
- Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.

Station 4: Design Challenge

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints, they can begin to assign the task of building the game to different members of their team.
- Students can start building their games. (Students need to share their blueprints with their teachers before building.)



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Design Challenge (20-30 minutes)

- Students will play their games and complete the Initial Reflection (page 15 in their Design Challenge Station Booklet) .
- After they have played their games, they will complete the game reflection form individually. Have students share their reflections in their groups and decide how they would like to improve their games.

Whole Group Table Games (15-20 minutes)

During this time you will introduce Race to 2 and Five for Twenty-Five. Students will play these games in the next module in Station 3.

- Introduce one of the games.
- After explaining the game and playing it with the whole group, give students time to play it on their own.
- After playing the game, have them discuss:
 - What math did they learn or use?
 - What strategies did they try to win the game?
 - Repeat with the second game.

Optional: ST Math Activity Page (15 minutes)

ST Math Activity Page

- Project the ST Math game, *Scale Fraction*.
- Play a few puzzles to help students understand the game.
- Have students turn to the ST Math Activity Page: *Scale Fraction*.
- 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.

Focused Instructional Time (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.
- 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

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints, they need to sketch their game, create their directions and rules, and assign the task of building the game to different members of their team.

Closing (10 minutes)

Thinking and Reflecting Time

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