ST Math
Summer Immersion

Grade 4 | Module 5

Topic: Write and compare decimal fractions

Module 5 Resources

Students work with a number line and hundred grid to represent decimal fractions. They compare decimal and fraction forms of numbers. They discuss the relationship of tenths and hundredths.

Module 5 at a Glance

Printed Resources

- **Bookmarks**
  - Problem Solving Process Bookmark
  - Problem Solving Facilitation Bookmark
- **Grades 3-5 Table Game Directions**
  - Sudoku Puzzles
  - *Traffic Lights Tic-Tac-Toe (optional)*
  - *Dara (optional)*
  - *Equivalent Fraction Concentration (optional)*
  - *Multiplication Connect Four (optional)*
  - *Number Line Fraction Bingo (optional)*
  - *Final Countdown (optional)*
  - *Race to 2 (optional)*
  - *Five for Twenty-Five (optional)*
- **Problem Solving Journal** (pages 26–28)
  - My Thinking Path
  - Problem of the Day
- **Math Mat**
  - Hundred Grids Math Mat
- **Design Challenge Station Booklet**
  - Page 17–18
- **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
- Learning Showcase and Celebration Guide
- Reflection Poster Guide

Immersion Slide Deck (slides 54–63, 70–72)

- 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.
- Various supplies for Mini-Math Game Design

My Thinking Path

- Daily reflection time for students on writing and comparing decimal fractions.

ST Math Puzzle Talks

- Fraction and Decimal Grid
- Number Line Trap

Problem Solving

Day 1:

- **Problem of the Day -** Barry had $4.00. He earned $2.75 a day for 5 days taking care of his neighbor's dog. How much money does he have now? Use a number line to show how much money Barry has now.

Problem Solving (continued)

Day 2:

- **Problem of the Day** - Loretta keeps time for each lap she runs around a track. The first lap she ran in 1.83 minutes. The second lap she ran in 1.9 minutes. She ran for three laps. Her total time for the three laps was 4.48 minutes. How long was her third lap?

Thinking and Reflecting Time (whole group)

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.

- Work with students to review the thinking they have recorded in their journals, (My Thinking Path, Exit Tickets, PODs, ST Math Puzzle Reflection, etc.), 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.

Instructional Stations

Students will only have two stations this module (20 minutes in each station). Use this time to give the Post-Assessment and/or Post-Quiz and to provide students time to finish their games and Reflection Posters.

Station 1a: Small Group Instruction

- Days 1 & 2: Hand out the Post-Assessment and/or Post-Quiz to students. If students finish early, they can sign in and play ST Math puzzles.

Station 1b: Reflection Poster

- Days 3 & 4: Give students time to continue working on their Reflection Poster.

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 Accomplishments Log.

Station 3: Table Games

- Days 1 & 2: Students solve Sudoku puzzles.
- Days 3 & 4: Students play one of the Table Games they have learned.

Station 4: Design Challenge

- Days 1–4: Students play each other's games, make revisions, and produce the final version.

Day 5: 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 a bookmark of questions to ask the students.

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My Thinking Path (5-10 minutes)

- Have students write in the topic: “Write and compare decimal fractions.”
- 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: Fraction and Decimal Grid (20-25 minutes)

¤ Focus on student thinking and developing problem solving skills using the Problem Solving Process.
¤ Provide students with the copies of the Hundred Grids 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? 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 about how many blocks to select in the grid. After they have had some think time, have them think-pair-share about what they would like to try, what will happen when they try it, and why they think it will work.

Test and Observe

- Select one of the students’ strategies, and test. Ask the students to think about if they agree or disagree with the strategy and why. How does it relate to their own strategy?

Analyze and Learn

- Ask students to think about how what they saw happen compares to what they thought would happen. What did they learn from the feedback? How does this affect their strategy? When you shade in the hundred grid, how do you know what number to put as the numerator/denominator of the fraction?
- For the next few puzzles in Level 1, have students discuss the solution and solution strategies. What represents one whole on the hundred grid? One-tenth? One-hundredth? How do you know?

Connect and Extend

- Compare the different forms for writing the numbers. What would the fraction and decimal form be if the entire grid was shaded? What is the equivalent for this number (e.g., 40/100) if the denominator is 10? How might you write 40/100 using tenths and hundredths?
- Have students write equations for the problem where their solution is written as a decimal or fraction.
- Display the first puzzle from Level 2. Discuss how these puzzles compare to puzzles in other levels.
- Have students use the Hundreds Grid Mat. Have students show their solutions on their mat.
- Have students show and discuss the equation for the puzzle. Examine the animation, and give students a chance to compare the numbers and the grid.
- Have students write expanded forms of the numbers and compare to the decimal and fraction forms.
- Repeat with the other puzzles in Level 2.

How does the student:

- understand that the fraction and decimal forms of writing the numbers are equivalent?
- compare the different forms for writing the numbers, including expanded form?
- understand what the whole is in the 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

- Barry had $4.00. He earned $2.75 a day for 5 days taking care of his neighbor's dog. How much money does he have now? Use a number line to show how much money Barry has now.

Instructional Stations (40 minutes)

Students will rotate through the stations (20 min each). Use this time to give the Post-Assessment and/or Post-Quiz and to provide students time to finish their games.

Station 1: Small Group Instruction

- Hand out the Post-Assessment and/or Post-Quiz to students. If students finish early, they can sign in and play ST Math puzzles.

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 Accomplishments Log.

Station 3: Table Games

- Have students solve the Sudoku puzzles.

Station 4: Design Challenge

- Have students finish their games and Reflection Posters.
- Have student complete page 17 and reflect on the changes to make improvements on their game.
- If students are done, they should be preparing their presentations. Students can use page 18 to prepare for their presentations.

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My Thinking Path (5-10 minutes)

- Have students reflect on what they have learned about writing and comparing decimal fractions. Students should complete the My Thinking Path reflection page in their journal.

Puzzle Talk: Number Line Trap (20-25 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 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. After they have had some think time, have them 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 strategy.

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. How does it relate to their own strategy? Watch the feedback, and ask students to describe what happened.

Analyze and Learn

- Ask: "Does this compare to your prediction? Do we need to change our strategy? How? How many tenths are needed to make 1? How many hundredths are needed to make 1?"
- Pull up another puzzle. Ask: "What do you know about the fraction in the sky? What do you notice about the number line? Where do you think you would place this fraction on the number line?"
- Have students think, pair, share solutions, and record them on their whiteboards. Try a student’s solution, and ask some guiding questions again. You may repeat with additional puzzles in Level 1.

Connect and Extend

- Display the first puzzle in Level 2 with a denominator of 100. Say to students, “What do you notice about the denominator of this fraction and the tick marks on the number line?”
- Ask students to talk with a neighbor about where the fraction is placed if the number line is not partitioned into parts equal to the denominator.
- Share students’ thinking. Try a student’s solution, and watch the feedback. Pause to discuss the number of bars between the tick marks for tenths and hundredths.
- You may also want to use the annotation tool to highlight the relationship of tenths and hundredths. Ask students: “What do we know about the relationship between tenthths and hundredths? How do they compare? How many tenths does it take to make 1? How many hundredths? How many hundredths does it take to make 1/10?”
- Solve additional puzzles in Level 2.

How does the student:

- determine where to place a fraction on a number line?
- determine where to place a decimal on a number line?
- explain the relationship between tenths and hundredths?
- write decimal and fraction forms of a 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

- Loretta keeps time for each lap she runs around a track. The first lap she ran in 1.83 minutes. The second lap she ran in 1.9 minutes. She ran for three laps. Her total time for the three laps was 4.48 minutes. How long was her third lap?

Instructional Stations (40 minutes)

Students will rotate through the stations (20 min each). Use this time to give the Post-Assessment and/or Post-Quiz and to provide students time to finish their games.

Station 1: Small Group Instruction

- Hand out the Post-Assessment and/or Post-Quiz to students.
- If students finish early, they can sign in and play ST Math puzzles.

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 Accomplishments Log.

Station 3: Table Games

- Have students solve the Sudoku puzzles.

Station 4: Design Challenge

- Have students finish their games and Reflection Posters.
- Have student complete page 17 in their Design Challenge Station Booklet, and reflect on the changes to make improvements on their game.
- If students are done, they should be preparing their presentations. Students can use page 18 in their Design Challenge Station Booklet to prepare for their presentations.

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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.

- Work with students to review the thinking they have recorded in their journals, (My Thinking Path, Exit Tickets, PODs, ST Math Puzzle Reflection, etc.), and discuss what they have learned during Immersion.
- Discuss major concepts and vocabulary they learned and used 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.
- Create a Reflection Poster Brainstorm. This can be used as a rough draft of the 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 begin working on their posters.
- The posters will be displayed for the entire school and parents to see on Day 5.

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 begin to think about all of the things that they have learned and make a poster to share what they have learned.

Whole Group Table Games (20 minutes)

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

Focused Instructional Time (40 minutes)

Focused Instructional Time

- In this time, students must complete the survey, their game, and their Reflection Poster.
- If everything is completed, they may choose to play their own games, ST Math games, or the board games; or practice their presentations.

Station 1b: Reflection Poster

- Give students time to continue working on their Reflection Poster.

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 Accomplishments Log.

Station 3: Table Games

- Allow students to choose one of the Table Games they have learned.
- Have students play that game.

Station 4: Design Challenge

- Have students finish their games and Reflection Posters.
- Have student complete page 17 in their Design Challenge Station Booklet and reflect on the changes to make improvements on their game.
- If students are done, they should be preparing their presentations. Students can use page 18 in their Design Challenge Station Booklet to prepare for their presentations.

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Focused Instructional Time (45-70 minutes)

Focused Instructional Time

- In this time, students must complete the survey, their game, and their Reflection Poster.
- If everything is completed, they may choose to play their own games, ST Math games, or the board games; or practice their presentations.

Station 1b: Reflection Poster

- Give students time to continue working on their Reflection Poster.

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 Accomplishments Log.

Station 3: Table Games

- Allow students to choose one of the Table Games they have learned.
- Have students play that game.

Station 4: Design Challenge

- Have students finish their games and Reflection Posters.
- Students who finish early can play any of the games they learned at the games station.

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
  - Time to practice presentations

Closing (10 minutes)

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.

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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.