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Grade 4 | Module 1

Topic: Acclimate Students to ST Math Immersion

[Module 1 Resources](#)

This module's focus: Getting your students started on ST Math and acclimated to the structure of the ST Math Immersion program. Whether or not your students have been using ST Math, it is important to introduce it. During this module, students will discuss strategies and learn how to overcome hurdles. Students will also begin to engage with the components of the program. Most importantly, during this module students will actively engage in thinking about their thinking and the strategies they use to solve problems and overcome challenges, while getting excited about exploring mathematics.

Module 1 at a Glance

Printed Resources

- **Bookmarks**
 - Problem Solving Process Bookmark
 - Problem Solving Facilitation Bookmark
- **Grades 3-5 Table Games**
 - Traffic Lights Tic-Tac-Toe
 - Dara
 - Equivalent Fraction Concentration (Day 4)
 - Multiplication Connect Four (Day 4)
- **Problem Solving Journal** (pages 2–7)
 - My Thinking Path
 - Problem of the Day (POD)
 - Exit Tickets
 - ST Math Puzzle Reflections

Optional Printed Resources

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

Teacher Resources

- ST Math Activity Pages - Teacher Introduction
- Teacher Planner
- Teacher Guide

Immersion Slide Deck (slides 2–14)

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

Supplies for Table Games (per group)

- **Traffic Lights Tic-Tac-Toe** - Tic-Tac-Toe game board; red, yellow, and green color tiles (9 of each color)
- **Dara** - Dara game board, 2 sets of 12 small game pieces of different colors

Other Supplies for Students

- Paper fraction strips or other fraction model manipulatives

My Thinking Path

- This daily opportunity for reflecting will be introduced on Day 3 of this module. Students will reflect on solving problems involving comparing fractions.

ST Math Puzzle Talks

- Big Seed
- Scale Fractions
- Fraction Bricks

Problem Solving

Day 1:

- **Problem of the Day** - Create a class “Getting to Know Our Class” chart. Ask the students questions to gather data about the class and record the information on a chart. For example:
 - How many of the students are girls? What fraction of the class are girls? How many of the students are boys? What fraction of the class are boys? How can we write an equation to show the total of the fraction of girls in the class plus the fraction of boys in the class?
 - Write another question about our class that can be answered by adding fractions of the class, such as the fraction of the class wearing glasses plus the fraction of the class not wearing glasses. Add these questions and equations to the class chart. Discuss that the total always equals a fraction equivalent to 1 whole.

Day 2:

- **Problem of the Day** - Remind students about yesterday’s Problem of the Day. How can we describe the class mathematically? Generate a list of three to five things students want to know about each other. For example: Favorite ice cream flavor, favorite color, number of siblings, number of pets, favorite subject in school, month of birth, favorite sport, etc.

Day 3:

- **Problem of the Day** - Create a model of a scale fraction with fourths. Use Cuisenaire rods, connecting cubes, or paper strips to create your bar model. Build a number line using your bar model. Include numbers halves, fourths, and eighths up to 3.

Day 4:

- **Problem of the Day** - Kyle and Juan each had the same size chocolate bar. Kyle cut his into 6 equal size pieces and gave 2 pieces to Carla. Juan cut his bar into 3 equal size pieces and gave 1 piece to Carla. Compare how much chocolate bar each friend has.

Preparing for Instructional Stations

This module is focused on teaching students about the structure of the stations, how to transition between stations, expectations of a station, and responsibilities in a station. It is very important to spend Days 1-3 really teaching the procedures of the stations. Use the [Teacher Planner](#) as a resource for planning Instructional Stations, also see the [Instructional Stations Overview for tips and best practices](#).

Day 1: Table Game Play (whole group)

- Discuss why we play games.
- Introduce and play the game Traffic Lights Tic-Tac-Toe.

ST Math Puzzles (small group)

ST Math Pre-Assessment and/or Pre-Quiz

- Students can play when they complete the Pre-Assessment and/or Pre-Quiz

Day 2: Table Game Play (whole group)

- Introduce and play Dara.
- Discuss why we play games like Traffic Lights Tic-Tac-Toe and Dara.
- Have students identify the math and/or strategy in the games.

ST Math Puzzles (small group)

- Have students sign in and play ST Math.

Day 3: Instructional Stations Routines (whole group)

- Establish class Routines

Table Game Play (small group)

- Play Traffic Lights Tic-Tac-Toe and Dara

ST Math Puzzles (small group)

- Have students sign in and play ST Math.



Grade 4 | Module 1 | Day 1

ST Math Immersion Focus (10 minutes)

Introduce ST Math Immersion and its components, and answer any questions the students may have to better prepare them for a successful experience. Introduce the components of the program including the Problem Solving Journal (which includes My Thinking Path, Problem of the Day (POD), Exit Tickets, and Puzzle Reflections), Puzzle Talks, and Instructional Stations (which includes Small Group Instruction, ST Math Puzzles, and Table Games). There are optional Activity Pages that can also be introduced. Explain how you will be completing the Pre-Assessment and / or Pre-Quiz if you decide to use them.

ST Math Focus (15 minutes)

Reminder About or Introduction to ST Math

Your students likely have been playing ST Math. For some of them, this may be their first experience with ST Math. On this first day it is important to reintroduce ST Math while sharing important tips and reminders as students play ST Math. (See Slide Deck, slides 3-5.)

If your students have used ST Math, you will not need to do a formal introduction to the program. Instead focus on engaging them in discussions where they can share tips, encouragement, and success stories with ST Math.

- Brainstorm what students like about ST Math. What tips do they have to share? What do they do when they get stuck?
- Have students share their favorite games and why they like them.
- Discuss goal setting with students. Have students set a puzzles and minutes goal for each day they play ST Math games.
- Provide students with an Accomplishments Log (Data Tracker), and walk them through how to use it.
- Let the students know if they will be doing the Journey, Assignments, or both. Remind them that you are able to see the minutes and puzzles they have completed.
- Ask: When you do an ST Math puzzle how does the animation help? Give an example.
 - This is a group discussion. Help students understand that the animation in the puzzle shows them if they are right or wrong. The information provided by this feedback (animation) can be used to adjust their thinking about how to solve the puzzle. As you discuss, allow all students to contribute to answering this question. Create a chart of their responses. Make sure you put their name or initials by their response so that you can compare it at the end of the program to what they learned.

For students who are new to ST Math:

- Choose one of the following ways to introduce ST Math to your students.
 - Show students the [Guided Intro](#) and/ or Intro Video [[English](#)] [[Spanish](#)]
 - Play the Slinky [game](#) with your students. During gameplay explain that ST Math is a program that teaches math in a very different way.
 - Encourage students to look at the visual models on the screen and determine what they think they should do.
 - Point out the things that are clickable and the clues that are given on the screen. (Click on the sky, and the parts of the screen shimmer to show where to click.)
 - Make sure students understand that they have to complete all the puzzles in a level before moving on to the next.
 - Remind students that if they get a puzzle wrong, they can click anywhere on the screen to replay the animation or to track movement on the screen to learn from their informative feedback.

Problem Solving (20 minutes)

Problem of the Day

- Create a class “Getting to Know Our Class” chart. Ask the students questions to gather data about the class, and record the information on a whiteboard or chart. (You will use this information throughout the module so it is important that it is in a form you can refer back to.)
 - Some questions to ask to gather data might include: How many students are in this class? How many are girls? Boys? How many students have brown eyes? Blue eyes? Green eyes? How many students in the class have black hair? Brown hair? Blonde hair? Red hair? How many have pets? Siblings? Favorite subject? Favorite flavor ice cream? Favorite color?
 - This is a great opportunity to practice counting, making tally marks, and comparing numbers (more/less, bigger/smaller, one more, two more, one less, two less, etc.)

Preparing for Instructional Stations (45 minutes)

Table Game Play & Discussion (25 minutes, whole group)

- Ask students to think about their favorite game to play. Engage them in a discussion about why that game is their favorite.
- Share with them that people of all ages enjoy playing games. Ask them to think about why people play games. Record their responses on chart paper.
- Tell students they are going to play a game. Introduce students to the game Traffic Lights Tic-Tac-Toe.
- Have them play the game with a partner.
- Discuss as a whole group. Ask students to share what they liked about the game. Ask questions about the math they used in the game, and record answers on chart paper. (How did the math work in the game? What was the purpose?)

ST Math Puzzles (20 minutes, small groups)

Students in small groups will each individually play ST Math Puzzles. You have the option to assign them the entire Immersion objective, have them continue their grade level journey from the previous school year, or assign them specific puzzles. If you do not have enough computers for each student to play ST Math, you can have some students working on ST Math, some continuing to play Number Line Bingo, and if applicable, others in a small group with the teacher completing the Pre-Assessment and/or Pre-Quiz.

- OR -

OPTIONAL - ST Math Immersion Grade 4 Pre-Assessment and/or Pre-Quiz

Administer the Pre-Assessment and/or Pre-Quiz to students. Those who finish early can play ST Math. This time can also be used to give the Pre-Assessment and/or Pre-Quiz to all students in a whole group setting. Another option would be to administer the assessment to small groups over the course of this first module.



Grade 4 | Module 1 | Day 2

ST Math Focus (5-10 minutes)

Today you are going to teach students the problem solving process. This process focuses on student thinking and developing problem solving skills. It follows the Perception-Action Cycle and can be used beyond ST Math to support students in problem solving. As you engage students in the Puzzle Talk, spend time highlighting strategies, pointing out the feedback, and asking students facilitation questions to promote their thinking. Show them the [Problem Solving Bookmark](#), and encourage them to refer to it as they play ST Math on their own.

Puzzle Talk: Big Seed (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

- Tell students you are going to teach them questions they can ask themselves to help think through the puzzles.
- Show the first puzzle and encourage students to complete this sentence: "I notice _____" (without suggesting a solution). Have several students share what they notice.
- Tell students that they can click the sky to make the clickable elements shimmer.
- Once students call out all the components they see on the screen, ask students what they wonder. "What question is this puzzle asking?"

Predict and Justify

- Encourage students to complete this sentence: "My prediction is _____ because_____."
 - Have different students share their predictions and why they think theirs are the best.
 - Ask students to name or describe their strategy they will use to test their prediction.
 - For example, students may predict that they have to fill the empty blocks. In this case, they would name the strategy of flipping. "My strategy is to flip the shape to fill in the blocks."

Test and Observe

- Try a few student strategies, both correct and incorrect. Watch the feedback, and discuss what they observed in the animation.

Analyze and Learn

- Facilitate students through the feedback analysis and understanding what worked and didn't work. By examining their thinking, students either reinforce their strategies or examine their errors, which provides an opportunity for them to learn from their mistakes.
 - How does this compare to what you thought would happen?
 - What did you learn?
 - How will you use what you learned?
- Be sure to use the playback features to pause, rewind, and fast forward the animation and discuss what they are learning from the feedback. Use the annotation tools to highlight the learning.
- Encourage students to complete this sentence: "Something I learned from the feedback is _____."
- Continue to facilitate student thinking as you work through additional puzzles.

Connect and Extend

- Share solutions, and discuss how puzzles are different as the levels progress. Encourage a variety of strategies/solutions, and remember to facilitate, not teach, how to solve the puzzles.
- Ask the students if what they learned about how the puzzle behaves in previous levels can be applied here.
- When playing Level 3, ask the students if there is more than one answer to the puzzle. Explore different solutions, and discuss what they thought would happen vs. what did happen.
- Before moving on, ask students to describe what is occurring in the puzzles. What are they learning? Do they notice any relationships or patterns? Chart the math concepts/words/skills that students discuss.
- Depending on how students are doing with the puzzles, you may want to skip to Level 5.
- Have students work in breakout groups to complete a puzzle from Level 5. How did what they learned in their earlier puzzles help them solve this puzzle?

Problem Solving (20-25 minutes)

Problem of the Day

- Remind students about yesterday's Problem of the Day. How can we describe the class mathematically? Generate a list of three to five things students want to know about each other. For example:
 - Favorite ice cream flavor, favorite color, number of siblings, number of pets, favorite subject in school, month of birth, favorite sport, etc.

Preparing for Instructional Stations (35 minutes)

Table Game Play & Discussion (20 minutes, whole group)

- Discuss the game that the students played yesterday, Traffic Lights Tic-Tac-Toe. Review what they liked/didn't like about the game. Ask questions, such as how did they figure out who won. Did they have a strategy that helped them win?
- Let students know that they are going to play a different game today.
 - Introduce students to Dara.
 - Have them play the game with a partner.
- Discuss as a whole group. Ask students to share what they liked/didn't like about the game. Ask questions about the math they used in the game and record answers on chart paper.
 - How did the math work in the game?
 - What was the purpose of the math?
- Show them the game chart from yesterday. Have them think about Traffic Lights Tic-Tac-Toe and Dara. Discuss their answers to the questions:
 - Which game did they like better? Why?
 - How was mathematics involved in each of these games?

ST Math Puzzles (15 minutes, small group)

Students in small groups will each individually play ST Math Puzzles. You have the option to assign them the entire Immersion objective, have them continue their Grade Level Journey from the previous school year, or assign them specific puzzles. If you do not have enough computers for each student to play ST Math, you can have some students working on ST Math, some continuing to play Dara, and if applicable, others in a small group with the teacher completing the Pre-Assessment and/or Pre-Quiz.



Grade 4 | Module 1 | Day 3

My Thinking Path (5-10 minutes)

Students will begin solving problems involving comparing fractions, including ordering on a number line.

My Thinking Path Discussion

- Introduce the My Thinking Path page to students. Have them write in the topic: “Solve problems involving comparing fractions.”
- Have students complete page 2 in their journal.
- Discuss their ideas and allow students to add to their paper any additional thoughts they have.
- From today on, begin each of Days 1-4 with time for students to reflect on their learning and prepare for the day.

Puzzle Talk: Scale Fractions (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 2. Ask: “What do you notice? What do you wonder?” Allow a few students to share out.

Predict and Justify

- Ask students to make a prediction of how to solve the puzzle, and after some think time, have them do a think-pair-share with a partner.
- Have students share out, and try one of the students’ ideas. Ask why they chose that strategy.

Test and Observe

- Solve the puzzle, and have students describe what happened. You may choose to replay the animation and pause before JiJi crosses.

Analyze and Learn

- Ask students some questions, such as: How is the visual model we saw on the top of the screen related to the number line? What did we learn and how does that help us with the rest of the puzzles?
- Show the next puzzle, and repeat the Problem Solving Process.

Connect and Extend

- Ask students: “How could we represent this model as a fraction? A mixed number?” Have students write their answers on their whiteboards or a piece of paper.
- Share students’ answers, and discuss.
- Try one of the students’ strategies. Watch and discuss the feedback. Were they correct? If so, what did they learn? If not, what will they change?
- Repeat with a few more puzzles in Level 2 and Level 4, and ask questions about the relationship between the denominator and the partitions for the number line.

How does the student:

- explain the fractions they see in the visual model? (Do they understand the $1 = 3/3$, which is the same as $1/3 + 1/3 + 1/3$?)
- understand how fractions are represented on a number line (e.g., fractions between 0 and 1, 1 and 2)?
- represent the model on the number line? (Can they convert the whole number to unit fractions?)
- 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

- Create a fraction model partitioned into fourths. Use Cuisenaire rods, connecting cubes, or paper strips to create your model. Build a number line using your bar model. Include numbers halves, fourths, and eighths up to 3.

Preparing for Instructional Stations (40 minutes)

Students will visit two stations today (15 minutes per station). See [Instructional Stations Overview](#).

Instructional Station Routines (10 minutes)

- It is important to establish routines for station rotation that allow students to seamlessly move from one station to another with little disruption. Beginning with module 2, there are 3 stations. For today, have students rotate only between the stations below while you monitor the students. Allow for 15 minutes at each station. Consider these tips as you set up stations with your class.
 - Communicate clear expectations to students.
 - Provide clear directions, and ensure that students have all the materials they need.
 - Make sure math tools are accessible to students.
 - Set a timer to help students pace themselves.
 - Provide strategies for students who need help during Instructional Station time.
 - Be sure to consider movement in high traffic areas during transition time.
 - Consider giving students' roles in the group to support accountability and collaboration.

Station 1: 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 2: Table Games

- Select Traffic Lights Tic-Tac-Toe or Dara. Have students play that game.
- Ask students to complete an Exit Ticket during the final 5 minutes.



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My Thinking Path (5-10 minutes)

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

Puzzle Talk: Fraction Bricks (20-25 minutes)

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

Notice and Wonder

- Give students fraction strips, and display a puzzle in Level 1. Ask: “What do you notice? What do you wonder?” Give students think time before sharing out whole group.

Predict and Justify

- Have students use fraction strips to figure out how they might solve this puzzle.
- Have students share out. Select one of the students’ ideas to discuss. Ask students: “Why do you think the answer is ___?” Discuss other strategies as a class.

Test and Observe

- Solve the puzzle using one of the strategies, and have students describe what happened in the feedback.

Analyze and Learn

- Ask students (giving think time): “What do we know equivalent fractions and how does that help us with the rest of the puzzles? Is there another fraction that is equal to this fraction? Can you figure out which fraction will fill this hole, too?”
- Have students determine an equivalent fraction. Try a student’s solution. Ask students to record the solution on their whiteboards by writing the fractions using the equal sign to show their equivalence. Discuss as a whole group the strategies students are using for locating a fraction on the number line.
- Discuss how they partition the number line and then locate the fraction. As you work on the puzzles, discuss and chart strategies students use to compare and order fractions. Keep this chart going throughout the module.
- If the puzzle has more equivalent fractions, have students determine the missing fractions and record the comparisons as a number sentence.
- Repeat with other puzzles in Level 1 and the first puzzle in Level 2, asking students to discuss and write what fraction they think will fill the hole.

Connect and Extend

- Using a fraction from a current puzzle, have students draw a number line and place the given fraction on the number line. Then ask students to place all of the equivalent fractions on the number line, too. Discuss why equivalent fractions are at the same spot on the number line.
- Sticking with the same puzzle, or a new one in Level 2, ask students to write and draw on a number line a fraction that is less than the current fraction and explain their work to a partner. All of the denominators in Level 2 are eighths, so continue to add equivalent fractions to the number line as students solve puzzles.
- Display the next puzzle in Level 2.
- Ask students to then write a fraction that is greater than the fraction shown, and share their fraction with a partner. Encourage them to prove that each fraction is greater than the fraction shown in the puzzle. Have students share out some of their solutions whole group.

- Show puzzles in Level 3 (all fifths and tenths). Ask questions such as:
 - What do you notice about the numerators and denominators in the fractions that fill the hole?
 - If the fraction in the sky has the denominator of 5, will there always be a fraction with the denominator of 10? Explain. If the fraction in the sky has the denominator of 10, will there always be a fraction with the denominator of 5? Explain.

How does the student:

- write equations to show equivalence of fractions?
- discuss the size of the fractions (denominator) and the number of unit fractions (numerator) of that size to compare equivalent fractions?
- partition a number line to place fractions?
- add fractions to a number line?

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

- Kyle and Juan each had the same size chocolate bar. Kyle cut his into 6 equal size pieces and gave 2 pieces to Carla. Juan cut his bar into 3 equal size pieces and gave 1 piece to Carla. Compare how much chocolate bar each friend has.

Whole Group Table Games (15-20 minutes)

During this time you will introduce Equivalent Fraction Concentration and Multiplication Connect Four. Students will play these Table 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)

- Have students complete the Intro to the Activity Book page.
- Project the game, *Fraction Bricks*.
- Play a few puzzles to help students understand the game.
- Have students turn to the ST Math Activity Page: *Fraction Bricks*.
- 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.

Closing (10 minutes)

Thinking and Reflecting Time

- Give students 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 this module, what they have questions about, and what they would like to learn more about.