

ST Math Summer School K-5 Curriculum

1 Objective

- Adding and subtracting fractions with unlike denominators

2 Overview

- Students use benchmark fractions, equivalent fractions and comparing fractions to create a number line to compare and order fractions, place them on a number line, and justify their reasoning for where they placed the numbers. They use this to assess the reasonableness of answers as they add and subtract fractions with unlike denominators.

3 Week 2 At A Glance

Printed Resources

- Posters
 - Think Before You Click Poster
 - Design Process Poster
- 3-5 Games
 - Traffic Lights Tic Tac Toe
 - Dora
 - Equivalent Fractions Concentration
 - Multiplication Connect Four
 - Number Line Fractions BINGO (Day 5)
 - Final Countdown (Day 5)
- Game Mats
 - Pie Monster 1-2 Game Mat
 - Estimate Fractions Game Mat
- Recording Sheets
 - My Thinking Path recording sheet
 - Look What I Did Today reflection sheet
 - Exit Tickets
- Design Station Booklet (pages 7-12)
- Problem Solving Printing
 - G5_journal_W2_D3
 - G5_journal_W2_D4
 - G5_task_W2_D1
 - G5_task_W2_D2
 - G5_POD_W2_D3
 - G5_POD_W2_D4
- Resources
 - Intervention Planner

4 My Thinking Path

- This week, students reflect on adding and subtracting fractions with unlike denominators.

5 ST Math Puzzles

- Fractions on the Number Line > Estimate Fractions on a Number Line (#5)
- Unlike Denominator Concepts and Strategies > Number Line Equivalence (#1)
- Unlike Denominator Concepts and Strategies > Pie Monster (#4)
- Unlike Denominator Addition and Subtraction > Module 1 > Scale Fraction Visual (#4)

6 Problem Solving

- Day 1:
 - Extended Problem of the Day Task - Build a number line and place the fraction cards on the number line. Engage students in a whole class discussion of how they determined where to place the fractions. Chart strategies.
- Day 2:
 - Extended Problem of the Day Task - Partner students. Partner A creates a bar model of fractions that include halves, fourths and eighths, Partner B creates a bar model of fractions that include thirds, sixths and twelfths. They may use Cuisenaire rods, connecting cubes or paper strips to create their bar model, but they must both use the same manipulative and have the same size "one" whole. Each builds a number line using their bar model. Include numbers up to 3. Partners compare their two number lines.

7 Problem/Task of the Day

8 Journal Prompt

9 Stations

8

- Day 3:
 - Problem of the Day - Darla wanted to make 2 gallons of punch to take to the school picnic. She found a recipe that called for $\frac{3}{4}$ gallons of fruit punch, 2 quarts of orange juice, $\frac{1}{2}$ gallons of 7-Up, and $\frac{1}{4}$ gallons of water. If Darla makes this recipe, will she have as much punch as she wants? Justify your solution.
- Math Journal Entry - Halley solved this subtraction problem: $\frac{7}{8} - \frac{1}{2} = \frac{6}{8}$. Compare the fractions in the equation to help explain why Halley's solution is not reasonable.
- Day 4:
 - Problem of the Day - Kevin filled 4 glasses with different amounts of water so they would make different sounds when he rubbed his finger along the rim. Glass A held $\frac{1}{2}$ cup of water, glass B held $\frac{1}{4}$ cup of water, glass C held $\frac{3}{8}$ cup of water, glass D held $\frac{2}{8}$ cup of water. How much water did Kevin use? How much water could he put in a fifth glass if he had 3 cups of water?
 - Math Journal Prompt - Bart solved this addition problem: $\frac{1}{2} + \frac{3}{8} = \frac{4}{10}$. Use equivalent fractions to explain to Bart that his solution is not reasonable.

9 Stations Week 2

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 which one to go to. Consider assigning students who need additional support to Station 1 where they can work with the teacher on concepts they are struggling with.

<p>Station 1: Small Group Instruction</p> <ul style="list-style-type: none"> Days 1 & 2: Show and work through puzzles from Fractions on the Number Line > Bubble Fraction Trap (#7). Days 3 & 4: Show and work through some of the puzzles in Unlike Denominators Addition and Subtraction > Module 1 > Alien Bridge (#6). 	<p>Station 2: ST Math Station</p> <ul style="list-style-type: none"> Have students log on 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 back out to the Today's Accomplishments screen. Have students complete the Look What I Did Today reflection sheet.
<p>Station 3: Games</p> <ul style="list-style-type: none"> Select Equivalent Fractions Concentration or Multiplication Connect Four. Have students play that game. Ask students to complete an Exit Ticket during the final 5 minutes. 	<p>Station 4: Design Station</p> <ul style="list-style-type: none"> Days 1 & 2: Have students think about how they might change a game. Days 3 & 4: Complete the Game Planning sheet on page 6 in the Game Design Station booklet.


Day 5: Design Station

- Discuss the importance of rules.
- Have the students complete the Rules Bonus Challenge in groups.
- As students continue to work on their blueprints they need to ensure that they are making the clear rules and directions.

Each week begins with an overview:

- 1 Objective** - specific math focus for the week
- 2 Overview** - the content students will be learning during the week
- 3 Printed Resources** - posters, games that build number sense, game mats, recording sheets, design station booklet, problem solving activities, and other resources that will be used during the week's lessons
- 4 My Thinking Path** - a graphic organizer students use each week to track their thinking around the week's topic
- 5 ST Math Puzzles** - the puzzles focused on in the Puzzle Talk lessons
- 6 Problem Solving** - problems/tasks/writing prompts that can be used to explore connections, expand perspectives, and have students check and challenge each other
- 7 Problem/Task of the Day** - opportunities for students to share strategies and discuss how they solved the problem
- 8 Journal Prompt** - opportunities for students to communicate their mathematical understanding in writing.
- 9 Stations** - opportunity for students to engage in personalized instruction by rotating through stations
 - Station 1: Small Group Instruction
 - Station 2: Games
 - Station 3: ST Math Station
 - Station 4: Design Challenge

ST Math Summer School K-5 Curriculum



ST Math® Summer School Grade 5 - Week 2

1
Day 1 - Lesson

My Thinking Path (10 minutes)


- Introduce the *My Thinking Path* document to students. Have them write in the topic, "Adding and Subtracting Fractions with Unlike Denominators."
- Have students begin working on the first two boxes.
- 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.

2
Puzzle Introduction Strategy

Fractions on the Number Line > Estimate Fractions on a Number Line (#5)

- Introduce the puzzle to the whole group.
 - Show a puzzle from Level 1. Have students discuss what they notice with a partner; then discuss whole group what students notice.
- Discuss solution strategies.
 - Students discuss in pairs and then whole group what they think will happen.
 - Try student suggestions. Analyze the feedback in both correct and incorrect solutions.
- Show other puzzles from different levels and have students solve them. Help them use what they already know to solve new levels.

3
Puzzle Introduction Video



Puzzle Intro Review Video

4
Math Focus


Locate fractions on number lines with and without partitions marked. Develop strategies for locating fractions by visually partitioning each whole into a number of sections based on the denominator and counting by unit fractions based on the numerator. Name fractions greater than one as mixed numbers.

5
Puzzle Talk:

Fractions on the Number Line > Estimate Fractions on a Number Line (#5)

- Give each student the Estimate Fractions Game Mat. Show Level 2 puzzles.
 - Have students represent this puzzle on their game mat by sliding the rocket over to the point on the number line. Students discuss their reasoning with a partner.
 - Share reasoning whole group. Listen for discussions about benchmark fractions or students comparing/ equivalent fractions. Chart different student responses.
 - Discuss role of the numerator and denominator in their estimates.
- Show a puzzle from Level 3.
 - Have students discuss what they notice with a partner.
 - Discuss how this puzzle compares to the Levels 1 and 2 puzzles.
- Solve and discuss how their solution strategy compares to solving puzzles in Levels 1 and 2.
- Show puzzles from Levels 4 and 5 and have students represent them on their game mat.
 - Share reasoning whole group.
 - Continue to add strategies to the chart including using fractions equal to one, counting unit fractions for fractions greater than one, and creating mixed number from fractions greater than one.

6
Game in a Minute



Estimate Fractions on a Number Line

7
Problem Solving (10 minutes)

- Extended Problem of the Day Task** - Build a number line and place the fraction cards on the number line. Engage students in a whole class discussion of how they determined where to place the fractions. Chart strategies.

$\frac{3}{6}$	$\frac{7}{8}$	$\frac{11}{12}$	$\frac{8}{6}$
$\frac{1}{8}$	$\frac{3}{4}$	$\frac{25}{12}$	$\frac{6}{3}$
$\frac{6}{12}$	$\frac{6}{5}$	$\frac{3}{5}$	$\frac{14}{8}$

8
Day 1 - Stations

Students will visit two stations today and the other two stations tomorrow.

Station 1: Small Group Instruction

Show puzzles from Fractions on the Number Line > Bubble Fraction Trap (#7).

- Have students use fraction strips, Cuisenaire rods or connecting cubes to compare fractions and locate them on a number line.
- Discuss how the number line works --moving right numbers increase, a number is a directed location on the number line, and any fraction can be found by partitioning the number line into sections of size $\frac{1}{b}$ and iterating those unit fractions.

Station 2: ST Math


- Have students log 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 back out to the Today's Accomplishments screen. Have students complete the *Look What I Did Today* reflection sheet.

Station 3: Games

- Select *Equivalent Fractions Concentration* or *Multiplication Connect Four*.
- Have students play that game.
- Ask students to complete an *Exit Ticket* during the final 5 minutes.

Station 4: Design Station

- Have students select one of the games they played last week and replay it.
- After playing the game, have students discuss how they would change the game.
- Students make the changes and then try playing the game with their changes.
- Have them discuss how the changes affected game play. Did they like them? Did they not like them? Did it make it easier or harder?



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Every day's lesson plan includes:

- 1 **My Thinking Path** - provides direction on how to get students thinking about the topic for the week
- 2 **Puzzle Introduction Strategy** - strategy for introducing a puzzle to the whole class
- 3 **Puzzle Introduction Video** - instructional video explaining strategies for introducing and discussing a puzzle with the whole class
- 4 **Math Focus** - explanation of the math focus for the lesson
- 5 **Puzzle Talk** - whole group lesson that includes strategies for discussing the visual model in the puzzle, engaging students in discourse, and making connections to the mathematics
- 6 **Game in a Minute Video** - overview of the ST Math game used in the lesson
- 7 **Problem Solving** - students will engage with a Problem of the Day and Math Journal Prompt or Extended Math Task
- 8 **Stations** - students working in groups of 3-4 participate in instructional stations