ST Math® Summer School Grade 4 - Week 2

Objective

- Comparing fractions and understanding equivalence.

Overview

- Students create fractions using paper strips. They use the strips and the number line they created to compare fractions and find equivalent fractions. Students solve problems involving comparing and ordering fractions.

Week 2 Links
bit.ly

Week 2 At A Glance

Printed Resources

- **Posters**
  - Think Before You Click Poster
  - Design Process Poster
- **3-5 Games**
  - *Traffic Lights Tic Tac Toe*
  - *Dara*
  - *Equivalent Fractions Concentration*
  - *Multiplication Connect Four*
  - *Number Line Bingo Fractions* (Day 5)
  - *Final Countdown* (Day 5)
- **Game Mats**
  - Pie Monster 1-2 Game Mat
  - Pie Monster 2 Step Equations Game Mat
  - Estimate Fractions Game Mat
- **Recording Sheets**
  - *My Thinking Path* recording sheet
  - *Look What I Did Today* reflection sheet
- **Design Station Booklet** (pages 7-12)
- **Problem Solving Printing**
  - G4_journal_W2_D1
  - G4_journal_W2_D2
  - G4_journal_W2_D4
  - G4_task_W2_D3
  - G4_POD_W2_D1
  - G4_POD_W2_D2
  - G4_POD_W2_D4
- Resources
  - Intervention Planner

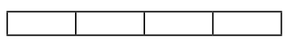
My Thinking Path

- This week, students reflect on comparing fractions and understanding equivalence

ST Math Puzzles

- Fraction Equivalence and Ordering > Common Denominator with Fractions (#3)
- Mixed Numbers > Estimate Fractions on a Number Line (#3)
- Fraction Equivalence and Ordering > Fraction Order Fill (#4)

Problem Solving

- Day 1:
  - **Problem of the Day** - Jana and Deklan each brought the same size pan of brownies for the class party.
    - Jana cut her brownie into 4 equal size pieces.
    - Deklan cut his brownie into 3 equal sized pieces.
    - They needed to give 24 students the same size piece.
    - How could they do this with their two pans of brownies?
  - **Math Journal Prompt** - Explain how to find $\frac{3}{8}$ of this whole rectangle. 
- Day 2:
  - **Problem of the Day** - Howard and Imani were in charge of dividing the clay for their table in Art class. Each table had 4 students.
    - Howard divided the clay into 4 equal sized pieces.
    - Imani divided the clay into 8 equal sized pieces.
    - Both tables fair shared all of their clay.
    - Compare and contrast the clay students at each table received.
  - **Math Journal Prompt** - Explain how to tell if 2 fractions are equivalent.
- Day 3:
  - **Extended Problem of the Day** - Work with a partner to cut apart the fractions and place them on a number line.
- Day 4:
  - **Problem of the Day** - Isabella baked a pan of lasagna for her family of 4. She cut the lasagna into eight equal pieces.
    - Explain how much lasagna each family member might eat.
    - Write equations/inequalities to compare how much each family member ate.
    - Find at least 3 ways.
  - **Math Journal Prompt** - How does a number line help you compare fractions? How do you know if two fractions are equivalent on a number line?

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.

Station 1: Small Group Instruction

- Days 1 & 2: Engage students in a math conversation around more problems that involve different fraction models.
- Days 3 & 4: Engage students in a math conversation around more problems that involve different fraction models or work on an ST Math puzzle.

Station 2: ST Math Station

- 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 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

- 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.

ST Math® Summer School Grade 4 - Week 2

Day 1 - Lesson

My Thinking Path

- Hand out the My Thinking Path document to students. Have them write in the topic, "Comparing fractions and understanding equivalence."
- 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.

Puzzle Introduction Strategy

Fraction Equivalence and Ordering > Common Denominator with Fractions (#3)

Puzzle Intro Review Video

- 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 want to try to solve the puzzle. Ask students to visualize 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.

Math Focus

Write an equation to compare fractions before and after they are cut. Include the fraction ($\frac{a}{a}$) that they multiply the original fraction by in order to get the equivalent fraction after it is cut (e.g., $\frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$).

Puzzle Talk:

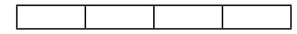
Fraction Equivalence and Ordering > Common Denominator with Fractions (#3)

- Show puzzles from Levels 1 and 2.
  - Explain how you determined which cutter to select.
  - Name the fractions represented by the two different color bars.
- Show a puzzle from Level 3.
  - Have connecting cubes, centimeter cubes, and strips of paper available for students.
  - Have students use available manipulatives to help them solve the puzzle. Share with a partner.
  - Have students share different strategies for solving the puzzle.
- Show other puzzles from Level 3.
  - Discuss which fraction is greater before selecting a cutter.
  - Have students discuss what they think will happen when they select the cutters.
  - Name the fractions before cutting and after they are cut.
  - Write equations and inequalities to compare the two fractions and the fractions before and after they are cut.

Common Denomiator with Fractions

Problem Solving (10 minutes)

- **Problem of the Day** - Jana and Deklan each brought the same size pan of brownies for the class party.
  - Jana cut her brownie into 4 equal size pieces.
  - Deklan cut his brownie into 3 equal sized pieces.
  - They needed to give 24 students the same size piece.
  - How could they do this with their two pans of brownies?
- **Math Journal Prompt -** Explain how to find $\frac{3}{8}$ of this whole rectangle.



Day 1 - Stations

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

Station 1: Small Group Instruction

- Create fractions from paper strips of the same length.
- Use different colors for different fractions.
- Use your fraction strips to compare fractions $\frac{1}{2}$, $\frac{3}{4}$, $\frac{6}{8}$, $\frac{2}{8}$, $\frac{3}{2}$, and $\frac{9}{4}$. You may work with a partner to have enough unit fractions to create some of these fractions.
- Place each of these fractions on the number line you created last week.
- Discuss why they may or may not be able to place the strips along the line to plot the 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 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?

ST Math® Summer School Grade 4 - Week 2

Day 2 - Lesson

My Thinking Path

- Have students reflect on what they have learned about solving problems involving comparing fractions and understanding equivalence.

Puzzle Talk:

Fraction Equivalence and Ordering > Common Denominator with Fractions (#3)

- Show a puzzle from Level 4.
  - Use the scrub bar to stop the action as the partitions are being cut and have students think about and describe what is happening.
  - Discuss the number created when the two fractions are added together at the bottom.
  - What happens to the two fractions when they are cut by the number of partitions in the other fraction?
- Show puzzles from Level 5.
  - Discuss how this level compares to Level 4.
  - Think about and discuss possible solutions.
  - Discuss how to name the fractions after they are cut. Write an equation to compare the fractions before and after they are cut.
- Show puzzles from Level 6.
  - Continue to discuss the fractions before and after they are cut and naming fractions.
  - Discuss why they select the cutters they select each time.
  - Write equations to represent the fractions adding at the bottom.

Math Focus

Discuss how they select the denominator to partition the number line into. As the number of partitions increases the size of the partitions decreases. Discuss the role of the denominator and numerator in placing numbers on a number line. Write equivalent fractions and mixed numbers.

Common Denomiator with Fractions

Problem Solving (10 minutes)

- **Problem of the Day** - Howard and Imani were in charge of dividing the clay for their table in Art class. Each table had 4 students. Howard divided the clay into 4 equal sized pieces. Imani divided the clay into 8 equal sized pieces. Both tables fair shared all of their clay. Compare and contrast the clay students at each table received.

- **Math Journal Prompt -** Explain how to tell if 2 fractions are equivalent.

Day 2 - Stations

Students will visit the two stations they did not visit yesterday.

Station 1: Small Group Instruction

- Create fractions from paper strips of the same length.
- Use different colors for different fractions.
- Use your fraction strips to compare fractions $\frac{1}{2}$, $\frac{3}{4}$, $\frac{6}{8}$, $\frac{2}{8}$, $\frac{3}{2}$, $\frac{9}{4}$. You may work with a partner to have enough unit fractions to create some of these fractions.
- Place each of these fractions on the number line you created last week.
- Discuss why they may or may not be able to place the strips along the line to plot the 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 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?

ST Math® Summer School Grade 4 - Week 2

Day 3 - Lesson

My Thinking Path

- Have students reflect on what they have learned about solving problems involving comparing fractions and understanding equivalence.

Puzzle Introduction Strategy

Mixed Numbers > Estimate Fractions on a Number Line (#3)

Puzzle Intro Review Video

- 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 want to try to solve the puzzle. Ask students to visualize 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.

Math Focus

Discuss strategies to compare and order fractions on the number line. Discuss fractions equal to one, how they know fractions are equivalent on the number line, benchmark fractions, and counting by unit fractions.

Puzzle Talk:

Mixed Numbers > Estimate Fractions on a Number Line (#3)

- As you work on the puzzles, discuss and chart strategies students use to compare and order fractions. Keep this chart going throughout the week.
- Give each student the Estimate Fractions game mat. Show Level 2 puzzle.
  - 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. Record different student responses.
- 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.
- Show puzzles from Levels 4 and 5 and have students represent them on their game mat.
  - Share reasoning whole group. Continue to add to the chart, including equal to one and counting unit fractions for fractions greater than one.

Estimate Fractions on a Number Line

Problem Solving (10 minutes)

- **Extended Problem of the Day** - Given a page of fractions to cut out, create a number line using all of these fractions. Be as exact as possible. Record your number line (be as accurate as possible). Select three of the fractions you placed on the number line and explain how you and your partner determined where to place these fractions on the number line. Challenge yourself.

Day 3 - Stations

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

Station 1: Small Group Instruction

Select fractions similar to the fraction cards for students to place on a number line.

- Have students use different strategies from the chart to help them place the fractions and compare them to other fractions. OR
- Show puzzles from Fraction Order Fill. Have students use fraction strips, Cuisenaire rods or connecting cubes to compare fractions. Discuss ways to compare and order fractions. Chart any new strategies.

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 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 complete the Game Planning Sheet (page 6 in their *Design Station Booklet*).
  - The name of our math game is:
  - A brief description of our game is:
  - We are choosing to make this type of game because:

ST Math® Summer School Grade 4 - Week 2

Day 4 - Lesson

My Thinking Path

- Have students reflect on what they have learned about solving problems involving comparing fractions and understanding equivalence.

Puzzle Introduction Strategy
Fraction Equivalence and Ordering > Fraction Order Fill (#4)

Puzzle Intro Review Video

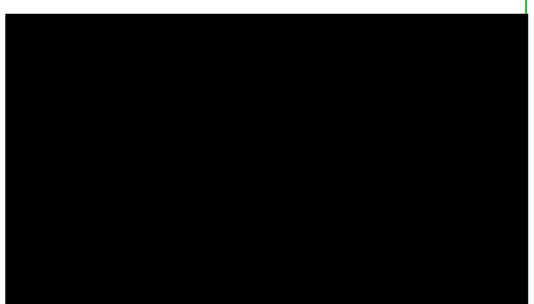
- Introduce the puzzle to the whole group.
  - Show a puzzle from Level 1. Have students discuss what they notice with a partner, then discuss whole group what students notice.
- Discuss solution strategies.
  - Students discuss in pairs and then whole group what they want to try to solve the puzzle. Ask students to visualize 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.

Math Focus

Discuss how to order fractions from least to greatest. Discuss the role of the numerator and denominator. Create a number line to compare fractions.

Puzzle Talk:
Fraction Equivalence and Ordering > Fraction Order Fill (#4)

- Show and have students solve other puzzles from Level 1 (same denominator).
  - Discuss how they determine the order.
- Show puzzles from Level 2 (same numerator).
  - Discuss how they determine the order.
  - Discuss how each level compares to the other levels.
- Show Levels 3 and 4.
  - As students work the puzzles, have them write the fractions in their notebook and write one inequality for each puzzle.
  - Have students write the fractions in order from least to greatest in their notebooks and explain how they knew how ordered the fractions. Discuss.
- For Level 4, have students use the number line they created on Day 3 of Week 1 or have them create a new number line that will help them order the fractions. Have students plot the fractions on their number line.



Fraction Order Fill

Problem Solving (10 minutes)

- **Problem of the Day** - Isabella baked a pan of lasagna for her family of 4. She cut the lasagna into eight equal pieces.
  - Explain how much lasagna each family member might eat.
  - Write equations/inequalities to compare how much each family member ate.
  - Find at least 3 ways.

- **Math Journal Prompt** - How does a number line help you compare fractions? How do you know if two fractions are equivalent on a number line?

Day 4 - Stations

Students will visit the two stations they did not visit yesterday.

Station 1: Small Group Instruction

Select fractions similar to the fraction cards for students to place on a number line.

- Have students use different strategies from the chart to help them place the fractions and compare them to other fractions. OR
- Show puzzles from Fraction Order Fill. Have students use fraction strips, Cuisenaire rods or connecting cubes to compare fractions. Discuss ways to compare and order fractions. Chart any new strategies.

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 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 complete the Game Planning Sheet (page 6 in their *Design Station Booklet*).
  - The name of our math game is:
  - A brief description of our game is:
  - We are choosing to make this type of game because:

ST Math® Summer School Grade 4 - Week 2

Day 5 - Lesson

Design Station (40 minutes)

- Discuss the importance of rules. Ask them to describe things that we have rules for and why rules are important. How do rules impact game play
- Have the students open their booklet to the Game Rules Challenge (page 7 in their *Design Station Booklet*).
- Ask the students to explain why rules are important.
  - Remind them of the rules they used when they played *Traffic Lights Tic Tac Toe* and *Dara*. What are some things that rules tell us? (Who goes first, how you move on the board, what you have to do to win, etc.)
- Discuss the game Tic Tac Toe. Remind students that *Traffic Lights Tic Tac Toe* is a modified version of tic tac toe. What are the rules of the game? Have the students write the rules in their booklets.
  - It is important to help students understand how to write rules that are clear and easy for the players to understand.
- Working in teams of two, have the students change one rule for Tic Tac Toe, write the new rule, and play the game using that rule.
  - Discuss how game play was affected by their new rule. Reiterate the importance of having clear rules.
- Inform the students that writing rules is only part of what they need to plan for their game.
- They are going to be working on blueprints. Review pages 8-11 in the *Design Station Booklet* with the students. Explain that blueprints allow them to plan out each part of their game so that it is easier to build. Let students know that they will be working on their blueprints, creating a sketch of their game, and writing their rules.
- Share with students that on page 12 of the *Design Station Booklet* they will begin assigning jobs to team members to build their game. As they make their blueprint they can start to think about who will have the job of making the game board, who will make the game cards or game pieces, who will write out all the rules that the group decides on, etc. It is important that everyone in the group helps build the game.
- After reviewing the booklet with the students, give them time to begin their blueprints.

Whole Group Games (Teacher-led) (20 minutes)

During this time you will introduce *Number Line Bingo Fractions* and *Final Countdown*. Students will play these games next week 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.

Day 5 - Stations

Focused Instructional Time (20 minutes)

- During this station time, students do not rotate. They can either be assigned to a station or allowed to choose which one to go to.
- This is an excellent opportunity to assign students who need additional support to Station 1 where they can work with the teacher on concepts they are struggling with.

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 *Intervention Planner* to help you plan your instruction.

Station 2: ST Math

- 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 complete the *Look What I Did Today* reflection sheet.

Station 3: 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 Station

- Allow students to continue to work on their blueprints.
- Once students have completed their blueprints they need to create their rules, directions, and assign the task of building the game to different members if their team.
- Remind students that they can record the jobs that need to be done on page 12 of the *Design Station Booklet.*

Day 5 - Closing

Thinking and Reflecting (10 minutes)

- Have students review their *My Thinking Path*, *Exit Tickets*, and Problem Solving work.
- Engage students in discussions about what they have learned this week, what they have questions about, and what they would like to learn more about.
- Have students complete an *Exit Ticket* summarizing their learning from the week.