DRAFT

Unit of Study
Fractions

Grade: 5	Topic: Number and Operations: Fractions	Length of Unit: 12-15 days

Focus of Learning

Common Core Standards:

Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

Supporting Standards:

Represent and interpret data.

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Enduring Understanding(s): *Students will understand that…*

- Fractions extend the number system's complexity and applicability in problem-solving.
- Fractions are numbers that express relationships between the part and the whole.
- Identifying the whole or "unit" is critical for interpretation of fractions.
- Fractions may represent division with a quotient less than one.
- Equivalent fractions represent the same value
- The more equal-sized pieces that form a whole, the smaller the pieces of the whole become.
- With unit fractions, the greater the denominator, the smaller the piece is.
- Comparisons between fractions are valid only when the two fractions refer to the same whole.

Guiding Questions: *These questions will guide student inquiry.*

- What is a fraction?
- How are fractions similar to whole numbers?
- How can you use what you know about whole number operations to solve problems with fractions?
- How does changing the number of the fractional parts help to solve problems with a different number of fractional parts?
- How is equivalence maintained when adding or subtracting fractions with different-sized parts?
- Where do we find fractions in the real world?
- When is it appropriate to estimate when solving problems with fractions?
- How will you justify your answer?
- What are ways you can use fractions to solve problem situations?

Student Performance

Knowledge: *Students will understand/know…*

- Fractions can be represented as part of whole.
- When comparing fractions, the whole must be the same.
- Fractions can be represented as part of a set
- Fractions can be represented as an area model
- Fractions can be represented as a number on a number line.

Application: *Students will be able to…*

- Create equivalent fractions.
- Use a common whole to add fractions.
- Reduce or rename fractions to solve problems.
- Reason about size of the parts based on denominator.
- Use models to represent fractions and solve problems.
- Use benchmark fractions to reason about fractions.

• Fractions can be represented as a measure. • A fraction is another representation of division. • Conceptual understanding of numerator and denominator. • Many fractions can represent the same value: 1/2=2/4=3/6. • Units can only be combined with like units – ex: common denominator: halves + halves, fifths+ fifths, feet + feet. • Adding and subtracting fractions with unlike denominators; the numerator tells the number of parts and the denominator tells the type of parts • Mixed numbers represent a whole number plus a fraction less than one	• Use proportional reasoning. • Read data on line plot and use the information to solve problems • Write measurements in fractions of a unit

Assessments ***(Attached)***

Pre-Assessment:

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Formative Interim Assessment:

- Mid-Unit Check (Use after Lesson 5)

Suggested Formative Assessments:

- Illustrative Mathematics: 5.NF Naming the Whole for a Fraction (Use after Lesson 1)
- Illustrative Mathematics: 5.NF Do These Add Up? (Use after Lesson 1)
- Illustrative Mathematics: 5.NF Finding Common Denominators to Add (Use after Lesson 5,6)
- Illustrative Mathematics: 5.NF Mixed Numbers with Unlike Denominators (Use after Lesson 6)
- Smarter Balanced Sample Item: MAT.05.SR.1.000NF.E.008 (Use after Lesson 6)
- Smarter Balanced Sample Item: MAT.05.CR.1.000NF.E.558 (Use after Lesson 6)
- Illustrative Mathematics: 5.NF Finding Common Denominators to Subtract (Use after Lesson 7,8)
- Illustrative Mathematics: 5.NF Making S'Mores (Use after Lesson 8)
- Smarter Balanced Sample Item: MAT.05.CR.1.000NF.E.557 (Use after Lesson 8)
- Illustrative Mathematics: 5.NF Jog-A-Thon (Use after Lesson 9)

Post Assessment: (Culminating Task)

- CORE: Jim's Trip to Disneyland

Learning Experiences (Lesson Plans Attached)

Days	Lesson Sequence	Materials
	Pre-Assessment: • **Lesson 1: Identifying and Comparing Fractional Representations of the Whole** *Students will know…* • fractions can be represented as part of whole. • fractions can be represented as part of a set • fractions can be represented as an area model • fractions can be represented as a number on a number line • when comparing fractions, the whole must be the same *Students will be able to…* • use models to represent fractions • identify the whole in a fraction context • use benchmark fractions to reason about fractions. • use proportional reasoning • write measurements in fractions of a unit	**Suggested Formative Assessment:** • Illustrative Mathematics: 5.NF Naming the Whole for a Fraction • Illustrative Mathematics: 5.NF Do These Add Up?
	Lesson 2: Fair Shares *Students will know…* • a fraction is another representation of division. *Students will be able to…*	

	• use models to represent fractions and solve problems. • use proportional reasoning.	
	Lesson 3: Pictorial and Numerical Representation of Equivalent Fractions *Students will know…* • conceptual understanding of numerator and denominator. • many fractions can represent the same value: 1/2=2/4=3/6. *Students will be able to…* • create equivalent fractions. • use models to represent fractions and solve problems. • write measurements in fractions of a unit	
	Lesson 4: Using Equivalent Fractions to Add Fractions with Unlike Denominators Pictorially *Students will know…* • units can only be combined with like units – ex: common denominator: halves + halves, fifths+ fifths, feet + feet. • fractions can be represented as a measure. • adding fractions with unlike denominators; the numerator tells the number of parts and the denominator tells the type of parts. *Students will be able to…* • use a common whole to add fractions. • use models to represent fractions and solve problems.	
	Lesson 5: Using Equivalent Fractions to Add Fractions with Unlike Denominators Numerically *Students will know…* • units can only be combined with like units – ex: common denominator: halves + halves, fifths+ fifths, feet + feet. • fractions can be represented as a measure. • adding fractions with different denominators; the numerator tells the number of parts and the denominator tells the type of parts. *Students will be able to…* • use a common whole to add fractions. • use models to represent fractions and solve problems. • reduce or rename fractions to solve problems.	**Suggested Formative Assessment:** • Illustrative Mathematics: 5.NF Finding Common Denominators to Add *(parts a & b)*
	Review and Assessment: Fraction Concepts Checkpoint *Students will:* • propose, justify, and communicate solutions	**Formative Interim Assessment:** • Mid-Unit Check
	Lesson 6: Using Equivalent Fractions to Add Fractions with Unlike Denominators with Sums Greater Than One *Students will know…* • units can only be combined with like units – ex: common denominator: halves + halves, fifths+ fifths, feet + feet. • fractions can be represented as a measure. • adding fractions with different denominators; the numerator tells the number of parts and the denominator tells the type of parts. • mixed numbers represent a whole number plus a fraction less than one. *Students will be able to…* • use a common whole to add fractions. • use models to represent fractions and solve problems. • reduce or rename fractions to solve problems. • Read data on line plot and use the information to solve problems • Write measurements in fractions of a unit	**Suggested Formative Assessment:** • Illustrative Mathematics: 5NF Mixed Numbers with Unlike Denominators • Illustrative Mathematics: 5.NF Finding Common Denominators to Add *(parts a, b, & c)* • Smarter Balanced Sample Item: MAT.05.SR.1.000NF.E.008 • Smarter Balanced Sample Item: MAT.05.CR.1.000NF.E.558
	Lesson 7: Using Equivalent Fractions to Subtract Fractions with Unlike Denominators From Numbers Between One and Two (Pictorially) *Students will know…* • units can only be combined with like units – ex: common	**Suggested Formative Assessment:** • Illustrative Mathematics: 5.NF Finding Common Denominators to Subtract *(parts a & b)*

	denominator: halves + halves, fifths+ fifths, feet + feet. • fractions can be represented as a measure. • subtracting fractions with different denominators; the numerator tells the number of parts and the denominator tells the type of parts. *Students will be able to…* • use a common whole to subtract fractions. • use models to represent fractions and solve problems. • reduce or rename fractions to solve problems. • read data on line plot and use the information to solve problems • write measurements in fractions of a unit	
	Lesson 8: Using Equivalent Fractions to Subtract Fractions with Unlike Denominators From Numbers Greater Than or Equal to One (Numerically) *Students will know…* • units can only be combined with like units – ex: common denominator: halves + halves, fifths+ fifths, feet + feet. • fractions can be represented as a measure. • subtracting fractions with different denominators; the numerator tells the number of parts and the denominator tells the type of parts. *Students will be able to…* • use a common whole to subtract fractions. • use models to represent fractions and solve problems. • reduce or rename fractions to solve problems.	**Suggested Formative Assessment:** • Illustrative Mathematics: 5.NF Finding Common Denominators to Subtract *(parts a, b, & c)* • Illustrative Mathematics: 5.NF Making S'Mores • Smarter Balanced Sample Item: MAT.05.CR.1.000NF.E.557
	Lesson 9: Solve Multi-Step Word Problems Using Addition and Subtraction of Fractions with Unlike Denominators *Students will know…* • all knowledge components cited above. *Students will be able to…* • perform all skill components cited above. • read data on line plot and use the information to solve problems • write measurements in fractions of a unit	**Suggested Formative Assessment:** • Illustrative Mathematics: 5.NF Jog-A-Thon
	Culminating Task: Jim's Trip to Disneyland *Students will* • show their knowledge and understanding of fractions	**Summative Assessment:** • CORE: 5th Gr. Module ○ "Jim's Trip to Disneyland"

Resources

Online	Text
Georgia Department of Education https://www.georgiastandards.org/Common-Core/Pages/Math.aspx **Illustrative Mathematics** http://www.illustrativemathematics.org/ **Inside Mathematics** http://www.insidemathematics.org/ **MARS tasks** http://map.mathshell.org/materials/index.php **Massachusetts Department of Elementary and Secondary Education** http://www.doe.mass.edu/candi/commoncore/ **National Library of Virtual Manipulatives** http://nlvm.usu.edu/en/nav/vlibrary.html **North Carolina Department of Public Instruction** http://www.dpi.state.nc.us/acre/standards/common-core-	**McGraw-Hill. *California Mathematics: Concepts, Skills, and Problem Solving: Grade 5*. New York: McGraw-Hill Companies, Inc. 2009.** **Shoseki, Tokyo. *Mathematics International: Grade 5*. 2012 (Japanese Text)** **Van de Walle, John, and LouAnn Lovin. *Teaching Student-Centered Mathematics: Grades 3-5.* Vol. 2. Boston: Pearson, 2006.**

tools/#unmath **Progressions for the Common Core State Standards in Mathematics** http://ime.math.arizona.edu/progressions/ **Smarter Balanced Assessment Consortium** http://www.smarterbalanced.org/smarter-balanced-assessments/#item	

Name : _____ Date: _____

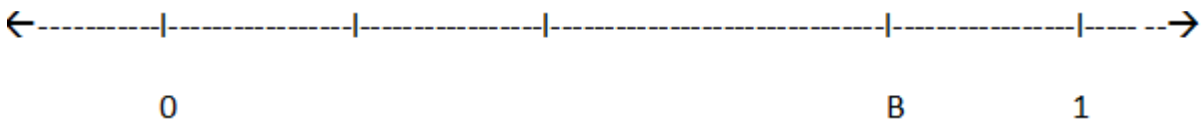
5.NF. 1 Mid-Unit Check

Numbers and Operations: Fractions—Use equivalent fractions as a strategy to add and subtract fractions.

1) Tonya likes to draw pictures to help her solve math problems. Show three ways to represent 5/7.

2) Which number is greater 7/8 or 4/5? Show how you know using words, pictures and numbers.

3) What fraction is shown by B? _____. Explain how you know.



2) Michael collected the honey from 4 of his beehives. From the first hive he collected 2/6 gallon of honey. From the second hive he collected 1/3 gallon. The last two hives yielded 1/12 gallon each. How many gallons of honey did Michael collect in all? Draw a diagram to support your answer.

Mid-Unit Check Credit for specific aspects of performance should be given as follows:	**Points**	**Total Points**
Problem 1 Reponses include **three unique** representations of 5/7. Possible representations include: • 5/7 correctly identified on a number line with two reference points. • 5/7 shown as an area model • 5/7 shown as part of a set using shapes or unique items • 5/7 shown as a numerical representation; for example: 1/7 + 1/7 + 1/7 + 1/7 + 1/7 = 5/7	1 point 1 point 1 point	3 points
Problem 2 • 7/8 is greater than 4/5. • Comparing the denominator in the fractions 7/8 and 4/5, I know that the fifths in 4/5 are larger pieces than the eighths in 7/8. Given that there is one piece missing from each of the fractions 4/5 and 7/8, I know that the piece missing from the 4/5 must be bigger than the piece missing from the 7/8. Therefore, 7/8 must be greater than 4/5.	1 point 1 point	2 points
Problem 3 • B = 4/5 • The marks that are equally-spaced indicate that continuing that pattern would result in a line segmented into fifths. Point B would fall on the fourth mark making it 4/5.	1 point 1 point	2 points
Problem 4 • 5/6 • Diagram may be a bar model, area model, number line, or any pictorial representation that shows conceptual understanding of : A)Equivalent fractions B) Adding fractions based on the same whole	1 point 1 point 1 point	3 points
TOTAL POINTS: (possible points = 10 points)		

Name: _____ Date: _____

Jim's Trip to Disneyland

(Adapted from: CORE)

Part A

Jim is planning a trip to Disneyland in Los Angeles, CA. He is leaving his house in Sacramento with a full take of gas. The chart below shows how much gas he will use along the way.

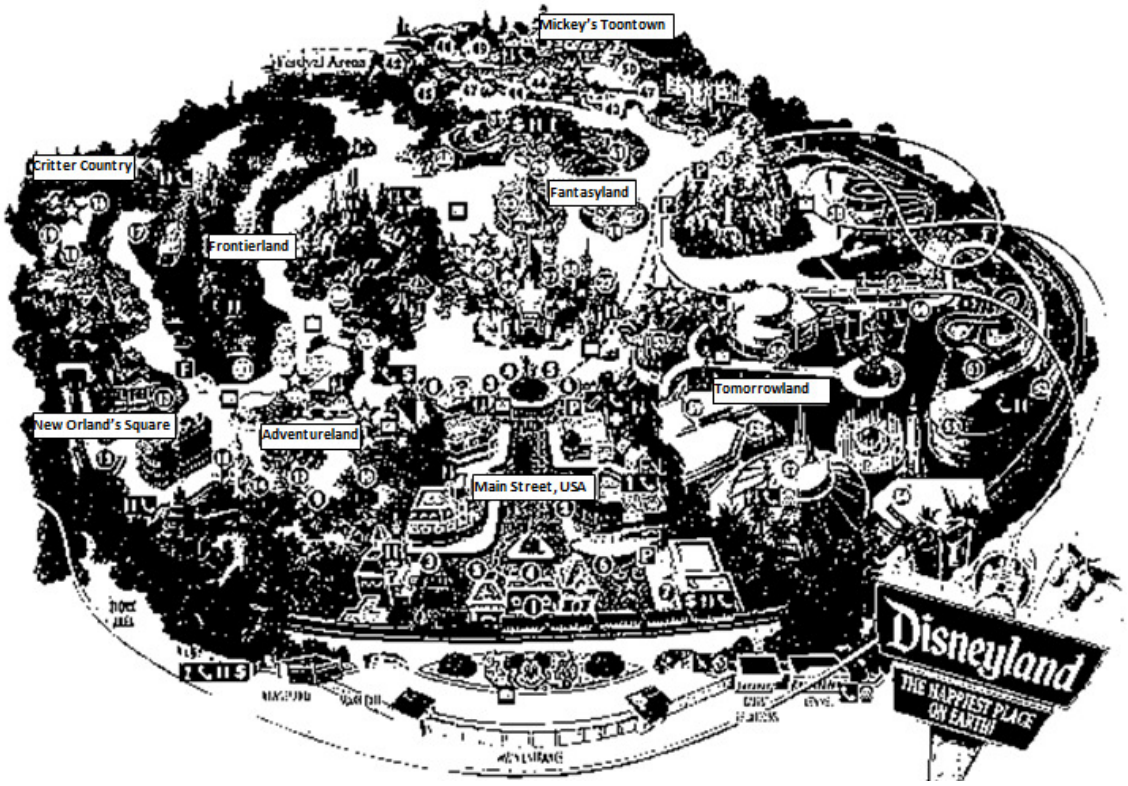
Starting Point	Destination	Miles	Tank of Gas
Sacramento	Fresno	172 miles	3/8 tank
Fresno	Bakersfield	97 miles	1/6 tank
Bakersfield	Los Angeles (Disneyland)	116 miles	1/4 tank
Los Angeles (Disneyland)	San Diego	134 miles	?

1. How much gas will Jim have in the tank when he arrives in Fresno? Show your work.

2. How much gas did he use to arrive at Disneyland? Show your work.

3. Explain the difference in solving questions 1 and 2.

Part B



Dee heard that Jim was in Southern California and invited him to come visit her in San Diego. Jim texts you and wants advice on whether he can make it to San Diego without stopping to fill up his gas tank. Refer to the table on Part A to determine if this is possible. Write your responses to Jim below, use math to justify your answer.

Part C

Jim is spending the whole day at Disneyland. He wants to visit as many attractions as possible. He wants to spend $\frac{1}{4}$ of the time at Adventureland and 1/6 of the time at Mickey's Toon Town. Write a possible schedule including at least two more attractions that Jim could visit filling his entire day. Explain how you got this schedule with words, numbers, or drawings.

Attraction Sites	
Adventureland 1/4	Main Street, USA
Critter Country	Mickey's Toontown 1/6
Fantasyland	New Orleans Square
Frontierland	Tomorrowland

Part D

Dee's Schedule for Disneyland			
Adventureland	1/4	Main Street, USA	1/8
Critter Country	1/3	Mickey's Toontown	1/6
Fantasyland	1/8	New Orleans Square	0
Frontierland	1/4	Tomorrowland	0

Dee decided to join Jim in Disneyland. She already preplanned the schedule for the day. Jim told Dee her schedule is not possible. Is Jim correct? Explain your reasoning.

_____

_____

_____

_____

_____

Jim and Dee wanted to create a new schedule together. They both wanted to spend 1/6 of the day at Mickey's Toontown. Create a possible schedule for the day using the chart below.

Jim and Dee's Schedule for Disneyland	
Adventureland	Main Street, USA
Critter Country	Mickey's Toontown
Fantasyland	New Orleans Square
Frontierland	Tomorrowland

Title	**Jim's Trip to Disneyland**
Grade	Grade 5
SBAC Assessment Claim	#2 – **Problem Solving –** Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies. #3 – **Communicating Reasoning** – Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Learning Goal	Students use equivalent fractions as a strategy to add and subtract fractions. Tasks associated with this target ask students to add and subtract fractions with unlike denominators. Contextual word problems ask students to apply and synthesize these operations.
Item Type	Constructed response; Performance task
Standards	• 5.NF.1 – Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad+bc)/bd.) • 5.NF.2- Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2
Practice(s)	1, 2, 3, 4,
Depth of Knowledge	Level Two – Basic Skills and Concepts Level Three – Strategic Reasoning and Thinking
Task Overview	In part one, students will solve some constructed response questions where they must add and subtract fractions with unlike denominators. In part two, students will estimate whether or not Jim has enough gas to reach a further destination and explain in a text message to Jim their reasoning and conclusion. In part three, students will decide how to divide their time (represented as fractions) between the different attractions at Disneyland. They will be provided with two given times, and will be expected to come up with at least two additional fractions so that the sum of their fractional times equal 1 whole.

Jim's Trip to Disneyland Rubric Credit for specific aspects of performance should be given as follows:	**Points**	**Total Points**
PART A 1. 5/8 of a tank remaining. (correct answer) Show work (this may include a correct process, but incorrect arithmetic)	1 point 1 point	2 points
2. 19/24 gallons of gas were used. (correct answer) Show work (This may include a correct process of showing common denominators, but incorrect arithmetic)	1 point 1 point	2 points
3. Responses should include some of these "look-for" phrases: • In question #1 I had to subtract the gas used (fraction/part) from the full tank of gas (1-whole) • In question #1 I subtracted 3/8 from 1 or 8/8 • In question #1 I had to make one whole tank of gas in to a fraction (8/8) • In question #2 I had to add the 3 fractions together • In question #2 I had to change the fractions to have common denominators in order to add them.	1 point for addressing each problem.	2 points
PART B 1. Show work (show estimation of how much gas it will take to get from Los Angeles to San Diego (6/24) and compare to remaining gas (5/24) 2. Response should include an explanation of how student's conclusion was reached (Jim did not have enough gas to drive to San Diego because the distance would take more than ¼ of a tank of gas. Jim does not have that much gas) *Students will be given credit if response correlates with the answer to part 1.	1 point 1 point	2 points
PART C 1. *Answer (will vary): all fractions will add up to one whole. (ex: 1/4 + 1/6 + 1/4 + 1/3) *Response should include work with common denominators: Show work for equivalence (ex: 2/12 + 3/12 + 3/12 + 4/12) *Create schedule or possible itinerary for the day	1 point 1 point 1 point	3 points
PART D 1. 29/24 correct answer (students use a common denominator to add fractions. *Response should include an explanation of how student's conclusion was reached (Dee's schedule did not work because it was over one whole.) 2. Create a new schedule (fractions add up to one whole)	1 point 1 point 1 point	3 points
TOTAL POINTS: (possible points = 14 points)		