Concept Lesson: Fruit Bar Fun
Fifth Grade
Note: Developing an understanding of the mathematical concepts and skills embedded in a standard requires having multiple opportunities, over time, to engage in solving a range of different types of problems which utilize the concepts or skills in question.

Student Task:
In this lesson, students will solve a problem involving addition and subtraction of fractions with unlike denominators. They will solve the problem in multiple ways that build toward an understanding of the algorithm for fraction addition and subtraction.

Materials:

Concept Lesson; student Task sheet (attached); fraction bars/other manipulatives

BIG IDEA
Basic Facts and Algorithms There is more than one algorithm for each of the operations with rational numbers. Some strategies for basic facts and most algorithms for operations with rational numbers, both mental math and paper and pencil, use equivalence to transform calculations into simpler ones.

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ESSENTIAL UNDERSTANDING
Fractions with unlike denominators can be added or subtracted by replacing fractions with equivalent fractions with like denominators. The product of the denominators of two fractions is a common denominator of both.

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- Students will use models and computational procedures to add fractions with unlike denominators.

<u>Common Core Standards for Mathematical Content</u>:

Domain: Number and Operations – Fractions

Cluster: 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.*

<u>Common Core Standards for Mathematical Practice</u>:

- **Math Practice 1 (MP1)**: Make sense of problems and persevere in solving them.
- **Math Practice 2 (MP2)**: Reason abstractly and quantitatively.
- **Math Practice 3 (MP3)**: Construct viable arguments and critique the reasoning of others.
- **Math Practice 4 (MP4)**: Model with mathematics.
- **Math Practice 5 (MP5)**: Use appropriate tools strategically.
- **Math Practice 6 (MP6)**: Attend to precision.
- **Math Practice 7 (MP7)**: Look for and make use of structure.
- **Math Practice 8 (MP8)**: Look for and express regularity in repeated reasoning.

<u>Mathematical Concepts</u>:

The mathematical concepts addressed in this lesson:

- Deepen students' understanding of the meaning of fractions (i.e., "fraction sense"), including the concept of equivalent fractions.
- Begin to develop an understanding of what it means to add and subtract fractions, including WHY common denominators are useful.

<u>Connections to the Teaching and Learning Framework:</u>

Standard 3: Delivery of Instruction

Component 3b: Using Questioning and Discussion Techniques

Element 3b1: Quality and Purpose of Questions:

Questions are designed to challenge students and elicit high-level thinking.

<u>Academic Language</u>:
The concepts represented by these terms should be reinforced/developed through the lesson:

- (Unit) Whole
- Equivalent/Not Equivalent
- Numerator
- Denominator
- Part (of the whole)

Task Vocabulary: Leftovers

It is important not to "teach" the terms prior to the lesson in a task of this nature. Instead, use the word wall as a tool to assist students when they encounter the terms in context.

<u>Language Objectives:</u>
Students will sequentially explain in writing how they solved or worked through the problem by providing facts and using academic language. Students will ask and answer what, how, and why questions in order to demonstrate their understanding of decimal notation.

<u>Assumption of Prior Knowledge/Experience</u>:
Understand fractions as parts of a whole or unit (grade 3); understand the meaning of equivalent fractions (grade 3). Add and subtract fractions and mixed numbers with like denominators (grade 4). Understand number line with fractions (grade 3); number line with benchmark fractions (grade 4).

<u>Key</u>:
Suggested teacher questions are shown in bold print.
Possible student responses are shown in italics.
****** Indicates questions that get at the key mathematical ideas in terms of the concepts of the lesson.
Standards for Mathematical Practice are marked with MP and their number.

<u>Lesson Phases</u>:
The phase of the lesson is noted on the left side of each page. The structure of this lesson includes the Set-Up; Explore; and Share, Discuss and Analyze Phases.

Talk Moves:
Classroom Discussions, by Chapin & O'Connor, cites five productive talk moves: revoicing, asking students to restate someone else's reasoning, asking students to apply their own reasoning to someone else's reasoning, prompting students for further participation, using wait time. Talk moves will be noted in the lesson.

Universal Access:
Identify strategies that address the needs of diverse learners, including, ELs, SELs, GATE students, students with disabilities, and other students with special needs.

- Where do you see opportunities for students to have instructional conversations, work in cooperative groups, develop academic vocabulary, and use graphic organizers and visual tools?

Some suggestions:

- Highlight what you know (facts) and what you are trying to find out (questions).
- Provide access to manipulatives, for example: fractions bars, graphic organizer, graph paper with colored pencils.
- Vocabulary support may include acting out the problem, providing realia.
- Prompt students to utilize visual word wall
- Students chart information as they solve the problem during collaboration
- Sample sentence frames to support English learners, for example: When I compare fractions, I do ____, because _____.
- Language Frames for Classroom Communication, see Appendix A, and note use in the lesson.

Addressing the Needs of Sub-Groups: Identify strategies that address the needs of diverse learners, including, ELs, SELs, GATE students, students with disabilities, and other students with special needs.

- Where do you see opportunities for students to have instructional conversations, work in cooperative groups, develop academic vocabulary, and use graphic organizers and visual tools?

THE LESSON AT A GLANCE

Set Up (pp. 6-7)

Set up the task:

- Solve the task in as many ways as possible and consider misconceptions students might have.

Link to prior knowledge:

- Refer to a previous problem involving fractions and bars.
- Show a representation of one whole bar.

Explore (pp. 8-10)

Provide private think time for students to access the problem.

Address misconceptions and errors:

- Identify misconceptions or errors and ask questions to move them towards the concepts of the lesson.

Assess and advance students' learning through questioning:

- Ask students to explain their thinking and reasoning and then pose questions that further their understanding.
- Ask students to explain the thinking and reasoning of others.
- Press students to use multiple representations and multiple strategies.

Share, Discuss, and Analyze (pp. 11-16)

Share different solution paths and connecting multiple representations:

- Subtracting amount eaten for each bar from one and finding the sum of the uneaten parts.
- Adding the amounts eaten and subtracting from 3.

Reinforce the notion of equivalent fractions.

Make a connection to the algorithm for adding and subtracting fractions.

- Sequencing the solutions to be shared in a purposeful way.
- Having students make connections between different representations and different solution paths.

Summarize the Mathematical Concepts in the Lesson:

- **Equivalent** fractions describe the **same amount** by using **different sized parts of the same whole** and are useful in comparing different parts of the same whole.
- **Equivalent fractions** are useful when combining (adding and subtracting) two different fractions (i.e., common denominator).

THE LESSON		
Phase	**RATIONALE**	**SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES**
S E T U P S E T U P S E T U P	**HOW DO YOU SET UP THE TASK?** • Solving the task prior to the lesson is critical so you: – become familiar with students' strategies – consider the misconceptions students may have or errors they might make – honor the multiple ways students think about problems – can provide students access to a variety of solutions and strategies – can better understand students' thinking and prepare for questions they may have • Planning for how you might help students make connections through talk moves or questions will prepare you to help students develop a deeper understanding of the mathematics in the lesson. (MP3) • It is important that students have access to solving the task from the beginning. The following strategies can be useful in providing such access: – strategically pairing students who's learning styles complement each other – providing manipulatives or other concrete materials (MP5) – identifying and discussing vocabulary terms that may cause confusion (MP6) – posting vocabulary terms on a word wall, including the definition and drawing or diagram (MP6)	**HOW DO YOU SET UP THE TASK?** • Solve the task in as many ways as possible prior to the lesson. • Think about how you want students to make connections between different representations and different strategies. • Make certain students have access to solving the task from the beginning by: – having students work with a partner – displaying the problem so that it can be referred to as the problem is read – making certain that students understand the vocabulary used in the task (i.e., part, whole, amount, numerator, denominator, equivalent). The terms that may cause confusion to the students could be posted on a word wall. However, do not "teach" these terms prior to the lesson. The word wall can be used as a reference if and when confusion occurs. • The terms that may cause confusion to students could be posted on a word wall, on the margins of the task, or on table tents. Encourage students to incorporate the vocabulary as they explain and write about their thinking.

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S E T U P S E T U P S E T U P	**SETTING THE CONCEPT FOR THE TASK** <u>Linking to Prior Knowledge</u> It is important that the task have points of entry for students. By connecting the content of the task to previous mathematical knowledge, students will begin to make the connections between what they already know and what we want them to learn. (MP1) • Having students explain what they are trying to find might reveal any confusion or misconceptions that can be dealt with prior to engaging in the task. Do not let the discussion veer off into strategies for solving the task as that will diminish the rigor of the lesson. (MP1) • Having students think-pair-share and then whole-group share what they know and what they are trying to find will reveal any confusions or misconceptions that can be dealt with prior to engaging in the task. (MP1)	**SETTING THE CONTEXT FOR THE TASK** <u>Linking to Prior Knowledge</u> You might ask students to talk about their favorite snack bars. Ask them if they have ever shared a bar with a friend or a sibling, and to describe how they divided the bar up. Tell them that today's lesson is about parts of a fruit bar. Ask a student to read the task as other follow along: *You and your friends, Marcus and Tamra, each have a "Snackers" fruit bar.* • *Marcus has eaten ½ of his Snackers bar.* • *Tamra has eaten ¾ of her Snackers bar.* • *You have eaten $^5/_8$ of your Snackers bar.* *Marcus claims that if you put the leftover parts of the 3 Snackers bars together, it would be more than a whole Snackers bar. Tamra disagrees. Which of your friends is correct? Explain how you know.* • Ask students to think-pair-share what they know and what they are trying to find out. Then ask students to share as a group what they think they are trying to find in this problem. (*We are trying to find how much of the 3 bars have not been eaten.)* Then ask one or two other students to state what they are trying to find. Use the talk move restating to have students reiterate what is shared.

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E X P L O R E E X P L O R E	**INDEPENDENT PROBLEM-SOLVING TIME** It is important that students be given <u>private think time</u> to understand and make sense of the problem for themselves and to begin to solve the problem in a way that makes sense to them. (MP1) Wait time is critical in allowing students time to make sense of the mathematics involved in the problem. (MP1)	**INDEPENDENT PROBLEM-SOLVING TIME** • Tell students to work on the problem by themselves for a few minutes. • Stress the importance of solving the problem in different ways. • Circulate around the class as students work individually. Clarify any confusion they may have but do not tell them how to solve the problem. Ask focusing, assessing, and advancing questions but do not tell them how to solve the problem. After several minutes, tell students they may work with a partner or in their groups. They could make connections with someone who has a solution different from theirs *or* similar to theirs. They should be able to explain and critique the reasoning of others. (MP3)

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E X P L O R E **E X P L O R E** **E X P L O R E**	**FACILITATING SMALL GROUP EXPLORATION** <u>If students have difficulty getting started:</u> It is important to ask questions that do not give away the answer or that do not explicitly suggest a solution method. <u>Possible misconceptions or errors:</u> It is important to have students <u>explain their thinking</u> before assuming they are making an error or having a misconception. After listening to their thinking, <u>ask questions</u> that will move them toward understanding their misconception or error. Misconception or errors can be opportunities for learning. • It is important to ask questions that scaffold students' learning without taking over the thinking for them by telling them how to solve the problem. (MP1) <u>Possible Solution Paths</u> *Subtracting each part eaten from a whole bar and then comparing the remaining parts to one:* • It is important to consistently ask students to explain and defend their thinking. It not only provides the teacher insight as to how the child may be thinking, but might also assist other students who may be confused. (MP3) • Providing connections between different representations (i.e., the symbolic notation and the fruit bars) strengthens students' conceptual	**FACILITATING SMALL GROUP EXPLORATION** <u>If students have difficulty getting started:</u> Ask questions such as: • **What are you trying to find?** • **How can you use the fraction bars (or other manipulatives) to help you?** <u>Possible misconceptions or errors:</u> *Finding the total amount of the bars that has been eaten rather than the total amount remaining.* • **How did you find your answer?** • **Let's look at the problem again. What are you being asked to find?** Students who may have learned an algorithm for adding fractions without a conceptual understanding of the algorithm may add the numerators and denominators. *(e.g., $\frac{1}{2} + \frac{3}{4} = \frac{4}{6}$)* • **Let's look at the fruit bars. Show me ½ of a bar and ¾ of another bar. If we put them side-by-side, how does that compare to $\frac{4}{6}$ of a bar?** <u>Possible Solution Paths</u> *Subtracting each part eaten from a whole fruit bar and then comparing the remaining parts to one:* • Students might begin by subtracting each part eaten from a whole bar to find the part remaining (e.g., 1 – ½ = ½; 1 – ¾ = ¼ and 1 – 5/8 = 3/8). You might ask: **Explain to me how you got your answer. Why did you**

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
E X P L O R E E X P L O R E E X P L O R E	understanding. (MP2; MP4) • Encouraging students to think of equivalent forms of 1 that are relevant to this problem (e.g., 1 = 2/2 = 4/4 = 8/8) may help them to make sense of the subtraction. (MP7) • Encourage students to discuss their strategies with their partners. They should be able to explain their strategies and the strategies of others and critique the reasoning of others as well. (MP3) *Finding the sum of the parts eaten and subtracting from 3 whole fruit bars:* • Asking questions based on what the students are currently thinking or doing scaffolds their learning from what they already know, and moves them towards understanding of the mathematical concepts. (MP2) • Pressing students to use correct mathematical language will strengthen their academic language and is more likely to lead to conceptual understanding. (MP6)	**subtract? How can you use your bars to show me what you did?** • Adding the leftover parts. **So do the leftover parts make more than a whole fruit bar? How do you know? How can you use your bars to show me?** *Finding the sum of the parts eaten and subtracting from 3 whole fruit bars:* • *Students might begin by finding the sum of the parts eaten (e.g., ½ + ¾ + 5/8).* You might ask/say: **How did you get your answer? How can you show me with the fruit bars? About how many bars did the three of you eat? About how much will be left uneaten? How can you use the bars to show me?** [Students will need 3 whole bars in order to find the amount that would be left.]

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S H A R E D I S C U S S A N D A N A L Y Z E	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON** <u>What solution paths will be shared, in what order, and why?</u> The purpose of the discussion is to assist the teacher in making certain students deepen their understanding of equivalent fractions, develop an understanding of how one combines fractions (addition or subtraction) and the usefulness of equivalent fractions for this purpose, and begin to develop an understanding of an algorithm for adding and subtracting fractions. Questions and discussions should focus on the important mathematics and processes that were identified for the lesson. • Make sure to mark for students that this is the most important part of the lesson and that you expect them to listen attentively, ask questions of each other, defend their reasoning, and make connections between others' solution paths and their own. (MP3) ** Indicates questions that get at the key mathematical ideas in terms of the concepts of the lesson.	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON** <u>What solution paths will be shared, in what order, and why?</u> • Select and sequence the solutions to be shared in a way that builds the mathematical understanding for this lesson and allows for connections to be made among different representations. Following is a SUGGESTED sequence that begins with a solution in which the fruit bars were used. Subsequent solutions can then be connected to this solution. *NOTE: There is not a "correct" way to select and sequence the solutions. Other sequences are possible that would also build conceptual understanding.

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S H A R E D I S C U S S A N D A N A L Y Z E	<u>Possible Solutions to be Shared</u> It would be helpful to display the solutions on chart paper in front of the room so that all students can see them and refer to them during the discussion. • Beginning the discussion by asking students to agree or disagree allows them to think about and communicate why their answer is correct. (MP3) • Asking students consistently to explain how they know something is true develops in them a habit of defending their thinking and reasoning. This leads to deeper understanding of mathematics concepts. (MP3)	<u>Possible Solutions to be Shared</u> • **So, Marcus said the leftover parts of the fruit bars make more than one bar. Who agrees with that? Why do you agree?** Ask a student who agrees to come to the front of the room and explain his/her thinking. Either of the following solution paths can be shared first.
	Subtracting each part eaten from a whole candy bar, and then comparing the remaining parts to one whole: • When asking students to share their solutions, the questions you ask should be directed to all students in the class, not just to the student(s) sharing their solution. • Asking students consistently to explain how they know something is true develops in them a habit of defending their thinking and reasoning. This leads to deeper understanding of mathematics concepts. (MP3) • Having the solution presented both concretely and symbolically will help students make connections between the two and to strengthen their	Subtracting each part eaten from a whole fruit bar, and then comparing the remaining parts to one: You might ask questions such as: • **Why did you subtract the parts eaten from one whole each time? Use the bars to show us what you did.** Students should indicate that to find the amount of each bar that was not eaten, they would need to take away from each fruit bar the amount that was eaten. • **** Explain how you figured out if the leftover parts add up to more than a whole fruit bar.** Listen for students' explanations that indicate the following: – *use of the fruit bars to demonstrate that the sum of the three eaten parts is a little less than 2 fruit bars. That would leave a little more than one*

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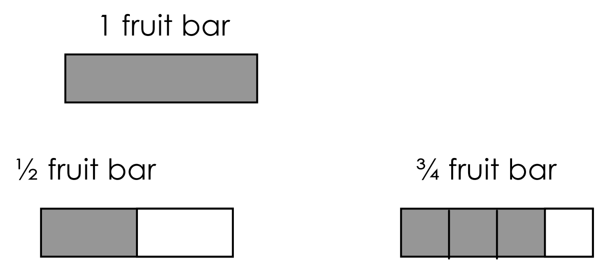
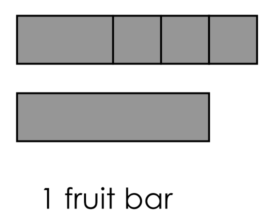
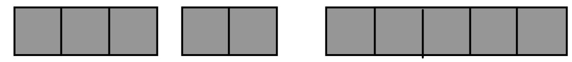
S H A R E D I S C U S S A N D A N A L Y Z E	conceptual understanding of fractions. (MP2) • Using estimations (e.g. "a little more than or a little less than") is a good strategy to build understanding of a concept prior to the students learning an algorithm. (MP1) • Asking other students to explain and critique the solutions of their peers builds accountability for learning into the discussion. (MP3) <u>Reinforcing the meaning of equivalent fractions</u> • Using the notion of equivalent fractions early in the conversation will provide a link between students' prior knowledge and the rationale for finding common denominators when adding and subtracting fractions. (MP7; MP8) Varieties of Sharing Protocols (MP3; MP6; MP7): • Student shares own work in front of class, and fields questions • Anonymous Sharing: Teacher has students write their names on the back of the paper, collects work, orders it, and projects it for the class to discuss. The student who did the work does not comment. How does this solution match the problem? What might the thinking be? How can we make it more complete? The goal is not to identify the student but instead to talk about the strategies.	*fruit bar that is not eaten.* (MP4*)* • **____ said that there would be more than one whole fruit bar left. Could someone else explain ___'s solution?** <u>Reinforcing the meaning of equivalent fractions</u> • **___ **said that ¼ is the same as 2/8. Why is that true? What word do we use to describe these kinds of fractions? How do we know when 2 fractions are equivalent?** *Students should be able to say that ¼ and 2/8 are the same because they represent the equal parts of the same whole.* The word "equivalent" is used to describe such fractions. <u>Finding the sum of the parts eaten and subtracting from 3 or comparing to 2:</u> • **Why did you add all of the parts of the fruit bars that were eaten? Show us with the fruit bars what you did.** *Students should state that they were first finding the total amount eaten and then subtracting that from the total number of bars.******* • **Explain how you figured out if the leftover parts add up to more than a whole fruit bar.** Listen for students' explanations that indicate the following:

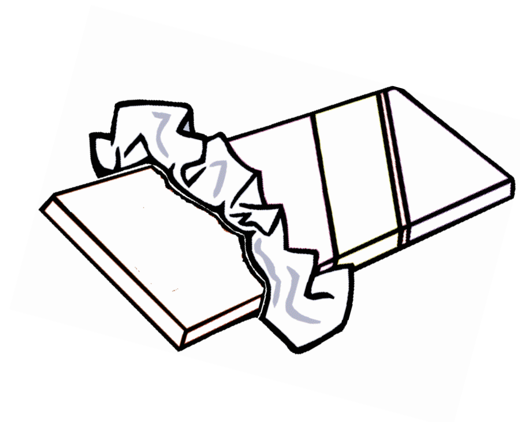
Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
SHARE DISCUSS AND ANALYZE	Varieties of Sharing Protocols (MP3; MP6; MP7): • Gallery Walk: Student work is posted around the room, students walk around the room to see it, posting comments on post-it notes, teacher facilitates a discussion around specific work afterwards. • Students work in pairs to create their work with markers on construction paper and solutions are shared as above. Finding the sum of the parts eaten and subtracting from 3 or comparing to 2: • Having the solution presented both concretely and symbolically will help students make connections between the two, and to strengthen their conceptual understanding of fractions. (MP2) Reinforcing the meaning of equivalent fractions • Revisiting the notion of equivalent fractions in the conversation will provide a rationale for finding common denominators when adding and subtracting fractions. (MP7; MP8) Connecting to the algorithm • Up until this point, the focus was on students using their knowledge of the meaning of fractions and estimation to answer the question. The purpose was to begin to build a conceptual understanding of what it means to add and subtract fractions. This next section begins to connect that understanding to the development of an algorithm for adding and	– *use of the fruit bars to demonstrate that the sum of the three eaten parts is a little less than 2 fruit bars. That would leave a little more than one fruit bar that is not eaten.* – *½ plus ¾ of a fruit bar is 1¼ fruit bars. $^5/_8$ is a little less than ¾ of a fruit bar because ¾ is equivalent to $^6/_8$. Since we would be adding 1¼ to a little less than ¾, we would get a little less than 2 fruit bars that were eaten. That would leave a little more than one fruit bar uneaten.* Reinforcing the meaning of equivalent fractions • ****___ said that ¾ is the same as $^6/_8$. Why is that true? What word do we use to describe these kinds of fractions?** *Students should be able to say that ¾ and $^6/_8$ are the same because they represent the equal parts of the same whole.* The word "equivalent" is used to describe such fractions. Connecting to the algorithm **We found that Marcus was correct, there was a little more than one candy bar leftover. How could we find out EXACTLY how much of the fruit bars were not eaten?** Listen to students' responses without judging the correctness or incorrectness of their statements. Ask them to explain their various strategies.

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES

SHARE DISCUSS AND ANALYZE	subtracting fractions.
	
	• These questions lead students to make connections to an algorithm for adding fractions with unlike denominators. (MP7; MP8)
	
	• Using estimation when solving problems will encourage students to think if their answers make sense in terms of the problem. (MP1)
	
	• Use talk moves: restating, further participation, applying their reasoning, and wait time to engage students in meaningful discussions. Norms for discussions are important throughout. The norms below might be some to use in place of raising hands. (MP2; MP3; MP7)
	• Norms for Discussion:
	    o Track, keep your eyes on, the speaker
	    o Address the speaker by name
	    o Use 3 second wait time before adding on or asking a question
	    o Talk clearly in order to be understood
	    o Define our mathematical reasoning in a clear way
	    o Ask questions during mathematics time when we don't understand
	    o Explain and justify our mathematical reasoning to each other with questions, defend our mathematical thinking to others
	
	• By using a concrete model connected to the
		• **Let's look just at how much of the fruit bars Marcus and Tamra ate all together.** Refer students to their fruit bar models.
		
		• ****How can we add ½ of a fruit bar and ¾ of a fruit bar together using our models?** Listen for students who indicate that they could put the two models side by side. (MP4)
		
		• **How does this compare to a whole fruit bar?** It is a little more than 1 whole fruit bar.
		
		
		
		½ fruit bar + ¾ fruit bar = 1 fruit bar plus ¼ fruit bar
		or 1 ¼ fruit bars
		
		
		• **What would happen if we started with how much**

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
SHARE DISCUSS AND ANALYZE	symbolic notation, students are more likely to build conceptual understanding prior to learning an algorithm or procedure. (MP4; MP5) • These questions reinforce the notion of equivalent fractions, which is important in learning an algorithm for adding and subtracting fractions with unlike denominators. (MP7; MP8) • These questions should provide a connection to an algorithm by assisting students in understanding that to add or subtract fractions, the number of equal parts into which the whole is divided must be the same for both fractions. (MP7; MP8) <u>SUMMARY:</u> • Having students summarize key mathematical points lets students know they have said or discovered something that is mathematically important to know. • Encouraging students to write down their new thinking, and record how their thinking has changed, allows time for internalizing the learning. Research has shown that when students reflect on the process of working cooperatively, and how it impacted theirs and other's learning, retention of content is increased.	**Tamra ate and added on how much Marcus ate? Would the answer change?** *Students should state that the amount eaten would not change.* ¾ fruit bar + ½ fruit bar = 1¼ fruit bar  • ****How do we know that the amount that goes beyond one fruit bar is ¼ fruit bar? How could we show that?** *Students should state that they could change ½ to 2/4.* Stress the notion that they are finding equivalent fractions. • **How did you know that 5/4 fruit bar is the same as 1 ¼ fruit bar?** *Students should state that 4/4 is the same as a whole so 5/4 is one whole plus ¼, or 1¼.* • ****Why did you use 2/4 as the equivalent fraction? Why not 3/6?** *To add parts together, the number of parts in each whole must be the same.* <u>SUMMARY:</u> ** **So we discovered that the parts of the whole fruit bars had to be expressed as equivalent fractions so that we could add the parts together.**

Snackers: Fruit Bar Fun



You and your friends, Marcus and Tamra, each have a "Snackers" fruit bar.

- Marcus has eaten ½ of his Snackers bar.
- Tamra has eaten ¾ of her Snackers bar.
- You have eaten $^5/_8$ of your Snackers bar.

Marcus claims that if you put the leftover parts of the 3 Snackers bars together, it would be more than a whole Snackers bar. Tamra disagrees. Which of your friends is correct? Use numbers and pictures or diagrams to explain how you know.

Snackers

Fruit Bar

Snackers

Fruit Bar

Snackers

Fruit Bar

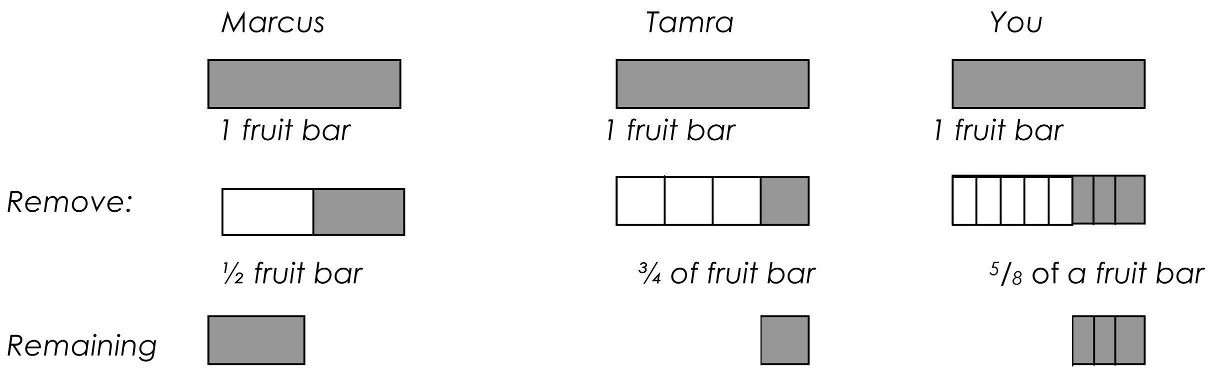
Snackers

Fruit Bar

POSSIBLE SOLUTIONS

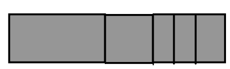
Subtracting each part eaten from a whole fruit bar and then comparing the remaining parts to one

- Students might begin by subtracting each part eaten from a whole fruit bar to find the part remaining…



$1 - \frac{1}{2} = \frac{1}{2}$ *$1 - \frac{3}{4} = \frac{1}{4}$* *$1 - \frac{5}{8} = \frac{3}{8}$*

and then add the remaining parts.



Students might then compare the result to 1 or add the parts.

Ex. *1 whole fruit bar*

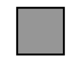
- Students might compare the uneaten parts to one whole fruit bar and reason that their sum is more than 1.
  - Marcus left ½ of a bar and Tamra left ¼ of a bar. It would take ¼ more of a bar to make one whole fruit bar. I had $^3/_8$ of a bar left and $^3/_8$ *is* more than ¼ since ¼ is equivalent to $^2/_8$. So together we left more than 1 whole fruit bar. Marcus was correct.

➢ Students might begin with 1 whole fruit bar and take off ½ for the amount Marcus ate leaving ½ of a fruit bar. They might then take off ¼ of the fruit bar from what remains leaving ¼ of a fruit bar. Since $^{2}/_{8}$ is equivalent to ¼ and we need to remove 3/8 more from what remains, there is not enough of the fruit bar left so Marcus must be correct.

Begin with 1.

Remove ½, which leaves ½.

Remove ¼, which leaves ¼ or $^{2}/_{8}$.



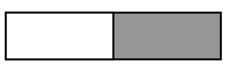
Since we need to remove 3/8 more and there is only 2/8 left, there must be more than 1 fruit bar remaining.

➢ Students might begin with 1 whole fruit bar and take off ½ for the amount Marcus ate leaving ½ of a fruit bar. Students might then reason that they need ½ more to make one whole fruit bar and determine if Tamra's remaining part and your remaining part together are more than, less than, or equal to ½. Since Tamra's remaining part of the fruit bar is ¼ of a fruit bar and your remaining part is $^{3}/_{8}$, this is more than ½ so Marcus must be correct.

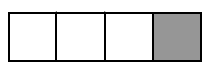
- Students might also divide the fruit bar into eighths and then use similar strategies to those above by using equivalent fractions.

<u>Finding the sum of the parts eaten and subtracting from 3 or comparing to 2:</u>

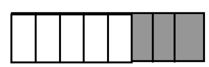
- Marcus ate ½



Tamra ate ¾



You ate 5/8



➢ Students reason that if you add the eaten parts of the candy bar, ½ plus ¾ is equal to 1 ¼ and then adding $^{5}/_{8}$ which is a little less that $^{6}/_{8}$ or ¾ would give us an amount of a little under 2 whole fruit bars eaten, which would leave more than a whole fruit bar uneaten so Marcus is correct.