SFUSD Math Core Curriculum
Grade 3

Unit 3.8: Fractions

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Big Idea
Fractions are numbers that describe the division of a whole (region, set, segment) into equal parts. Unit fractions are the building blocks of all fractions.

Unit Objectives
• Students define a fraction as a number that describes a part of a whole • Students use unit fractions to name other fractions • Students recognize and work with different representations of fractions: regions, tape diagram/bar model, and number line/measurement. • Students recognize and generate simple equivalent fractions and explain why they are equivalent. • Students compare two fractions with the same numerator or denominator by reasoning about their size.

Unit Description
Students explore fractions as a part:whole relationship and relate partitioning to division. They explore different visual models demonstrating fractional parts: division of area within regions, bar models, and tape diagrams, and division of length on a number line. Students explore the connection between unit fractions and fractions composed of unit fractions and construct strategies to identify equivalence and nonequivalence when comparing fractions.

CCSS-M Content Standards

Number and Operations—Fractions*

Develop understanding of fractions as numbers.

3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*.

3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line.

3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line.

3.NF.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 and 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or < and justify the conclusions, e.g., by using a visual fraction model.

*Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Geometry

Reason with shapes and their attributes.

3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Progression of Mathematical Ideas

Prior Supporting Mathematics	Current Essential Mathematics	Future Mathematics
Although there are no specific standards regarding fractions in Grade 2, students have had experiences partitioning geometric shapes (circles and rectangles) into two, three, or four equal parts, and naming the parts using the words halves, thirds, fourths, half of, a third of, a fourth of, and so on. Students have also worked with fractions of an hour when studying time. They were also introduced, informally, to equivalent fractions by describing the whole as two halves, three thirds, and four fourths. Finally, they recognized that equal shares of identical wholes need not have the same shape.	Students develop a more formal understanding of fractions, beginning with unit fractions. They use fractions and visual fraction models to represent parts of a whole. Students work with representations: regions and number line/measurement. Students understand that the size of a fractional part is relative to the size of the whole. They use fractions to represent numbers equal to, less than, and greater than 1. Students recognize equivalent fractions and solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.	In Grade 4, students will develop their understanding of equivalent fractions and operations with fractions. They will extend their understanding of fraction equivalence to develop methods for generating and recognizing equivalent fractions. Students will use their knowledge of how fractions are built to compose (e.g., ⅛ + ⅛ + ⅛ = ⅜) and decompose (e.g., ⅔ = ⅓ + ⅓) fractions. Students will use their understanding of fraction multiplication as repeated addition to multiply a fraction by a whole number.

Unit Design

Entry Task: *What do you already know?*
Apprentice Task: *What sense are you making of what you are learning?*
Expert Task: *How can you apply what you have learned so far to a new situation?*
Milestone Task: *Did you learn what was expected of you from this unit?*

Unit Overview (12 days)

	Days	Description	Core Math
Entry Task	1	Students use their informal understanding of fractions from second grade as well as from everyday life to solve a series of problems about equal regions of geometric figures.	A whole can be partitioned into equal parts called fractions.
Lesson Series 1	3	Students develop conceptual understanding of fractions using concrete models. Students identify and name unit fractions, partition shapes into equal parts of a whole, and place fractions on a number line.	Fractions can be named by counting the number of unit fractions. (¾ is the same as counting by ¼ three times, "one-fourth, two-fourths, three- fourths").
Apprentice Task	1	Students demonstrate their understanding of fractions as equal parts of a whole and numbers on a number line.	Fractions are numbers that represent equal parts of a whole and can be placed on a number line.
Lesson Series 2	2	Students construct an understanding of equivalent fractions and use multiple tools (fraction kits, number lines, tape diagrams, etc.) to solve problems involving equivalent fractions.	Equivalent fractions are fractions that are the same size. They may look different, but they represent the same number and are located at the same point on a number line.
Expert Task	1	Students work with number lines from zero to one and explain why given fractions are equivalent.	Fractions are equivalent if they are the same point on a number line.
Lesson Series 3	3	Students express whole numbers as fractions, identify fractions greater than one, and compare fractions with the same numerator or denominator by reasoning about the number or size of unit fractions.	Fractions with the same numerator or denominator can be compared by reasoning about the number or size of unit fractions.
Milestone Task	1	Students demonstrate their understanding of fractions as equal parts of a whole and as points on a number line. Students also identify equivalent fractions and compare fractions with the same numerator or the same denominator.	Fractions are numbers that are equal parts of a whole and can be located on a number line. When different fractions are at the same point on a number line they are equivalent.

Resources

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Students make **Fraction Kits** in Lesson Series 1. Other optional fraction manipulatives, such as **Fraction Bars**, should be available to students throughout this unit.

	Student Pages	Blackline Masters	Materials	Slides
Entry Task S = Spanish C = Chinese	Unit 3.8 Family Letter S C Ramona and Howie's School Playground S C		Entry Task Teacher Answer Guide	Unit Warm-ups S Entry Task S
Lesson Series 1	Mario's Sandwich Student S C Fraction Kit Recording Sheet S C	Mario's Sandwich Launch BLM S C 0 to 1 Number Line BLM S C Fractions on a Number Line Mini Lesson BLM (Optional) S C	Strips of Construction Paper Bag or envelope for storage Scissors Optional website: www.conceptuamath.com	LS1 Day 1 S LS1 Day 2 S LS1 Day 3 S
Apprentice Task	Understanding Fractions S C	Fraction Number Line Sliders BLM	Paper clips	
Lesson Series 2	Glenn and Maggie's Chocolate Bars S C Exploring Equivalent Fractions S C Equivalent Fractions Extra Practice S C	Glenn and Maggie's Chocolate Bars BLM S C Equivalent Fractions on a Number Line BLM S C	Fraction Kits & other fraction manipulatives Yellow & blue construction paper strips Optional website: http://tinyurl.com/2cxdbh	LS2 Day 1 S LS2 Day 2 S
Expert Task	The Swim Race Expert Task S C	Expert Task Visual BLM	Fraction Kits & other fraction manipulatives	Expert Task S
Lesson Series 3	Comparing Fractions Investigation Part I S C Sharing Brownies Part I S C Comparing Fractions with the Same Numerator S C Comparing Fractions Investigation Part II S C Sharing Brownies Part	Fractions Greater than One Number Line BLM S C Extension (Optional) Game Cards: Less Than Greater Than BLM Comparing Fractions Game Recording Sheet BLM S C	Fraction Kits & other fraction manipulatives	LS3 Day 1 S LS3 Day 2 S LS3 Day 3 S

	II S C Comparing Fractions with the Same Denominator S C			
Milestone Task		Milestone Task School Garden BLM S C	Fraction Kits & other fraction manipulatives Milestone Task School Garden Answer Guide Milestone Task School Garden Rubric	Milestone Task S

Math Talks Bank

Below are the Math Talks suggested for this unit. These Math Talks are also listed with each lesson. Math Talks should happen 3 to 5 times a week for 10–15 minutes each. See **Math Teaching Toolkit** section on **Math Talks** for more information (http://www.sfusdmath.org/math-talks.html).

Re-engage with Previous Content

Multiplication and Division:
Objective: Students continue to build toward fluency with multiplication and division within 100.
Description: Students use mental math to solve each equation. Students share strategies for solving problems mentally.

Suggested Math Talks to Re-engage with Multiplication and Division

Question/Prompt: What is the missing _____ (number,product, quotient, factor, dividend, divisor)?

8 x 7 = ?	24 ÷4 = ?	? = 6 x 7	24 ÷ ? = 4	3 x ? = 21	32 = ? x 8

Anticipated Student Responses

- **8 x 7 = ?** *I know 8 x 7 is 56 because I broke apart the 7 into 2 and 5 and I know that 8 x 2 = 16 and 8 x 5 =40 and 40 + 16 = 56.*
- **24 ÷4 = ?** *I know that 20 divided into 4 groups is 5 and 4 divided into 4 groups is 1 so 24 divided into 4 groups must be 6 because 5 +1 = 6.*
- **? = 6 x 7** *Fives are easy to multiply so I broke the 6 into 5 and 1. I know that 5x7=35 and 7x1=7 so 7 x 6 is the same as (5x7) + (1x7). 35 +7 = 42.*
- **24 ÷ ? = 4** *I know that 4 x 6 = 24 so the missing number must be 6.*

- **3 x ? = 21** *I knew the missing factor was greater than 6 because 3 x 6 is 18. So I tried skip counting by 3 seven times and found that 3 x 7 =21*
- **32 = ? x 8** *I know 8 x 2 =16 if I double 16 I get 32. So, the missing number has to be double 2, or 4.*

Engage with Current Content

Fractions:
Objective: Reason about the size of fractions
Description: Students determine which they would rather have and why

Suggested Math Talks and Anticipated Student Responses

Entry Task
Would you rather have One whole Oreo Cookie or Two whole mini Oreo Cookies? (Entry Task)

- *I would rather have one whole oreo cookie because it is larger than two whole mini cookies.*
- *I would rather have two whole mini cookies because it is the same amount of cookie but I can share one or keep one for later.*

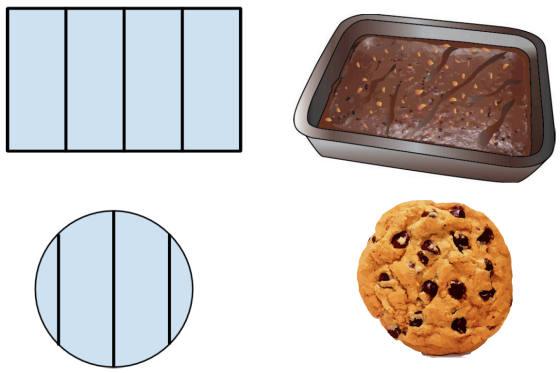
Lesson Series One

LS1 D1

Which would you rather have? One piece of the brownie or one piece of the cookie? Why?

- *I would rather have one piece of brownie because the pieces are the same size.*
- *I would rather have one piece of brownie because the cookie has some small pieces.*

LS1 Day 1 Math Talk BLM S C

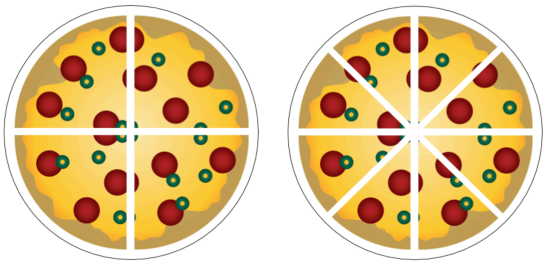


LS1 D2

Would you rather have ¼ of a whole pizza or ⅛ of a whole pizza?

- *I would rather have one fourth of a whole pizza because if you cut a pizza into four pieces the pieces are bigger than if you cut a pizza into eight pieces.*
- *I would rather have one eighth of a whole pizza because one fourth of a pizza would be too big to eat.*

LS1 Day 2 Math Talk BLM S C



LS1 D3

You have more than zero dollars but less than one dollar. How much money might you have?

- *I might have half of a dollar, fifty cents.*
- *I might have a quarter, twenty five cents.*

Apprentice Task

What might go on a number line between zero and one.

- *There are no numbers between zero and one.*
- *One half would go halfway between zero and one.*

Lesson Series Two

LS2 D1

Which would you rather have? One half dollar or two quarter dollars?

- *I would rather have two quarters because two is more than one.*
- *I would have either because they are the same amount of money.*

LS2 D2

Glenn ate ¼ of his chocolate bar and Maggie ate ½ of her chocolate bar. Glenn says he ate more chocolate than Maggie. How is this possible?

- *It is not possible because one fourth is smaller than one half.*
- *Glenn has a larger candy bar so his pieces are larger.*

LS2 Day 2 Math Talk BLM S C

Glenn's chocolate bar

Maggie's chocolate bar

Expert Task

Would you rather have $\frac{2}{6}$ of a whole pie or $\frac{1}{3}$ of a whole pie? Why?

- *I would have either because it is the same amount out of the whole pie.*
- *I would rather have one third of a whole pie because I could always cut it in half (and have two sixths) if I wanted to save some for later.*

Lesson Series Three

LS3 D1: Would you rather have two dollars or four half dollars? Why?

- *I would rather have two dollars because it is more money.*
- *I would have either because four half dollars is the same as two whole dollars.*

LS3 D2: Would you rather have $\frac{1}{3}$ of a pizza or $\frac{1}{8}$ of a pizza? Why?

- *I would rather have $\frac{1}{3}$ of a pizza because thirds are larger than eighths*
- *I would rather have $\frac{1}{8}$ of a pizza because 8 is greater than 3.*

LS3 D3: Would you rather have $\frac{2}{6}$ of a pizza or $\frac{3}{6}$ of a pizza? Why?

- *I would rather have three sixths of a whole pie because it is the same as half.*
- *I would rather have three sixths because three sixths is more than two sixths.*

Milestone Task

Would you rather have one half dollar or two quarter dollars?

- *I would rather have one half dollar because it is the same amount of money but it would be easier to keep track of than two quarters.*
- *I would rather have two quarter dollars because it is still fifty cents but I could buy something for twenty-five cents without needing change.*

Entry Task

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Core Math	A whole can be partitioned into equal parts called fractions.
Description	**Ramona and Howie's School Playground:** Students use their informal understanding of fractions from second grade as well as from everyday life to solve a series of problems about equal regions of geometric figures.
CCSS-M Standard(s)	**Geometry** **Reason with shapes and their attributes.** 2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape. 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*
Resources and Setup	Ramona and Howie's School Playground S C Entry Task Teacher Answer Guide
Homework	Entry Task HW S C

Math Talk

Fractions

Would you rather have one whole cookie or two halves of a cookie? Why?

This math talk may give you insight into students' understanding of halves and wholes.

Lesson Plan	*Note: While students will have a wide range of experiences with informally using fractions in real life and in school, this is their first foray into a more formal understanding of fractions. As such, use this task as an opportunity to observe what your students already know about fractions and how they apply this to the problems in the task.*
LAUNCH **1**	Ask: *If you could renovate our playground what would it look like?* Discuss: Allow students to turn and talk about how they would renovate a playground. Set up the problem: Tell students that they will be working with partners on a problem about a playground renovation at a school that a girl named Ramona and a boy named Howie attend.
EXPLORE **2**	***Monitor***: As students work on the problems, circulate, ask questions, and take notes. Notice how students are reading the problems, solving them, and explaining their work.

Select ***student work:***
As students are working, keep track of strategies that you may want to share. Try to choose 2-4 pieces of work that will support conceptual understanding of fractions.

→ Key Math to Observe

- Do students accurately identify the designs that show halves including design B?
- Do students understand why design C does not show halves ?
- When students draw fractions, do they take care to show equal portions?
- Are students able to articulate how they know parts are equal?
- Are students able to start using fraction notation? ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$)

SUMMARIZE

3

→ Core Math to Emphasize

- A whole can be partitioned into equal parts called fractions.

Sequence student work:
Decide the order in which you want students to share their work.

Sequence the sharing strategically so that students will be able to make connections between strategies.

Key Concepts to Introduce:

- Reading and writing fractions- words "One half, two halves, etc..." & notation
- Equal parts of a whole

As much as possible, allow the key concepts of the lesson to come from student work. However, you may find it necessary to model a specific concept for students.

For example, if no students use fraction notation you may want to introduce the structure of a fraction in a mini lesson.

Connect strategies and solidify learning:
While students are sharing, ask them to think about how other students solved the problems and how their strategies may be similar or different from their own.

You may ask the class to respond to one another with one of the following talk stems:

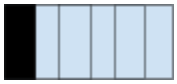
- I have a question....
- I understand...
- Can you explain why...

Sample Anchor Chart:

One Whole	1	One Whole $\frac{1}{1}$	
One half	$\frac{1}{2}$	One of the parts when the whole is divided into two equal parts	
One fourth	$\frac{1}{4}$	One of the parts when the whole is divided into four equal parts	

One eighth	$\frac{1}{8}$	One of the parts when the whole is divided into eight equal parts	

Note: Consider *starting with halves, fourths, and eighths and add in the thirds and sixths, below, in Lesson Series two.*

One third	$\frac{1}{3}$	One of the parts when the whole is divided into three equal parts	
One sixth	$\frac{1}{6}$	One of the parts when the whole is divided into six equal parts	

Notebook Prompt (5 minutes)
What do you already know about fractions?

Notes	Universal Support
• Students may not understand the concept of equal portions when they partition whole geometric figures. • They may not understand terms referring to fractions such as one half, one fourth, etc.	• The use of an anchor chart that clearly names fractions and shows a visual representation will help students use the vocabulary. • Allowing students to cut/fold shapes will help those who might otherwise not understand.

Extensions	Ask students to design a second playground that is divided into fourths.
Additional Notes	Third grade is the first year in which students learn about fractions in a formal sense. For more information about this, watch this five minute video: https://vimeo.com/66775207

Lesson Series 1 **Overview**

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Description

These lessons focus on developing students' conceptual understanding of fractions using concrete models. Students identify and name unit fractions, partition shapes into equal parts of a whole, and place fractions on a number line.

Standards

Number and Operations—Fractions*

Develop understanding of fractions as numbers.

3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*.

3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line.

*Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Students will work with halves, fourths, and eighths in this task. Thirds and sixths will be introduced in lesson series two.

Geometry

Reason with shapes and their attributes.

3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

	Day 1	Day 2	Day 3
Core Math	A fraction is a number that represents an equal part of a whole.	Unit fractions have one as the numerator and can be counted to compose other fractions.	A fraction is a part of a whole and a point on a number line.
Description	Students partition shapes into equal parts and name unit fractions.	Students explore basic fraction concepts and notations by creating and using Fraction Kits.	Students locate fractions on Number Line DIagrams.
Resources and Setup	Mario's Sandwich Launch BLM S C Mario's Sandwich Student S C	Fraction Kit Recording Sheet S C Strips of Construction Paper Bag or envelope for storage Scissors 	Fraction Kits (from Day 2) 0 to 1 Number Line BLM S C Optional: Fractions on a Number Line Mini Lesson BLM S C
Homework	Day 1 HW S C	Day 2 HW S C	Day 3 HW S C

Lesson Series 1 – **Day 1**

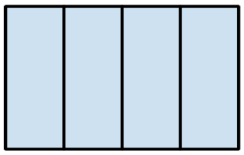
Core Math	A fraction is a number that represents an equal part of a whole.
Description	Students partition shapes into equal parts and name unit fractions.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Students will work with halves, fourths, and eighths in this lesson series. Thirds and sixths will be introduced in lesson series two. **Geometry** **Reason with shapes and their attributes.** 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*
Resources and Setup	Mario's Sandwich Launch BLM S C Mario's Sandwich Student S C Optional: The website www.conceptuamath.com/app/tool-library has a number of tools that you can use to demonstrate a variety of fraction concepts.
Homework	Day 1 HW S C

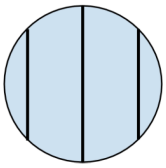
Math Talk

Fractions

Which would you rather have? One piece of the brownie or one piece of the cookie? Why?

In this math talk you will want to emphasize the concept of equal parts.





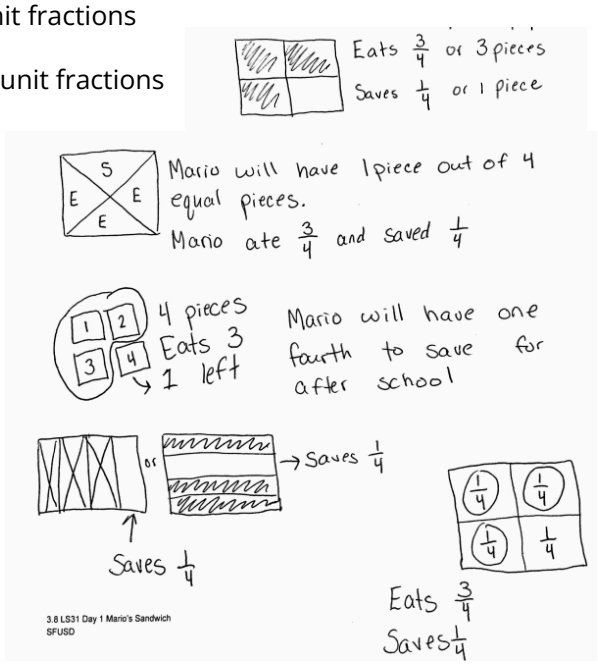
Images are here: **LS1 Day 1 Math Talk BLM** S C

Lesson Plan	
LAUNCH **1**	 Use the 3 Read Protocol with the Mario's Sandwich Launch BLM to help students understand the problem. • 1st Read: Read the problem aloud. Ask students what the problem is about and have them share with a partner. • 2nd Read: Read the problem together and ask students to identify the quantities and the units in the problem. • 3rd Read: Read the problem one more time and ask students to think about what mathematical questions could be asked about the problem. You may choose to record the questions that students generate. If students do not come up with a viable question, pose the questions yourself: "How much of Mario's sandwich does he save for after school?"
EXPLORE **2**	Direct students to Mario's Sandwich Student page. You may also choose to have students solve the problem in a math notebook. Explain to students that they are going to have to solve the problem and explain their thinking. You may choose to have students work in pairs or small groups. ***Monitor-*** As students work, monitor what they are doing and listen in on their conversations. During this time you are looking for different strategies to share. **→ Key Math to Observe** • Are students able to identify equal parts? • Are students able to justify their thinking? • How are students representing the sandwich? • Are students using words such as whole, part, and equal? • Are students attempting to use fraction notation and terminology? **Key Questions to Ask** • What can you tell me about Mario's sandwich? • How did you decide which piece he saved for after school? • Would it matter if you chose a different piece? • What is the same/different about what Mario ate and what he saved for later? ***Select*** *students to share* Look for students who were able to explain that Mario saved one piece out of four equal pieces, or one fourth of the whole sandwich.
SUMMARIZE **3**	**→ Core Math to Emphasize** • A fraction is a number that represents an equal part of a whole **Note: If time allows you may want to have students start making Fraction Kits (LS1 Day 2).** ***Sequence*** *the order for sharing* Choose 2-3 students/groups to share. Sequence the groups in an order that will help the class build a conceptual understanding of fractions as numbers less than, equal to, or greater than one. For example, you might choose to share student work that will help students understand how to write fractions using fraction notation.

	$\frac{Numerator}{Denominator}$ $\frac{Part}{Whole}$ $\frac{1}{4}$ Define the terms numerator and denominator. Post the words with a visual example in a place where students can easily reference it (see notes). Possible sequence: 1. A concrete example (a paper "sandwich" cut into fourths). 2. A picture that represents Mario's whole sandwich and the one piece that is left. 3. The number one fourth in fraction notation $\frac{1}{4}$ ***Connect*** strategies and solidify learning ● While students share, encourage them to make connections between strategies. What do they notice that is the same or different? ● Guide students towards making connections between different representations. ● Ask students to identify how others may have similar answers but have justified their thinking differently.  **Notebook Prompt (5 minutes)** How do you know when you have an equal part of a whole?

Notes	Universal Support
● Students might not understand that there are numbers between whole numbers ● Students might not understand vocabulary such as whole number, fraction, half, fourth, eighth, numerator, and denominator ● Students may have difficulty putting their thinking into words	● Provide fraction bars or circles ● Provide squares of paper (for sandwich) ● Allow students to work in pairs ● Allow students to work in small groups ● Ask students to think of a time when they had to divide something into equal pieces ● Post vocabulary with visual examples on a math word wall ● Use Sentence frame: ○ "Mario ate _____ fourths at lunch and had _____ fourth left for after school." ○ "Mario cut his sandwich into _____ equal pieces called fourths."

Extension	If Mario ate only half of his leftover piece after school how much would he have left?

Additional Notes	During the summary of this lesson try to use student work to bring forward key concepts.
	• A **unit fraction is** one equal part of a whole (the numerator is one) and other fractions are composed of multiple unit fractions.
	  ○ For example: When you have three of the unit fraction $\frac{1}{4}$ you have three one fourth sized pieces, or three fourths, which can be written in fraction notation as $\frac{3}{4}$.
	• Fractions can be written in words "one-fourth" and in fraction notation $\frac{1}{4}$.
	
	• Introduce the definition of numerator and denominator:
	  ○ The numerator is the number of unit fractions (parts) being counted.
	  ○ The denominator is the number of unit fractions (parts) in the whole.
	  ○ For example: In the fraction $\frac{1}{4}$ the denominator indicates that you are working with fourths, the numerator tells you how many fourths are in the number.
	
	The sample at right can help you anticipate how your students might approach this task.
	
	Note: This is NOT an answer key. The best way to anticipate what students will do is to complete the task with colleagues.
	
	 

Lesson Series 1 – **Day 2**

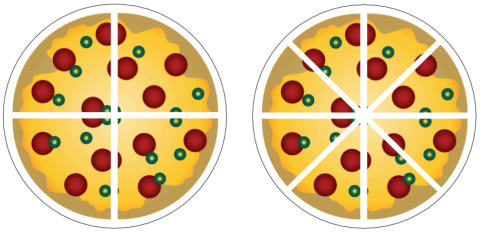
Core Math	Unit fractions have one as the numerator and can be counted to compose other fractions. For example:  "One fourth … Two fourths… Three fourths … Four fourths…"
Description	Students explore basic fraction concepts and notations by creating and using Fraction Kits.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Students will work with halves, fourths, and eighths in this lesson series. Thirds and sixths will be introduced in lesson series two. **Geometry** **Reason with shapes and their attributes.** 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*
Resources and Setup	• Fraction Kit Recording Sheet S C • 9" × 12" sheets of construction paper in six different colors: Red, orange, yellow, green, blue, and purple, cut into 1" × 12" strips; each student will need one of each color. Students will need red, orange, green, and purple today. They will use the yellow and blue in the next lesson series. • Bag or envelope for storage • Scissors  ***Make your own fraction kit to anticipate student needs and to have as a sample for students to see.***
Homework	Day 2 HW S C

Math Talk

Fractions

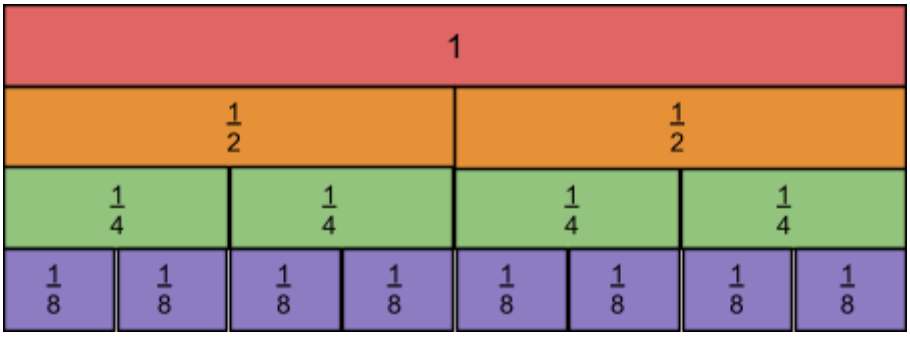
Would you rather have ¼ of a whole pizza or ⅛ of a whole pizza?

Students begin to think about the size of unit fractions. For example: *One fourth is larger than one eighth even though 8 is greater than 4.*



Images are here: **LS1 Day 2 Math Talk BLM** S C

Lesson Plan	Note: Students will work with fraction kits throughout this unit. In Grades 4 and 5 they will use fraction kits to explore more advanced fraction concepts.
LAUNCH **1**	**Making Fraction Kits** Each student will need: • 6 equal length strips of construction paper (Red, orange, yellow, green, blue, and purple). Students will need red, orange, green, and purple today. They will use the yellow and blue in the next lesson series. • Scissors • Pencil and Marker **It is important that each student uses the same color strip for each fraction that you have chosen ahead of class (e.g. red for wholes, orange for halves etc.).** This standardization will help students keep track of which fraction is being referred to during activities and discussions. In addition, the same colors are used in the SFUSD Math Core Curriculum in grades 4 and 5. Directions: 1. The red strip is the whole. Write WHOLE in the center 2. The orange strip is the halves. Fold and cut the strip into two equal pieces. Label each piece with the unit fraction $\frac{1}{2}$. 3. The green strip is the fourths. Fold in half, then in half again and cut the strip into four equal pieces. Label each piece with the unit fraction $\frac{1}{4}$. 4. The purple strip is the eighths. Fold and cut it into eight equal pieces. Label each piece with the unit fraction $\frac{1}{8}$. The final two strips will be used to create thirds and sixths in lesson series two. Whole: One piece/part out of one piece/part in the whole $\frac{1}{1}$  One Whole Half: One piece/part out of two pieces/parts in the whole $\frac{1}{2}$  Two Halves Fourth: One piece/part out of two pieces/parts in the whole $\frac{1}{4}$  Four Fourths Eighth: One piece/part out of two pieces/parts in the whole $\frac{1}{8}$  Eight Eighths



EXPLORE

2

Note: Creating the fraction strips may take a long time. You may choose to do the explore part of this lesson the following day.

Once students have completed their kits, have them sketch the pieces on their **Fraction Kit Recording Sheet**. Each rectangle on the student page is 4 in long, you may choose to have students use rulers or estimate.

As they fill out the worksheet, students practice counting unit fractions and determine which unit fractions are smallest/larger than another.

→ Key Math to Observe

- Are students able to identify and name the unit fractions?
- Are students able to point to unit fractions while counting (for example: "one fourth, two fourths, three fourths, four fourths")?
- Are students able to identify that the smallest pieces are eighths and the largest piece is one whole?

Key Questions to Ask

- What do you notice about the size of the pieces?
- How many _____ does it take to make one whole?
- How do you know an eighth is the smallest piece?
- What do you notice about the halves and the fourths? Fourths and the eighths?

***Select** student work to share*

Look for students who were able to identify and count by unit fractions, i.e. pointing to each unit fraction while counting, "one fourth, two fourths, three fourths".

Also look for students who are able to explain why one unit fraction is bigger/smaller than another, i.e. "One fourth is bigger than one eighth because the whole is cut into 4 large pieces instead of eight smaller pieces".

SUMMARIZE

3

→ Core Math to Emphasize

- A unit fraction is a fraction with 1 in the numerator.
- A unit fraction counts 1 of the parts when a whole is partitioned into some number of equal parts.
- Unit fractions can be counted.
  - For example: When you have 3 of the unit fraction $\frac{1}{4}$ you have three fourths. You can count each unit fraction as one fourth, two fourths, three fourths and write write three fourths as $\frac{3}{4}$.

	Sequence *the order for sharing* Choose 2-3 students/groups to share. Sequence in an order that will help the class build a conceptual understanding of unit fractions as numbers that can be counted and represent a certain sized part of a whole. ***Connect*** strategies and solidify learning • Guide students towards making a connection between the representations of fractions in the kit and the numerical recording. • Bring out common student ideas to share and discuss. • For example: If students think that $\frac{1}{4}$ is greater than $\frac{1}{2}$ because 4 is greater than 2 you may help one student understand why $\frac{1}{4}$ is less than $\frac{1}{2}$ and then ask that student to share their thinking with the rest of the class.  **Notebook Prompt (5 minutes)** What other fractions could you build using the unit fraction ¼?

Notes	Universal Support
• Students may have difficulty folding and cutting. • Students may be confused about why smaller fractions have a greater number as the denominator. • Students may have difficulty remembering what the numerator and denominator mean.	• Draw lines for students to fold and cut on. • Give students real world examples of where they might have broken a whole into equal parts. • Put vocabulary words on a math word wall with matching visuals .

Extensions	Ask students to determine what thirds or sixths might look like.

Lesson Series 1 – **Day 3**

Core Math	Like whole numbers, fractions are numbers that can be placed on a number line.
Description	Students locate fractions on Number Line Diagrams.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*. 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. 3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Students will work with halves, fourths, and eighths in this lesson series. Thirds and sixths will be introduced in lesson series two.
Resources and Setup	Fraction Kits (created on Day 2) 0 to 1 Number Line BLM S C Optional: Fractions on a Number Line Mini Lesson BLM S C
Homework	Day 3 HW S C

Math Talk

Fractions

You have more than zero dollars but less than one dollar. How much money might you have?

This math talk is designed to start students thinking about the concept of more than zero, less than one. It is also a review of the second grade standard on counting coins.

Anticipated student responses:

- *You can't have more than zero but less than one.*
- *I might have .50 cents, or half of a dollar*
- *I might have .25 cents, or a quarter of a dollar*

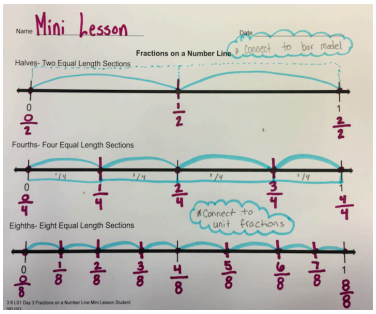
Lesson Plan	
LAUNCH	Have students take out their Fraction Kits and tell them that today they will learn how to represent fractions on a number line.

1	• As a warm up, have students sketch one whole using their choice of unit fractions. • Explain that the **sketch of a fraction strip is called a bar model or tape diagram** (see example below) • Allow students a few minutes to explore drawing diagrams using the fractions strips from their kit. *Note: The terms Bar Diagram/Model and Tape Diagram refer to a visual fraction model. The terms mean the same thing and can be used interchangeably.* Fraction Kit (Concrete Model)  Bar Model/Tape Diagram (Graphic Representation) 
EXPLORE **2**	After students have had a chance to practice sketching bar/tape diagrams show a number line diagram from zero to one (**0 to 1 Number Line BLM**). Tell students that, just like whole numbers, fractions can be placed on a number line. Ask: *What numbers could be on a number line between 0 and 1 whole?*  Use the think, write, pair/share structure to engage students in the problem: • Think- students silently think about the problem for 10 seconds • Write- students write their thoughts independently for one minute • Pair/Share- students pair with one other student to share their thinking ***Monitor-*** As students think, pair, and share, monitor to look for students who are able to accurately place fractions on a number line between zero and one. **→ Key Math to Observe** • Are students able to show one half on the number line? • Are students able to divide the line into four and eight equal length sections to show fourths and eighths? • What strategies are students using to partition the number line? • Can students use the number line to count by unit fractions (one eighth, two eighths, three eighths… eight eighths)? • Are students making connections between the Fraction Kit, Tape Diagram, and Number Line? • Do they notice that two halves, four fourths, and eight eighths are the same as one whole? Allow students to grapple with placing fractions on a number line.

Key Questions to Ask

- What number is halfway between 0 and 1? How do you know?
- What number is halfway between 0 and $\frac{1}{2}$? How do you know
- How do you know where $\frac{1}{2}$ is?
- Is _____ more or less than half? How do you know?
- What do you notice about the size of each section on the number line?
- How can you be sure that you are creating equal parts?
- Where is the numerator/denominator represented on the number line?

If the majority of students are struggling, you may choose to do a mini lesson using student work as a model or using the optional Fractions on a Number Line Mini Lesson BLM S C



***Select** students to share*
Look for students who were able to accurately place the numbers halves, fourths, or eighths on a number line between zero and one.

***Sequence** the order for sharing*
Choose 2-3 pairs/groups to share. For example, you might choose to share a number line that shows half first, then fourths, then eighths.

SUMMARIZE

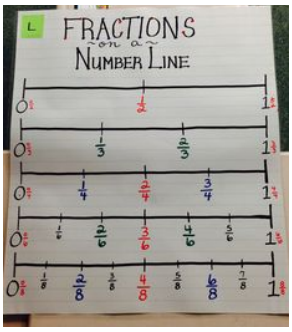
3

→ Core Math to Emphasize

- Like whole numbers, fractions are numbers that can be placed on a number line.

***Connect** strategies and solidify learning*

- Ask students to identify how they partitioned a number line into equal parts.
- Compare a number line that shows fourths with a number line that shows eighths. Ask students what they notice is the same/different between the two.
- Create an Anchor Chart for fractions on a number line You may choose to start with halves, fourths, and eighths and add thirds and sixths in Lesson Series 2.



Notebook Prompt (5 minutes)

What is one number that could be placed on a number line somewhere between 0 and 1? Draw a number line to explain your thinking.

Notes	Universal Support
• Students may have difficulty transferring their understanding of the fraction kits to a tape diagram and/or number line • Students may want to draw 4 lines to divide a number line into fourths (instead of 3). Ask students to determine how many lines they need to draw to divide a shape in half (1) to help them understand why only three lines are needed.	• Use ready-made fraction tiles or virtual manipulatives. • Model how to line up the fraction strips on a number line • Model how to find fourths and eighths by starting with half.

Apprentice Task

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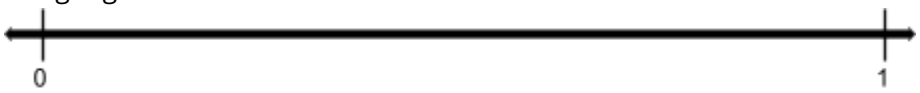
Core Math	Fractions are numbers that represent a part of a whole and can be placed on a number line.
Description	Students demonstrate their understanding of fractions as equal parts of a whole and numbers on a number line.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*. 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. 3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. Students will work with halves, fourths, and eighths in this task. Thirds and sixths will be introduced in lesson series two. **Geometry** **Reason with shapes and their attributes.** 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*
Resources and Setup	Fraction Kit (from Lesson Series 1) Other fraction manipulatives such as Fraction Bars or Circles (optional) Fraction Number Line Sliders BLM 1 per pair, copied on cardstock and cut out Understanding Fractions S C Paper clips Apprentice Task Answer Guide
Homework	Apprentice Task HW S C

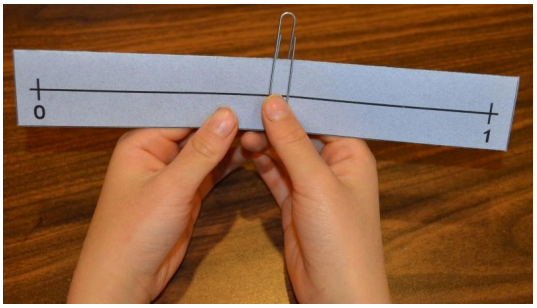
Math Talk

Fractions

What might go on this number line?



This math talk is meant to re-engage students with fractions on a number line.

Lesson Plan	
LAUNCH **1**	Create Fraction Number Line Sliders You may create a larger number line slider to use as a sample to show the class. Or use the student one on a document camera to demonstrate.  Give each student one double number line to fold and use with a paperclip as shown. Ask students to talk with a partner about what they notice about the lines. Students might say: • *It looks like a ruler* • *There are marks on both sides* • *When you turn it over, the lines kind of match* Show them how to use the number line and the paper clip to estimate the location of fractions, then flip the number line over to see how accurate their estimate was. Students may use this tool along with their Fraction Kits while solving problems throughout the unit.
EXPLORE **2**	Students complete the Apprentice Task to demonstrate their understanding of fractions up to this point in the unit. Students may work in pairs or small groups. ***Monitor-*** As students work, monitor what they are doing and listen in on their conversations. During this time you are looking for different strategies that connect to the core math of this lesson. **→ Key Math to Observe** • Are students able to express in pictures and/or words what each numerator and denominator tells them? • Are students able to partition a rectangle into equal parts? • Are students able to mark equal sections on a number line to represent fourths and halves? • Can students accurately place a fraction on a number line? **Key Questions to Ask** • What would that fraction look like? • Where is the denominator in the fraction___? • Where is the numerator in the fraction ___?

	Select *students to share* You might want to select students who have defined the numerator and denominator in different ways or have divided the rectangles into equal parts differently.
SUMMARIZE **3**	**→ Core Math to Emphasize** • Fractions are numbers that represent a part of a whole and can be placed on a number line. ***Sequence*** *the order or sharing* Choose 2-3 pairs/groups to share. Sequence the groups in an order that will help students make mathematical connections between different strategies. ***Connect*** *strategies and solidify learning* • While students share, encourage them to make connections between strategies. What do they notice that is the same or different? • Ask students to identify when others have similar answers but have justified their thinking differently. • Compare a tape diagram and number line that represent the same fraction and ask what each model could represent. For example, a tape diagram of fourths could represent a cake cut into four parts and a number line of fourths could represent the distance of a bike ride or length of a ribbon (measurement).  **Notebook Prompt (5 minutes)** How do you know where to place a fraction on a number line?

Notes	Universal Support
• Use this opportunity to formatively assess your students. Take note of their emerging ideas. Use the data from the Apprentice Task to re-engage students in the content as needed .	• Allow students to work together • Provide access to a math word wall with important vocabulary and visuals • Provide Fraction Kits and/or other fraction manipulatives

Extensions	Ask students to write a part III of the Apprentice Task

Lesson Series 2 **Overview**

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Description

Students construct an understanding of equivalent fractions and use multiple tools (fraction kits, number lines, tape diagrams, etc.) to solve problems involving equivalent fractions.

Standards

Number and Operations—Fractions*

Develop understanding of fractions as numbers.

3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line.

3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line.

3.NF.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 and 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

*Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

	Day 1	Day 2
Core Math	Equivalent fractions are fractions that are the same size.	Equivalent fractions may look different but they represent the same number and are located at the same point on a number line.
Description	Students explore the concept of equivalent fractions using Fraction Kits, Bar Model/Tape Diagrams and other visual models.	Students use number line diagrams to find equivalent fractions.
Resources and Setup	Fraction Kit from Lesson Series 1 Yellow and blue construction paper strips for thirds and sixths Exploring Equivalent Fractions S C Equivalent Fractions Extra Practice S C	Fraction Kits Glenn and Maggie's Chocolate Bars BLM S C Glenn and Maggie's Chocolate Bars S C Equivalent Fractions on a Number Line Mini Lesson BLM S C Equivalent Fractions on a Number Line BLM S C Optional website: http://tinyurl.com/2cxdbh
Homework	Day 1 HW S C	Day 2 HW S C

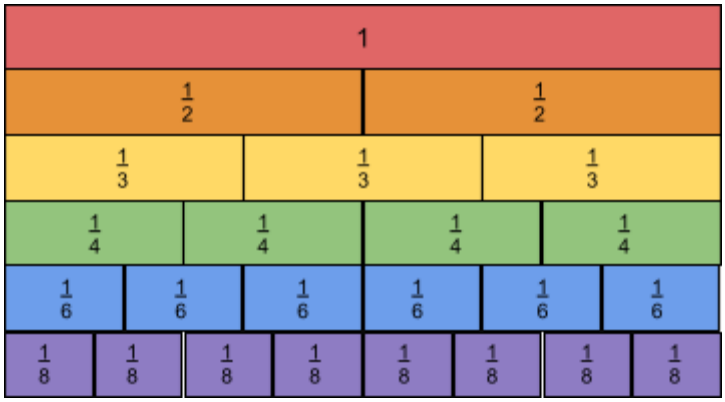
Lesson Series 2 – Day 1

Core Math	Equivalent fractions are fractions that are the same size.
Description	Students explore the concept of equivalent fractions using Fraction Kits, Bar Model/Tape Diagrams and other visual models.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. 3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line. 3.NF.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 and 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. 3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	Fraction Kit from Lesson Series 1 Yellow and blue construction paper strips for thirds and sixths Exploring Equivalent Fractions S C Equivalent Fractions Extra Practice S C
Homework	Day 1 HW S C

Math Talk

Fractions

Which would you rather have? One half dollar or two quarter dollars (quarters)?

Lesson Plan	
LAUNCH **1**	If you have not already, begin this lesson by having students add thirds and sixths to their fraction kits using two strips of construction paper that are the same length as the others (yellow for thirds and blue for sixths). Instruct students to create the sixths using half as a benchmark. First fold the strip of paper in half and then divide each half into three equal sections. Use a pencil to mark off sixths as accurately as possible before cutting. Students can then use two of the sixths to mark thirds. Alternatively, you may choose to mark thirds for students and then have them use one third to create two sixths. • Ask students to determine where they think the thirds and sixths should be placed within their Fraction Kit. • Have students put their Fraction Kit in order including the thirds and sixths.  Explain to students that today they will be investigating equivalent fractions. Talk about the word *equivalent* and point out that the root of the word is equal. Remind students that when they see the equal sign they should remember that it means "same as".
EXPLORE **2**	Tell students that they will be able to use any of the following: • Fraction kits and any other manipulatives • Math notebooks for recording (bar/tape diagrams, pictures, numbers, words, or other representations of equivalent fractions). • Crayons/markers/colored pencils • Various types of paper Tell them they will record their work on the Exploring Equivalent Fractions page. Alternatively, you may choose to have students record their thinking in a math notebook.  • Give students a defined amount of time to explore • Allow students to grapple with the idea of equivalent fractions as they attempt to construct their own understanding. ***Monitor-*** As students work, look for students who are able to determine when two fractions are equivalent. Look for different representations and ask students to record what they are finding.

→ Key Math to Observe

- Are students able to identify equivalent fractions?
- Are students able to explain how they know that two fractions are equivalent?
- Are students able to model equivalent fractions with the fraction kit?
- Are students able to find more than one example of equivalent fractions?

Key Questions to Ask

- What do you notice about the number of unit fractions? (for example, a student might notice that two thirds and four sixths are equivalent but you need more sixths than thirds because they are smaller pieces).
- Where is the numerator/denominator represented in this model?
- How do you know that _____ and _____ are equivalent?
- Is there another fraction that is also equivalent to _____?

Select *students to share* who can show an example of at least two equivalent fractions.

SUMMARIZE

3

→ Core Math to Emphasize

- Equivalent fractions are fractions that are the same size.

Sequence *the order or sharing*

You might choose to have students share different ways to show the same equivalent fractions. For example, one student might show equivalent fractions using the fraction kit while another may show the same fractions with a bar/tape diagram or other graphic representation.

Connect *strategies and solidify learning*

- While students share, encourage them to make connections between strategies.
- Ask students to notice what is the same or different between strategies.
- Guide students towards making connections between representations. For example, connect a concrete representation using fraction strips to a graphic representation such as a bar/tape diagram followed by a number line.

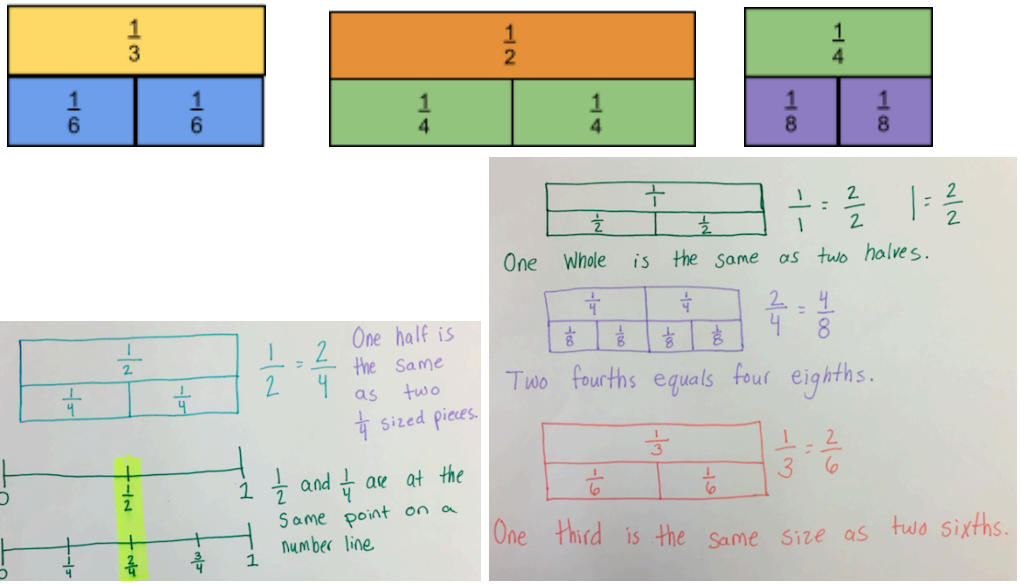
You may want to leave time for students to complete the **Equivalent Fractions Extra Practice Student Page.**

Notebook Prompt (5 minutes)

What does it mean when two fractions are equivalent? Draw a picture to explain your thinking.

Notes	Universal Support

• Students may have difficulty creating thirds for their fraction kit.
• Students may have difficulty explaining how they know two fractions are equivalent.
• Students may have difficulty recording their thinking on paper.
	• Mark off thirds prior to students cutting strips.
	• Create an anchor chart of different ways to represent equivalent fractions.
	• Sentence Frames
	  ○ I know __ is equal to __ because __.
	  ○ I can tell __ and __ are the same size because__.

Extensions	Ask students to explore equivalence. with fractions greater than one. For example, ask: "What would sixth fourths look like? What fraction is equivalent to six fourths?"
Additional Notes	**Anticipated Student Responses** (The colors in these samples may be different than the ones in the kits made in class.) 

Lesson Series 2 – **Day 2**

Core Math	Equivalent fractions may look different but they represent the same number and are located at the same point on a number line.
Description	Students use number line diagrams to find equivalent fractions.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. 3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line. 3.NF.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 and 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	Fraction Kits Glenn and Maggie's Chocolate Bars BLM S C Glenn and Maggie's Chocolate Bars S C Equivalent Fractions on a Number Line Mini Lesson BLM S C Equivalent Fractions on a Number Line Mini Lesson Student Page S C Optional website: http://tinyurl.com/2cxdbh
Homework	Day 2 HW S C

Math Talk

Fractions

Glenn ate ¼ of his chocolate bar and Maggie ate ½ of her chocolate bar.

Glenn says he ate more chocolate than Maggie. How is this possible?

Glenn's chocolate bar

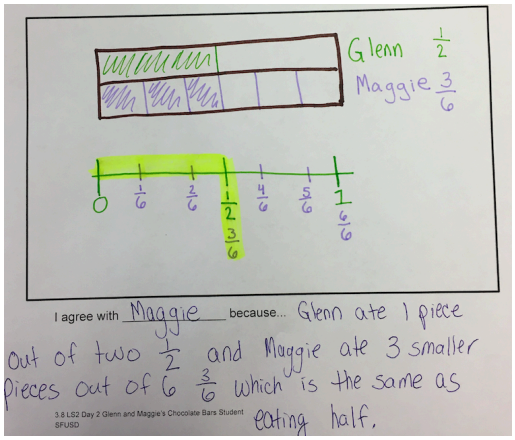
Maggie's chocolate bar

Images are here: **LS2 Day 2 Math Talk BLM** S C

Lesson Plan	
LAUNCH **1**	• Remind students that in the previous lesson they found equivalent fractions using their fraction kits and recorded examples of equivalent fractions using pictures, words, numbers, or other representations. • Explain to students that in this lesson they will connect what they already know about finding equivalent fractions to a number line diagram. • Display Glenn and Maggie's Chocolate Bars BLM • Use the 3-Read protocol to helps students understand the following problem: *Glenn and Maggie each bought the same sized chocolate bar. Glenn broke his bar into two equal pieces and ate one piece. Maggie broke her chocolate bar into six equal pieces and ate three pieces. Glenn thinks Maggie ate more than him but Maggie argues that they ate the same amount. Who do you agree with? Why?*
EXPLORE **2**	Students work on Glenn and Maggie's Chocolate Bars. ***Monitor-*** As students work, look for different strategies that show the equivalent fractions $\frac{1}{2}$ and $\frac{3}{6}$ **NOTE:** If you do not observe any students attempting a number line, you may choose to draw a number line from zero to one on the board and ask students to think about how they could solve this problem using a number line. **→ Key Math to Observe** • Are students able to represent $\frac{1}{2}$ and $\frac{3}{6}$? • What strategies are students using to solve the problem? • Are students able to use a number line diagram to represent halves and sixths? • Are students able to find equivalent fractions on a number line diagram?

Key Questions to Ask

- What do you notice about one half and three sixths?
- Do you agree / disagree with _____? Why?
- How do you know the two numbers are equivalent?
- How could you use number line diagrams to represent Glenn and Maggie's candy bars?
- How could you use number line diagrams to show how much Glenn and Maggie ate or how much they have left?



***Select** students to share*

Look for students who are able to show and explain how they know Glenn and Maggie ate an equal amount of chocolate. You may decide to choose students who use fraction strips, bar/tape diagrams, or number lines.

SUMMARIZE

3

→ Core Math to Emphasize

- Equivalent fractions are located at the same point on a number line.

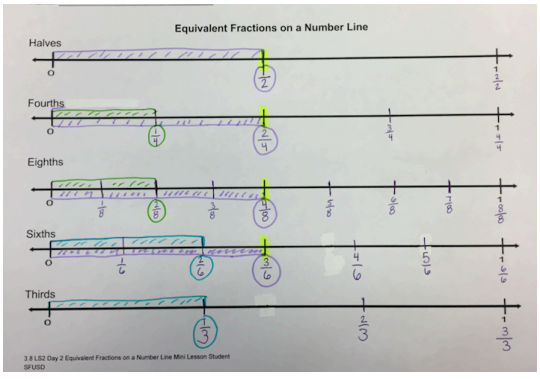
***Sequence** the order or sharing*

Choose 2-3 students (or pairs/groups) to share. Sequence the sharing in an order that will help the class build an understanding of equivalent fractions on a number line.

***Connect** strategies and solidify learning*

- Guide students towards making connections between familiar and new strategies.
- Ask students to explain how the number line diagram is similar/different than other diagrams that they have used.
- Ask students to explain how these number lines compare to other number lines they have used in the past

Mini Lesson (if needed)



- Use the **Equivalent Fractions on a Number Line Mini Lesson BLM**
- Explain that equivalent fractions are located at the same point on a number line
- Start with Line 1 and mark $\frac{1}{2}$,
- Move through the other number lines for fourths, sixths, and eighths and identify where half is located.
- Ask students if they see any other fractions that would be at the same point on a number line. Make a list of equivalent fractions that the class identifies.

Practice *Finding equivalent fractions on a number line*

- Use **Equivalent Fractions on a Number Line**
- Allow students to work in partners or small groups

	 **Notebook Prompt (5 minutes)** What are two fractions that you could place at the same point on a number line? Draw a number line to explain your thinking.

Notes	Universal Support
• Students may have a difficult time explaining who they agree with and why. • Students may have difficulty understanding the problem. • Students may think that the fraction with the greater number in the denominator is larger.	• Allow students to work in partners or small groups. • Use the 3-Read protocol to help students understand the problem • Ask students to show or draw examples of the fractions in the problem or use their fraction kit.

Extensions	Ask students to find other ways that Maggie and Glenn could break apart a chocolate bar into equal parts and eat half. ($\frac{2}{4,}$, $\frac{4}{8}$).

Expert Task

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Core Math	Fractions are equivalent if they are the same point on a number line.
Description	Students plot fractions on a number line to determine equivalent fractions..
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	The Swim Race Expert Task Answer Guide The Swim Race Expert Task S C Expert Task Visual BLM Fraction Kits Other fraction manipulatives such as Fraction Bars
Homework	Expert Task HW S C

Math Talk

Fractions

Would you rather have $\frac{2}{6}$ of a whole pie or $\frac{1}{3}$ of a whole pie? Why?

In this math talk students reason through how they can determine equivalent fractions using mental math.

Lesson Plan	
LAUNCH **1**	Display The **Expert Task Swim Race Visual BLM** and pose the following question: • *What questions can we ask about these pictures?* You may choose to record student's thinking as they generate questions. Explain the Expert Task including the following: Four friends are competing in a swim race. The pool is divided into 4 lanes, one for each person Tell students that they will use visual models (tape/bar diagram) and number lines to solve problems involving distances. You may choose to pose the following questions: • *What would it mean to only swim a fraction of the pool's length?* • *How is it possible to swim more than zero miles but less than one mile?* Provide groups with the Swim Race Expert Task and any of these suggested materials: • Fraction Kits • Anchor Chart of Strategies - e.g. Bar Model/Tape Diagram, Number Line, etc. • Math notebook and/or extra paper

EXPLORE **2**	***Monitor*** As students work, look for different strategies that connect to the core math of this lesson. ***Note:*** *There are two "thinking" questions posed at the bottom of each student page:* *Think: Who is winning so far? How do you know?* *Think: What do you notice about their practice distances?* *These questions are here for your formative assessment of understanding equivalent fractions. You may choose to have students discuss the questions with a partner and/or write their thinking down in the math journals or on a sticky note.* **→ Key Math to Observe** • Are students able to divide visual models and number lines accurately? • Are students able to identify equivalent fractions? • What other tools are students using to understand the problems? • Are students talking to each other about the math? • Are students able to explain their thinking? Note: If a student has previously learned an algorithm for determining equivalent fractions encourage that student to prove their thinking conceptually in a diagram or on a number line. Do not use this example to share whole group since the third grade standard focuses on understanding fractions conceptually without using memorized procedures. **Key Questions to Ask** • How do you know ___ and ___ are equivalent fractions? • Can you prove that _____ swam less than or more than _____? • How do you know who swam the longest/shortest distance? • How could you explain your thinking another way? • How do you know you are correct? ***Select*** *students to share* Look for pairs, groups, or individual students who were able to successfully explain when and why two fractions are equal.
SUMMARIZE **3**	**→ Core Math to Emphasize** • Fractions are equivalent if they are the same point on a number line. ***Sequence*** *the order or sharing* Choose 2-3 pairs, groups, or individuals to share. Sequence the sharing in an order that will help the class make connections between strategies. ***Connect*** *strategies and solidify learning* While students share, encourage them to make connections between strategies by asking questions. For example: • *How did you decide ___ and ___ are equivalent?* • *What did you do that is similar?* • *What did you do that is different?* Ask students what they notice about the numbers in the equivalent fractions.

	 **Notebook Prompt (5 minutes)** How can you prove that two fractions are equivalent?

Notes	Universal Support
• Students may struggle to understand the problems. • Students may find it difficult to partition a number line into equal sections. • Students may not be familiar with a lap pool.	• Allow students to work in pairs or small groups. • Allow students to use their fraction kit or other strategies to understand the problems. • Show a video of a swim meet.

Lesson Series 3 **Overview**

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Description

Students express whole numbers as fractions, identify fractions greater than one, and compare fractions with the same numerator or denominator by reasoning about the number or size of unit fractions.

Standards

Number and Operations—Fractions*

Develop understanding of fractions as numbers.

3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or < and justify the conclusions, e.g., by using a visual fraction model.

*Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

	Day 1	Day 2	Day 3
Core Math	Whole numbers and numbers greater than one can be expressed as fractions.	Fractions with the same numerator (number of unit fractions being counted) can be compared by reasoning about the denominator (size of the parts in the whole).	Fractions with the same denominator can be compared by reasoning about the number of pieces indicated by the numerator.
Description	Students work with fractions equal to and greater than one.	Students use unit fractions to compare fractions with the same numerator by reasoning about the size of the pieces.	Students compare fractions with the same denominators by reasoning about the number of unit fractions in the numerator.
Resources and Setup	Fraction Kits Fractions Greater than One Number Line BLM S C	Comparing Fractions Investigation Part I S C Sharing Brownies Part I S C Comparing Fractions with the Same Numerator S C Fraction Kits	Comparing Fractions Investigation Part II S C Sharing Brownies Part II S C Comparing Fractions with the Same Denominator S C Extension (Optional) Game Cards: Less Than Greater Than BLM S C Comparing Fractions Game Recording Sheet BLM S C
Homework	Day 1 HW S C	Day 2 HW S C	Day 3 HW S C

Lesson Series 3 – **Day 1**

Core Math	Whole numbers and numbers greater than one can be expressed as fractions.
Description	Students work with fractions equal to and greater than one.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	Fraction Kits Fractions Greater than One Number Line BLM S C
Homework	Day 1 HW S C

Math Talk

Fractions

Would you rather have two whole dollars or four half dollars? Why?

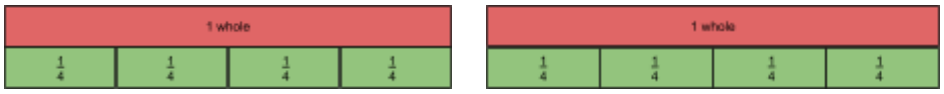
In this math talk students begin to think about fractions equal to and greater than one.

Lesson Plan	
LAUNCH **1**	**Display a number line from 0 to 3 on the board or show the Fractions Greater than One Number Line BLM.** • Remind students that so far they have been working with fractions between zero and one. Pose the following questions: • Do you think there are fractions greater than one? • Could we write whole numbers as fractions? **Use the think, write, pair/share structure to engage students in the problem.** 1. Think- students silently think about the problem for 10 seconds 2. Write- students write their thoughts independently for one minute 3. Pair/Share- students pair with one other student to share their thinking You may choose to have a brief whole class discussion about these questions or tell students that by the end of this lesson they will be able to answer these questions.

EXPLORE **2**	**Pose the following problem: How many fourths are in two wholes?** Tell students that they should use any of the materials and strategies they have used so far in the unit to explore this question. Give students access to Fraction Kits and remind them about using Bar Models/Tape diagrams or Number line diagrams. Allow students time to explore this problem and record their thinking. ***Monitor -*** As students work, look for different strategies that show that eight fourths (eight $\frac{1}{4}$ size pieces) is equal to two wholes ($\frac{8}{4}$= 2 or $\frac{8}{4}$= $\frac{2}{1}$) **→ Key Math to Observe** • Are students able to show two as eight fourths? • How are students representing 2? • How are students representing fourths? • Are students able to represent their thinking using multiple strategies such as fraction kits, tape diagrams, number lines, pictures, numbers, words, etc...? • Are students counting by fourths? For example: $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{5}{4}, \frac{6}{4}, \frac{7}{4}, \frac{8}{4}...$ • Are students able to name whole numbers as fractions? For Example: $\frac{4}{4}$= $\frac{1}{1}$= 1 = One Whole, $\frac{8}{4}$= $\frac{2}{1}$= 2 = Two One Wholes, $\frac{12}{4}$= $\frac{3}{1}$= 3 = Three One Wholes **Key Questions to Ask** • How can you represent two wholes? • How do you know that four fourths is the same as one whole? • How might you write the fraction eight fourths? • How could you write the whole number 2 as a fraction? • How can you prove that the whole number 2 is the same as $\frac{8}{4}$? • Can you find another way to explain your answer? ***Select*** - Look for students who are able to model $\frac{8}{4}$ as two wholes, the whole number 2, or the fraction $\frac{2}{1}$.
SUMMARIZE **3**	**→ Core Math to Emphasize** • Whole numbers and numbers between whole numbers can be represented as fractions. ***Sequence*** *the order of sharing* Choose 2-3 pairs/groups to share. Sequence the sharing in an order that will help the class build an understanding of fractions greater than one. One possible sequence is to start with a Fraction Kits representation, then move to a Bar Model or Tape Diagram, then show solutions on a number line, and finally in

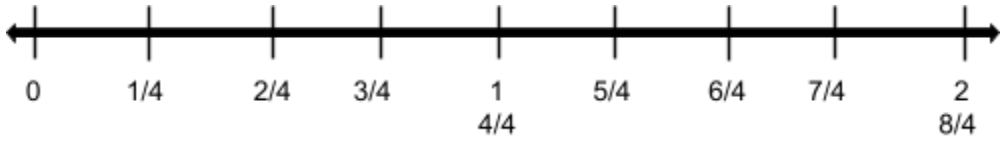
equation form.

1. **Concrete representation or picture**



2. **Bar Model/Tape Diagram**

3. **Number line diagram**



4. **Fraction notation** $\frac{8}{4} = 2$ $\frac{8}{4} = \frac{2}{1}$

Connect *strategies and solidify learning*

- While students share, help them to make connections between the strategies by asking: *How does each strategy show two wholes? Eight fourths?*
- Guide students towards writing eight fourths in fraction notation- $\frac{8}{4}$
- Ask students how they might write the whole number 2 as a fraction ($\frac{2}{1}$)

Mini Lesson (use as needed)
If students are struggling to understand fractions greater than one or how to write whole numbers as fractions, you may choose to do this mini lesson:

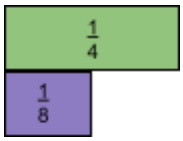
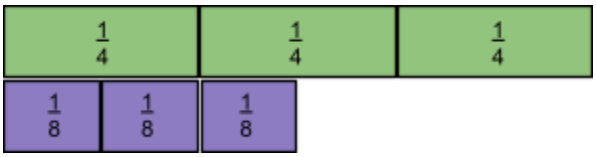
1. Have students draw a number line from 0 to 3 (or make copies of the Fractions Greater than One Number Line BLM).
2. Model how to divide each section between whole numbers into fourths. Start with half and then divide each half into two fourths.
3. Model how to label the number line from $\frac{1}{4}$ to $\frac{12}{4}$
4. Ask students to decide what else could go on the number line at the points $\frac{4}{4}$, $\frac{8}{4}$, and $\frac{12}{4}$ (1, 2, and 3).
5. Explain why the whole number two is the same as having 2 one whole pieces. You may want to use fraction strips to demonstrate.
6. Tell students that the whole number 2 can also be written as $\frac{2}{1}$ (two one whole pieces)

	 **Notebook Prompt (5 minutes)** How do you know when a fraction is equal to a whole number?

Notes	Universal Support
• Students may have difficulty understanding that there are numbers between whole numbers. • Students may think that a fraction greater than one is "wrong" because the numerator is greater than the denominator. • Students may have difficulty partitioning number lines into equal segments	• Remind students that it is possible to have more than one of something but less than two- for example, I can have more than one cookie but less than two if I have one whole and then part of another. • Practice counting by unit fractions past one whole: ⅓, ⅔, 3/3, 4/3, 5/3, 6/3, etc. • Add "Fractions Greater than One" to an anchor chart of your math word wall- include visuals. • Allow students to use fraction strips as a measuring tool when creating number lines.

Extensions	An interesting online resource for students to explore fractions is NCTM Illumination Fraction Models: http://tinyurl.com/mphgc4s
Note	Fractions greater than one are no longer referred to as "Improper." This term falsely implies that fractions with a numerator greater than the denominator are incorrect.

Lesson Series 3 – **Day 2**

Core Math	Fractions with the same numerator (number of unit fractions being counted) can be compared by reasoning about the denominator (size of the parts in the whole). Examples:  $\frac{1}{4} > \frac{1}{8}$ One fourth is greater than one eighth because fourths are bigger than eighths  $\frac{4}{8} < \frac{4}{6}$ Four Eights is less than four sixths because eighths are smaller than sixths.
Description	Students use unit fractions to compare fractions with the same numerator by reasoning about the size of the pieces. Example: ¾ is greater than ⅜ because fourths are bigger than eighths. *The numerator, 3, tells us how many pieces. Three fourth sized pieces are greater than three eighth sized pieces.* 
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or < and justify the conclusions, e.g., by using a visual fraction model. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	Comparing Fractions Investigation Part I S C Sharing Brownies Part I S C Comparing Fractions with the Same Numerator S C Fraction Kits
Homework	Day 2 HW S C

Math Talk

Fractions

Would you rather have $\frac{1}{3}$ of a pizza or $\frac{1}{8}$ of a pizza? Why?

In this math talk students reason about the size of each unit fraction and grapple with understanding why a greater number in the denominator does not mean a greater fraction.

Lesson Plan

LAUNCH

1

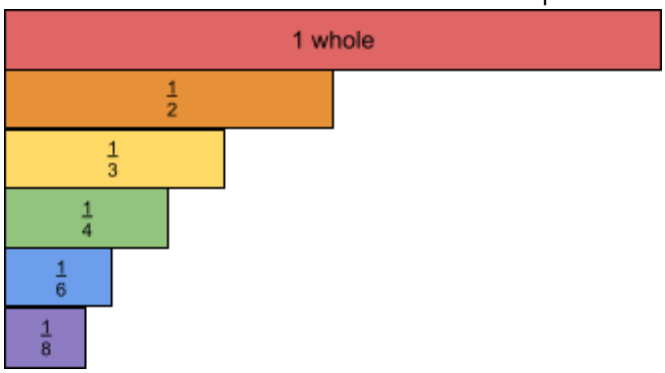
Comparing Fractions Investigation

Ask: "What does it mean to compare numbers?"

- Review the inequality symbols < and >
- You may want to ask students to write a few examples of inequalities using whole numbers and the symbols <, >, or =

Tell students they will work on the **Comparing Fractions Investigations Part I** recording sheet to explore fraction comparisons.

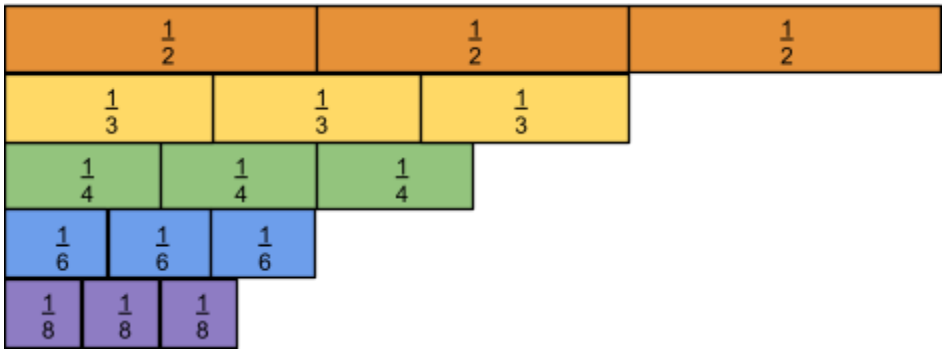
Work with the whole class to show and compare unit fractions with the Fraction Kit.



Ask students what they notice. Students might say:

- *⅛ is the smallest and 1 whole is the largest.*
- *¼ is greater than ⅙. Etc.*

Work with the whole class to show and compare fractions with a numerator of 3 with the Fraction Kit.



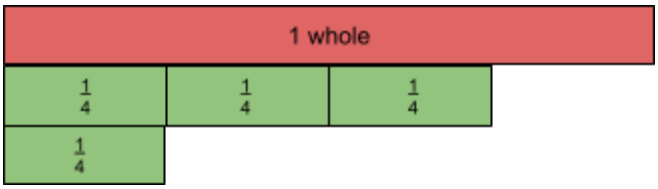
	Ask students what they notice. Students might say: • *3/2 is greater than 1 whole.* • *3/3 is equal to 1 whole. Etc.* Have students record their observations in the worksheet. Use the launch as a formative assessment to assess what students already understand about comparing unit fractions.
EXPLORE **2**	**Pose the Problem: Sharing Brownies Part I** Read the problem together Provide students with these materials: - Fraction Kits - Construction paper and scissors - Crayons/markers/colored pencils - Various types of paper - Math notebooks ***Monitor-*** As students work, look for students who compare one sixth and one eighth to show that one sixth is greater than one eighth. **→ Key Math to Observe** • Are students able to accurately identify and name unit fractions? • Are students able to explain why ⅙ is greater than ⅛ ? • Are students able to use the size of the denominator to compare fractions with the same numerator? • Are students able to represent the problem using multiple strategies such as fraction kits, tape diagrams, number lines, pictures, numbers, words? **Key Questions to Ask** • How can you represent each pan of brownies? • How can you prove that ⅙ is greater than ⅛? • Can you explain why ⅛ is less than ⅙ even though eight is greater than 6? • What if Robin and Shawn each had 2 brownies? ***Select*** *students to share* Look for students who were able to model the situation and explain why 1 piece out of 6 is a larger piece than 1 piece out of 8.
SUMMARIZE **3**	**→ Core Math to Emphasize** • Fractions with different denominators and equal numerators can be compared by reasoning about the size of each part. ***Sequence*** Choose 2-3 pairs/groups to share. A possible sequence is to start with a concrete example using fraction strips, followed by a graphic representation such as a number line and then a numeric representation using <, >, =. ***Connect*** *strategies and solidify learning* • Ask students what they notice is the same or different in different representations.

	• Ask how students with similar answers justified their thinking differently. Take time to surface ideas and discuss them. For example, have a student who thinks $\frac{1}{6} > \frac{1}{8}$ share alongside a student who thinks $\frac{1}{8} > \frac{1}{6}$. Then ask the class: • *With whom do you agree? Why?* • *How can we convince ourselves that $\frac{1}{6} > \frac{1}{8}$? What might (name of student) have been thinking that lead her/him to conclude that $\frac{1}{8} > \frac{1}{6}$?* **Practice: Comparing Fractions with the Same Numerator** • Allow students to work in pairs, small groups, or independently • Students compare and order fractions with the same numerator Note: Developing a classroom culture in which *Mistakes are Gifts* is important in order to be able to have students engage in productive discourse. Be careful not to share a student's incorrect work without his/her permission.  **Notebook Prompt (5 minutes)** What does the numerator in a fraction tell you about that number?

Notes	Universal Support
• Students may have difficulty understanding the problem • Students may have trouble directly modeling the situation in the problem • Students may struggle to transfer their understanding of a concrete model to paper (tape diagram, number line, pictures, words, numbers, etc.) • Students may have difficulty explaining their reasoning and using precise language	 • Use the 3-Read Protocol to help students understand the problem • Ask students to identify what each number (quantity) in the problem means and what the unit is. • Refer students to an anchor chart of different ways to represent fractions • Refer students to a math word wall to develop precise language **Vocabulary:** Whole, Fraction, Numerator, Denominator, Greater than/Less than <, >, Equal to/Same as =, Piece/Part/Portion **Sentence Frame** • I know ___ is less than/greater than _____ because....

Extensions	An interesting online resource for students to explore fractions is NCTM Illumination Fraction Models: http://tinyurl.com/mphgc4s

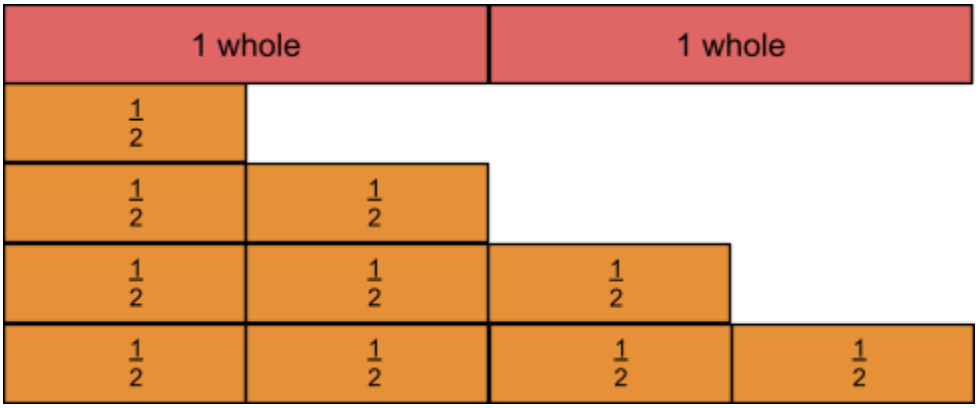
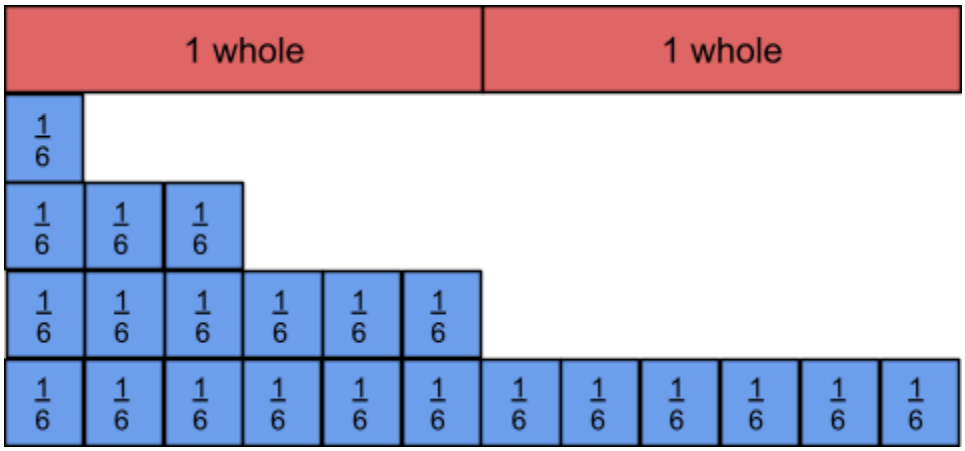
Lesson Series 3 – **Day 3**

Core Math	Fractions with the same denominator can be compared by reasoning about the number of pieces indicated by the numerator.
Description	Students compare fractions with the same denominators by reasoning about the number of unit fractions in the numerator. Example: ¾ is greater than ¼ because ¾ has three ¼ pieces (units) and ¼ is just one ¼ piece (unit). 
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or < and justify the conclusions, e.g., by using a visual fraction model. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.
Resources and Setup	Comparing Fractions Investigation Part II S C Sharing Brownies Part II S C Sharing Brownies Part II Answer Guide Comparing Fractions with the Same Denominator S C Fraction Kits Extension (Optional) Game Cards: Less Than Greater Than BLM S C Comparing Fractions Game Recording Sheet BLM S C
Homework	Day 3 HW S C

Math Talk

Fractions

Would you rather have $\frac{2}{6}$ of a pizza or $\frac{3}{6}$ of a pizza? Why?

Lesson Plan	In this lesson, students learn how to compare fractions with the same denominator by reasoning about the numerator.
LAUNCH 1	**Comparing Fractions Investigation** • Remind students that they have practiced comparing fractions with the same numerator by reasoning about the denominator. Work with the class through the problems in **Comparing Fractions Investigations Part II.** Show and compare fractions with two as the denominator  $\frac{1}{2}, \frac{2}{2}, \frac{3}{2}, \frac{4}{2}$ Show and compare fractions with six as the denominator  $\frac{1}{6}, \frac{3}{6}, \frac{6}{6}, \frac{12}{6}$ After each example, discuss with students what they notice and have them record this in the worksheet.
EXPLORE	**Pose the Problem: Sharing Brownies Part II**

2

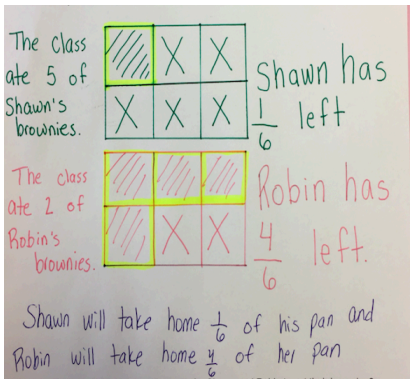
Read the problem together.
Provide students with these materials:

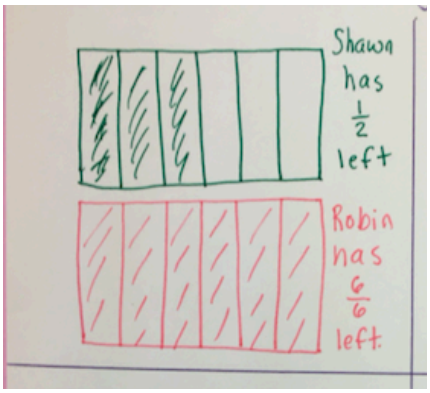
- Fraction Kits, Construction paper and scissors, Crayons/markers/colored pencils

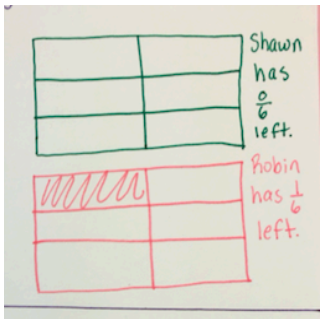
NOTE: There are **multiple solutions** to this problem.

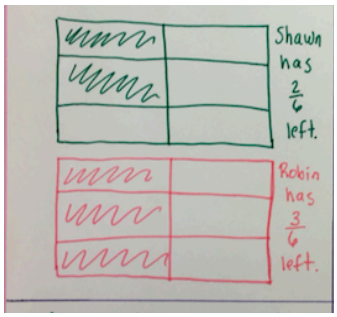
Encourage students to solve the problem in as many ways as they can.

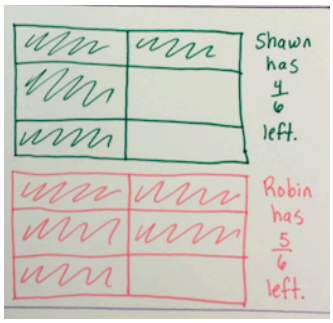
Here are some possibilities:











→ Key Math to Observe

- Are students able to determine when one fraction is greater than/less than another?
- What strategies are students using?
- Are they identifying fractions with equal denominators?

Key Questions to Ask

- How do you know ___ is greater than/less than _____? How can you show it?
- How did you know which symbol to use?
- What would those fractions look like?
- Where would those fractions be placed on a number line?

Extend the Problem:

- If Robin took home half of her brownies, what fraction of the pan could Shawn have taken home?
- How do you know?
- Find all the possibilities of how this problem could be true; how do you know that

	you've found them all?
SUMMARIZE **3**	**→ Core Math to Emphasize** • Fractions with the same denominator can be compared by reasoning about the number of pieces indicated by the numerator. ***Sequence*** *the order of sharing* Choose 2-3 pairs/groups to share. Look for students who are able to show and/or explain how to compare fractions with equal denominators. For example, you might choose students to share a concrete example using fraction strips, followed by a graphic representation such as a tape diagram and a numeric representation using <, >, =. ***Connect*** *strategies and solidify learning* While students share, encourage them to make connections between strategies. Ask: • *What do they notice that is the same or different?* Guide students towards making connections between their representations. Ask: • *How do the fraction strips connect to a picture or diagram?* • *How is a number line similar or different to a bar/tape diagram?* Have a student who thinks $\frac{1}{6} > \frac{1}{8}$ share alongside a student who thinks $\frac{1}{8} > \frac{1}{6}$. Then ask the class: • *With whom do you agree? Why?* • *How can we convince ourselves that 1/6 > 1/8? What might (name of student) have been thinking that led her/him to conclude that 1/8 > 1/6.* **Practice: Comparing Fractions with the Same Denominator** • Allow students to work in pairs, small groups, or independently • Students compare and order fractions with the same denominator  **Notebook Prompt (5 minutes)** What does the denominator in a fraction tell you about that number?

Notes	Universal Support
• Students may have trouble modeling the situation in the problem	• Provide sentence frames: ○ _____ is less / greater than equal to _____ because...

Extensions	**Game: Greater Than, Less Than, or Equal to?** Students practice comparing fractions with equal numerators or equal denominators. Students can use the cards with pictures, the cards without pictures, or both mixed together. **Resources:** Game Cards: Less Than Greater Than BLM **Optional:** Comparing Fractions Game Recording Sheet BLM S C **Directions:** Students play in pairs. They put the deck of cards in a pile, face down. They turn over the top card and each student silently determines if the fractions are equal or if one is greater. When they are ready, at the same time, they point to the greater fraction or say "equal." If they agree, they put that card aside and turn over the next card. If they disagree, they discuss their strategy or draw a picture of the fractions. When consensus is reached, they play again with a new card. After a set number of rounds, each pair records observations about the methods they used to compare the fractions. Students can record their work on the optional BLM. **Credit:** *Greater Than, Less Than, Equal To?* game adapted from and used with permission of IllustrativeMathematics.org.

Milestone Task

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Core Math	Fractions are numbers that are equal parts of a whole and can be located on a number line. When different fractions are at the same point on a number line they are equivalent.
Description	Students demonstrate their understanding of fractions as equal parts of a whole and as points on a number line. Students also identify equivalent fractions.
CCSS-M Standard(s)	**Number and Operations—Fractions*** **Develop understanding of fractions as numbers.** 3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a/b* as the quantity formed by *a* parts of size 1/*b*. 3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. 3.NF.2a Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. 3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line. 3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 3.NF.3a Understand two fractions are equivalent (equal) if they are the same size, or the same point on a number line. 3.NF.3b Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 and 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model. 3.NF.3c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* 3.NF.3d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or < and justify the conclusions, e.g., by using a visual fraction model. *Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. **Geometry** **Reason with shapes and their attributes.** 3.G.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*
Resources and Setup	Milestone Task School Garden BLM S C Milestone Task School Garden Answer Guide Teacher Milestone Task School Garden Rubric
Homework	Milestone Task HW S C

Math Talk — Fractions

Would you rather have one half dollar or two quarter dollars? Why?

This math talk will re-engage students with equivalent fractions and promote discussion of "fourths" as "quarters".

Lesson Plan	
LAUNCH **1**	Hand out Milestone Task "The School Garden" and introduce the context. If your school has access to a garden, make a connection to how each class shares a part of the garden. If your school does not have access to a garden, show pictures of community gardens and explain that people divide them into areas. Have students work independently on this task.
EXPLORE **2**	Provide students the tools they have used in the previous lessons to choose from (Fraction Kits, paper for folding, anchor chart of strategies, or other manipulatives as needed). **→ Key Math to Observe** • Are students able to understand a fraction as an equal part of a whole? • Are students able to understand a fraction as a number on a number line? • Do students understand that two fractions are equivalent (equal) if they are the same size, or the same point on a number line? • Can students recognize and generate simple equivalent fractions using a visual fraction model? • Can students express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers? • Are students able to compare two fractions with the same numerator or the same denominator by reasoning about their size?
SUMMARIZE **3**	**→ Core Math to Emphasize** • Fractions with the same denominator can be compared by reasoning about the number of pieces. After collecting student work, debrief with the class if time allows. Ask: • *What do you think you did well? What was difficult? What questions do you have?*  **Notebook Prompt (5 minutes)** Read your notebook entry from the entry task: *What do you know about fractions?* What do you still agree with? What can you add to your thinking?

Notes	Universal Support
• Students might divide a shape into parts that are not equal. • Students might be confused with the denominators and the numerators.	**Considerations for students with learning differences:** • Provide extra time and visual supports as available. • Provide any IEP testing modifications and/or accommodations. • Assist by re-reading the problem. • Provide students with allowable universal tools and designated supports. **Vocabulary:** equal, section, equivalent, amount, exact **Sentence frames:** • The fraction ___ is bigger than ___ because ___.