3rd Grade Mathematics

Fractions - Unit 3 Curriculum Map January 6th – March 7th

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

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Unit Overview

In this unit, students will:

- Develop an understanding of fractions, beginning with unit fractions.
- View fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole.
- Understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one.
- Solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
- Recognize that the numerator is the top number (term) of a fraction and that it represents the number of equal-sized parts of a set or whole; recognize that the denominator is the bottom number (term) of a fraction and that it represents the total number of equal-sized parts or the total number of objects of the set
- Explain the concept that the larger the denominator, the smaller the size of the piece
- Compare common fractions with like denominators and tell why one fraction is greater than, less than, or equal to the other
- Represent halves, thirds, fourths, sixths, and eighths using various fraction models

Essential Concepts

The foundation for fluency is based on the study of patterns and relationships in multiplication and division facts.

Essential Questions

- What strategies help you solve an unknown fact?
    - How can you use known facts to help you find unknown facts?
      If you don't know 6x9, how can you use 6x10 to help?
- What properties help you solve an unknown fact?
- How can you explain the patterns observed in multiplication and division combinations/facts?

REVIEW OF GRADE 2 FLUENCIES	
2.OA.2	Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

EXPECTED GRADE 3 FLUENCIES	
3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3rd Grade Unit 3 January 6th – March 7th

Important Dates and Calendar

Week of …	Monday	Tuesday	Wednesday	Thursday	Friday
1/6-1/10	REVIEW MODULES				
1/13-1/17					
1/21-1/24	No School				Checkpoint
1/27-1/31	UNIT 3 NEW CONTENT				1/2 Day
2/3-2/7					
2/10-2/14					
2/17-2/21	NO SCHOOL				
2/24-2/28	UNIT 3 NEW CONTENT				
3/34-3/7	Assessment Week				

IMPORTANT DATES

Monday, Jan 20th	MLK Day
Friday, Jan 24th	Checkpoint 2 Grades 6-7
Friday, Jan 31st	1/2 Day
Week of Feb 17th	VACATION
Friday, March 14th	Data Due
Friday, March 21st	Data Returned to Principals

Pacing Guide

Review Content

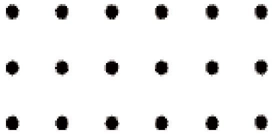
Activity	Common Core Standards/SLO	Teacher Notes	Estimated Time
1) Morning Routines 2) Daily Routine	3.MD.1	Pg. 10-36	4- 5 days
1) Think about addition and subtraction 2) 500 3) Take 1000 Game	3.NBT.2	Pg. 10-36	4 – 5 days
1) Multiplication Chart Mastery 2) Find the Unknown Number 3) My Special Event	3.OA.7	Pg. 10-36	4 – 5 days
Assessment Check 1	3.MD.1,3.NBT.2, 3.OA.7	Pg.37	½ day
Checkpoint #2 (Friday, January 24th)	SGO Standards Fluency Only		1 day

New Content

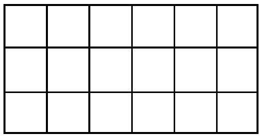
Fraction Exploration	3.NF.1	Pg. 10-36	2 days
Illustrative Mathematics Task Locating fractions less than 1 on the number line		Pg. 72-77	1 day
Comparing Fractions I	*3.NF.2*	Pg. 10-36	2 days
Illustrative Mathematics Tasks Locating Fraction greater than 1 on the number line	*3.NF.2*	Pg. 72-77	1 day
Comparing Fractions II	*3.NF.2*	Pg. 10-36	2 days
Illustrative Mathematics Task Closest to ½ Which is Closer to 1?		Pg. 72-77	1 day
Using Fraction strips to explore the number line		Pg. 10-36	2 days
Illustrative Mathematics Task Naming the Whole for a Fraction **Pattern Block Fractions**		Pg. 72-77	1 day
Illustrative Mathematics Task Finding 1 Finding 2/3		Pg. 72-77	1 day
MAKE A HEXAGON GAME		Pg. 10-36	1 day
PIZZAS MADE TO ORDER		Pg. 10-36	1 day
Assessment Check 2	3.NF.1-3	Pg.78-80	½ day
Selected Review	*Based on Assessment Checks and student work*		2 days
Unit 2 Assessment	3.NF.1, 3.NF.2, 3. NF.3, 3.G.2		2 days

Review Content Overview - Multiplication Concepts

Multiplication can be defined in terms of repeated addition. For example, 3 × 6 can be viewed as 6 + 6 + 6. More generally, for any positive integer n, $n \times b$ can be represented as $n \times b = b + b + \dots + b$, where the sum on the right consists of n addends.
A rectangular array provides a visual model for multiplication. For example, the product 3 × 6 can be represented as



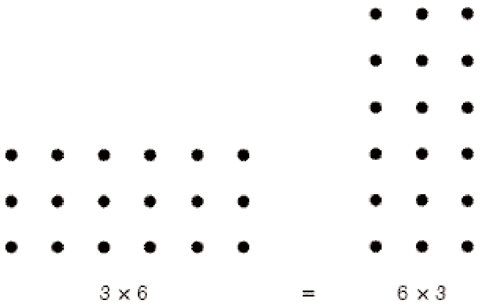
By displaying 18 dots as 3 rows with 6 dots in each row, this array provides a visual representation of 3 × 6 as 6 + 6 + 6. An equivalent area model can be made in which the dots of the array are replaced by unit squares. Besides representing 3 × 6 as an array of 18 unit squares, this model also shows that the area of a rectangle with a height of 3 units and a base of 6 units is 3 × 6 square units, or 18 square units.



Multiplication is a binary operation that operates on a pair of numbers to produce another number. Given a pair of numbers a and b called factors, multiplication assigns them a value $a \times b = c$, called their product.

Multiplication has certain fundamental properties that are of great importance in arithmetic. The Commutative Property of Multiplication states that changing the order in which two numbers are multiplied does not change the product. That is, for all numbers a and b, $a \times b = b \times a$.

The array model can be used to make this plausible. For example, because 3 × 6 = 6 × 3, an array with 3 rows and 6 dots in each row has the same number of dots as an array with 6 rows and 3 dots in each row.

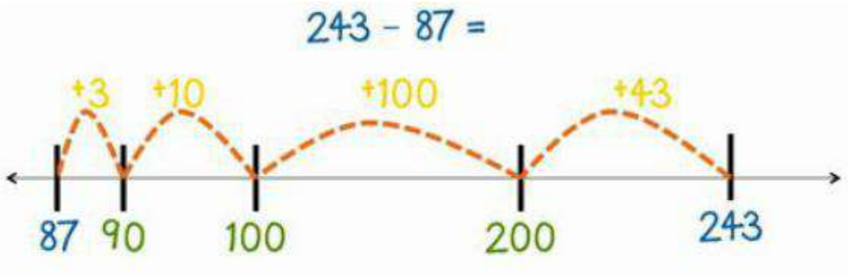


Another important property of multiplication is the Identity Property of Multiplication. It states that the product of any number and 1 is that number. That is, for all numbers a, $a \times 1 = 1 \times a = a$.

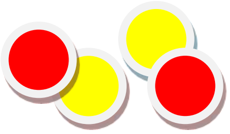
The Zero Property of Multiplication states that when a number is multiplied by zero, the product is zero. That is, for all numbers a,
$a \times 0 = 0 \times a = 0$.

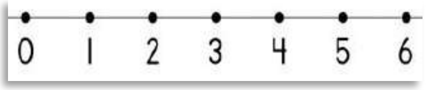
CONCRETE REPRESENTATIONS

- Number Lines



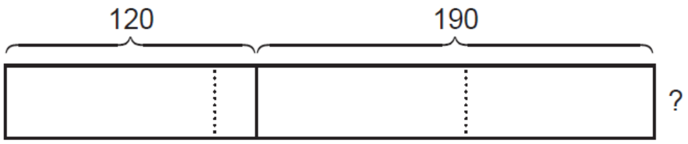
- color coin counters to represent whole numbers
- Number Lines
- Thermometers, rulers and other equally partitioned tools

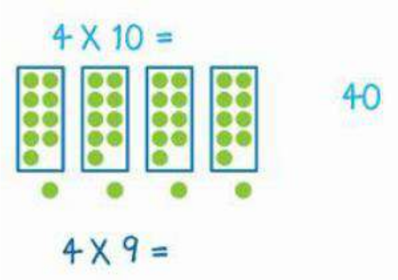




PICTORIAL REPRESENTATIONS

- Bar Models
- Visual Representation





ABSTRACT REPRESENTATIONS

- Applying the Operations
- Applying Properties of Numbers
- Applying the standard algorithms for addition, subtraction, multiplication, and division and strategies based on place value such as:

	Possible Strategy #1	Possible Strategy #2
29 + 8	29 can become 30 and take 1 from 8 reducing it to 7.	9 and 8 becomes 17 17 plus 20
54 + 86	50 + 80 + 10 =	Add 6 to 54 to get 60. Then 60 + 80 = 140

Common Core Standards – Review Content

REVIEW CONTENT	
3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
	By studying patterns and relationships in multiplication facts and relating multiplication and division, students build a foundation for fluency with multiplication and division facts. Students demonstrate fluency with multiplication facts through 10 and the related division facts. Multiplying and dividing fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Strategies students may use to attain fluency include: • Multiplication by zeros and ones • Doubles (2s facts), Doubling twice (4s), Doubling three times (8s) • Tens facts (relating to place value, 5 x 10 is 5 tens or 50) • Five facts (half of tens) • Skip counting (counting groups of __ and knowing how many groups have been counted) • Square numbers (ex: 3 x 3) • Nines (10 groups less one group, e.g., 9 x 3 is 10 groups of 3 minus one group of 3) • Decomposing into known facts (6 x 7 is 6 x 6 plus one more group of 6) • Turn-around facts (Commutative Property) • Fact families (Ex: 6 x 4 = 24; 24 ÷ 6 = 4; 24 ÷ 4 = 6; 4 x 6 = 24) • Missing factors Students should have exposure to multiplication and division problems presented in both vertical and horizontal forms.
3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
	Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly, accurately, and efficiently. Students explain their thinking and show their work by using strategies and algorithms, and verify that their answer is reasonable. An interactive whiteboard may be used to show and share student thinking. Example: • Mary read 573 pages during her summer reading challenge. She was only required to read 399 pages. How many extra pages did Mary read beyond the challenge requirements? Students may use several approaches to solve the problem including the traditional algorithm. Examples of other methods students may use are listed below:

	• 399 + 1 = 400, 400 + 100 = 500, 500 + 73 = 573, therefore 1+ 100 + 73 = 174 pages (Adding up strategy) • 400 + 100 is 500; 500 + 73 is 573; 100 + 73 is 173 plus 1 (for 399, to 400) is 174 (Compensating strategy) • Take away 73 from 573 to get to 500, take away 100 to get to 400, and take away 1 to get to 399. Then 73 +100 + 1 = 174 (Subtracting to count down strategy) • 399 + 1 is 400, 500 (that's 100 more). 510, 520, 530, 540, 550, 560, 570, (that's 70 more), 571, 572, 573 (that's 3 more) so the total is 1 + 100 + 70 + 3 = 174 (Adding by tens or hundreds strategy)
3.MD.1	Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
	Students in second grade learned to tell time to the nearest five minutes. In third grade, they extend telling time and measure elapsed time both in and out of context using clocks and number lines. Students may use an interactive whiteboard to demonstrate understanding and justify their thinking.

Review Content Lessons

TIME TO GET CLEAN
3.MD.1

In this lesson, students will examine a family's morning bathroom routine. They will discuss and explore telling time to the minute as well as elapsed time.

BACKGROUND

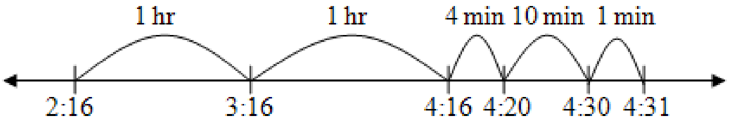
In this task, students will record and draw time to the nearest minute and calculate elapsed time in 15, 30, and 60 minute intervals.

Teachers may want to begin with a discussion of daily activities in students' lives and the amount of time those activities typically take. For example, getting ready for school may begin at 7:06 AM and end at 7:36 AM, a 30 minute duration. Then engage students in a discussion of activities that typically happen during the school day and their estimates of the duration of these activities.

As the calculations are made, you should encourage students to explore a linear model of time as well as a traditional analog clock. The linear model can be created using an open number line. Jumps are made from the beginning time to the ending time much like movement on a number line and increments of time may be recorded above the jumps. An example is shown below:

To find the elapsed time from 2:16 pm to 4:31 pm,

- ○ start with an open number line
- ○ add the starting time, and
- ○ then count up to the ending time using jumps that make sense to the students:



If telling time is built into daily routines, students should have had classroom experiences with telling time to the nearest minute. Daily routines can be extended to elapsed time by asking students the stopping time if they start work now and work for 15 minutes or 30 minutes. Additionally, students could be asked what time they will return to the classroom if they will be returning in one hour.

ESSENTIAL QUESTIONS

- What strategies can I use to help me tell and write time to the nearest minute and measure time intervals in minutes?
- How can we determine the amount of time that passes between two events?
- What part does elapsed time play in our daily living?
- How can I demonstrate my understanding of the measurement of time?

MATERIALS

- "Morning Routines" student recording sheet
- clock (classroom clock or individual clocks for each student)
- empty number line, or any material students may need to assist them with measuring elapsed time

TASK DESCRIPTION

Students will follow the directions below from the “Morning Routines” student recording sheet.

- Closely examine the *Morning Routines* chart below.
- With a partner or small group, fill in the missing parts of this schedule.
  - Answer the questions below about the bathroom schedule. ○ Who spends the most time in the bathroom?
  - ○ Who spends the shortest time in the bathroom?
  - ○ How long to Dad and Grandpa spend in the bathroom in all?
  - ○ How much longer does Meagan spend in the bathroom than Carl?
  - ○ The first person goes into the bathroom at 6AM. It is in use until everyone is finished getting clean. At what time will the bathroom be free each day?
  - ○ Choose one person’s bathroom slot. Tell how you figured out their missing information.

FORMATIVE ASSESSMENT QUESTIONS

- What strategies did you use to figure out the missing times on the chart?
- What connections can you make to parts of the hour? (half hour, quarter hour, etc?)
- What is the hardest part about telling time to the nearest minute and elapsed time?
- What part of this task did you find was easiest to complete?
- How did you determine the elapsed time?
- Is there more than one way to figure out elapsed time?

DIFFERENTIATION

Extension

- Have students make and use a list of other values and their equivalents (i.e. ½ hour = 30 minutes).
- Have students create their own schedule with missing values for a classmate to complete.
- Have students prepare a “Telling Time Toolkit” for a visitor from prehistory (or at least before clocks were invented) explaining everything they need to know about telling time to the nearest minute and explaining how to figure out elapsed time.

Intervention

- Provide beginning and ending times for activities that do not cross the hour mark. For example, show a beginning time of 11:15 and an ending time of 11:45 for a given activity. Be sure students understand the elapsed time of 30 minutes before moving to activities of a longer duration that begin and end in different hours.
- Only provide the elapsed time in minute form.
- Allow students to use clock, calculators, and number lines for help.
- Facilitate a teacher-guided group.

Morning Routines!

3.MD.1

The Freeman Family Bathroom is a busy place in the mornings! So, the Freeman kids decided to create a chart for everyone to follow so things wouldn't get too crowded. There's one problem. Baby Freeman (Georgie) erased some important parts of the schedule. The Freeman kids are very nervous about this because they will have to show their new schedule to the family tonight and be ready to explain it. Can you help them?

- Closely examine the Freeman Family Morning Bathroom Schedule below.
- Fill in the missing parts of the schedule. Use clocks or other tools to help you.
- Answer the questions about the schedule on the space provided.

Part I: The Freeman Family Morning Bathroom Schedule

Person	Activities	Start Time	End Time	Time Taken
Megan	Shower, wash hair, dry hair, brush teeth		6:30	**½ hour**
Carl	Shower, brush teeth	6:30	6:56	
Baby Georgie	Take a bath	6:56		24 minutes
Mom	Shower, brush teeth		8:05	¾ hour
Dad	Shower, shave, brush teeth	8:05	8:47	
Grandpa	Take a bath, shave	8:47		35 minutes

Part II: Explanations for the Family Meeting

1. Who spends the most time in the bathroom? ___________________________________
2. Who spends the shortest time in the bathroom? _________________________________
3. How long to Dad and Grandpa spend in the bathroom in all? ______________________
4. How much longer does Meagan spend in the bathroom than Carl? __________________
5. The first person goes into the bathroom at 6AM. It is in use until everyone is finished getting clean. At what time will the bathroom be free each day? ___________________
6. Choose one person's bathroom slot. Tell how you figured out their missing information below.

____

____

TASK: DAILY SCHEDULE
3.MD.1

In this task, students will record and draw time to the nearest minute and calculate elapsed time in 15, 30, and 60 minute intervals.

ESSENTIAL QUESTIONS

- How can we determine the amount of time that passes between two events?
- What part does elapsed time play in our daily living?
- What does it mean to tell time to the minute?
- What strategies can I use to help me tell and write time to the nearest minute and measure time intervals in minutes?

MATERIALS

- "Daily Schedule" student recording sheet
- Clock (Classroom clock or individual clocks for each student)

TASK DESCRIPTION

Note: As students record daily events, be sure the elapsed time is in 15, 30, or 60 minute intervals. Alternatively, provide a daily schedule that is already filled in with start and stop times. Then have students calculate the elapsed time, or duration, of each activity and record it on the chart. Students will follow the directions below from the "Daily Schedule" student recording sheet.

- In the Daily Routines chart below, record six of your class' daily activities.
- Then calculate the elapsed time, or duration, of each activity and record it on the chart.
- Choose three events. List the event and record the start time and end time for each event on the clock faces below.
- Choose one of the events above and explain how you found the elapsed time.

FORMATIVE ASSESSMENT QUESTIONS

- How did you determine your start and end times?
- What kinds of activities can you typically complete in a quarter-hour, half-hour and hour?
- How did you determine the elapsed time?
- Is there more than one way to figure out elapsed time?

DIFFERENTIATION

Extension

- Have students use a digital camera to create an interactive slide show, flipchart, or schedule chart for display of the daily school events.

Intervention

- Provide beginning and ending times for activities that do not cross the hour mark. For example, show a beginning time of 11:15 and an ending time of 11:45 for a given activity. Be sure students understand the elapsed time of 30 minutes before moving to activities of a longer duration that begin and end in different hours.
- On a paper divided into fourths, have students list as many things as they can that last approximately 15 minutes/30 minutes/1 hour/more than 1 hour.
- Ask students to complete a similar chart for a typical weekend day.

Name ______________________________________ Date _______________________

Daily Routines

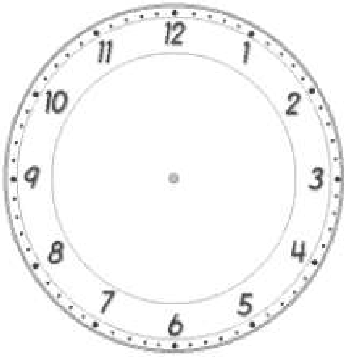
In the Daily Routines chart below, record six of your daily class activities. Then calculate the elapsed time, or duration, of each activity and record it on the chart.

Daily Rountines			
Event	**Start Time**	**Stop Time**	**Duration of Event**

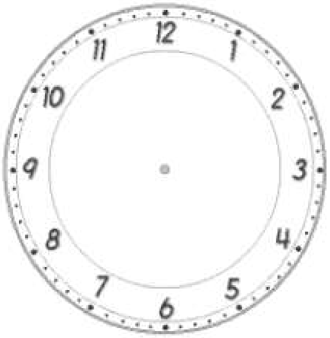
Choose three events from your chart. List the event and record the start time and end time for each event on the clock faces below.

1. Event: ____

Start Time

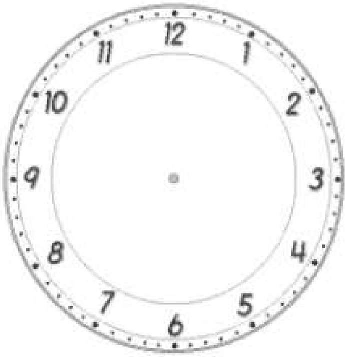


End Time

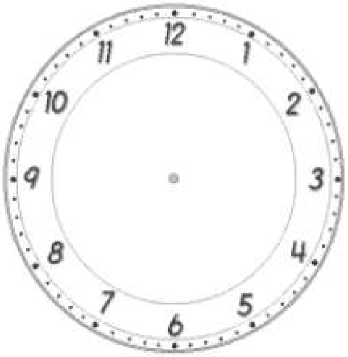


2. Event: ____

Start Time

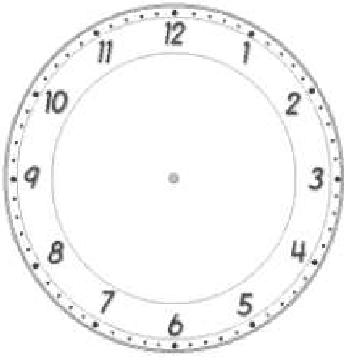


End Time

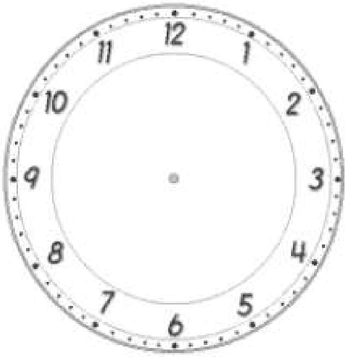


3. Event: ____

Start Time



End Time



4. Choose one of the events and explain how you found the elapsed time.

"THINK ABOUT ADDITION AND SUBTRACTION"
3.NBT.2

BACKGROUND

According to research, students will develop many different strategies for addition and subtraction. As a teacher, you will want to make sure that students have at least 2 efficient, mathematically correct, and useful strategies that can be used with various numbers.

ESSENTIAL QUESTIONS

- How can I use addition and subtraction to solve real world problems?
- What strategies can I use to solve real world problems?
- How are addition and subtraction related?

MATERIALS

- Math Journals (or paper)
- Manipulatives/cut outs (to help students create models for their problems)
- "Let's Learn About Addition and Subtraction" recording sheet

NUMBER TALK (Example)

25 + 27 =	Decompose 27 to 25 + 2 25 + 25 = 50 and 50 + 2 = 52	20 + 20 = 40 Then 40 + 12 = 52
199 + 199 =	200 + 200 = 400 Then 400 - 2 = 398	190 +190 = 380 Then 380 + 18 = 398

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Although addition and subtraction were covered in 2nd grade, students can still benefit from acting the stories out. Students should use pictures, words and numbers to solve the word problems.

Part I

The teacher will begin by asking students to respond to the following questions in their math journal. Sheena sorted the change in her piggy bank. She has 122 pennies, 97 nickels, 118 dimes, and 308 quarters. How many coins did Sheena sort in all?
Once students are finished, the class will discuss the strategies they used to determine the answer. There should also be discussion about how subtraction could be used to verify results. This information may also be used to create an anchor chart.

Part II

Although students are not formally introduced to decimals in CCSS until 4th grade, it is acceptable and developmentally appropriate for students to encounter these life skills by adding and subtracting dollars and cents in 3rd grade. Students should not be expected to add and subtract decimals out of this context.

In small groups, students will complete the “Figuring Out Addition and Subtraction” recording sheet. Students should be encouraged to solve their problems in multiple ways, using pictures, numbers, and words.

- Your school cafeteria sells popsicles for seventy-five cents, nutty buddies for eighty-five cents, and ice cream cones for sixty cents. If a student spends ten dollars in the month of October for these treats, what could the student have bought? List as many combinations as you can find.
- Rene is saving for a computer that cost $750. He received $123 for his birthday in May and saved $347 from cutting grass during June and July. How much money does Rene still need to purchase the computer?

FORMATIVE ASSESSMENT QUESTIONS

- Explain one strategy that can be used when adding?
- Explain one strategy that can be used when subtracting?
- What strategies can be used to solve real world problems accurately?
- How are addition and subtraction related?

DIFFERENTIATION

Intervention

- Students may use manipulatives such as counters or money.
- Adjust the numbers in the task. If students are struggling with the idea of money, discuss everything in the context of pennies within 1000 ($10.00)

Name________________________ Date ______________

Think about Addition and Subtraction!

***Try to solve each problem in more than one way using pictures, numbers, and words.**

Your school cafeteria sells popsicles for seventy-five cents, nutty buddies for eighty-five cents, and ice cream cones for sixty cents. If a student spends ten dollars in the month of October for these treats, what could the student have bought? List as many combinations as you can find.

Rene is saving for a computer that cost $750. He received $123 dollars for his birthday in May and saved $347 dollars for cutting grass during June and July. How much money does Rene still need to purchase the computer?

PERFECT 500!
3.NBT.2

This task involves estimation with addition. It utilizes many mental math strategies developed in number talks and prior tasks.

BACKGROUND KNOWLEDGE

Students should have addition skills clearly in place, and strategies for larger numbers, including counting up, counting back, pairs that make ten, pairs that make 100, and compensation strategies.

Students may find this game challenging, particularly at the beginning of the year. When introducing this game, you may choose to use one of the variations of the game from the list below.

- Play just one round, the students with the sum closest to 100 wins.
- Play just one round as a class. Put the digits on the board and let students create the sum that is closest to 100.
- Discuss the relationship between pairs of 10 and pairs of 100. (i.e. 4 + 6 = 10, so 40 + 60 = 100 What about 42 + 68? Why doesn't that equal 100?

ESSENTIAL QUESTIONS

- How can I learn to quickly calculate sums in my head?
- What strategies will help me add numbers quickly and accurately?
- What strategies are helpful when estimating sums in the hundreds?

MATERIALS

- Deck of game cards, (2 copies of the cards provided for a deck of 40 cards)
- "500" Directions Sheet
- "500" Student Recording Sheet

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

This game allows students to look for combinations of numbers that equal 100.

Task Directions

The goal of the game is to have a sum as close to, but not over, 500 at the end of five rounds. To begin, each student is dealt 5 cards. The player uses four of the cards to make 2, two-digit numbers, saving the unused card for the next round. Each player tries to get as close as possible to 100. Students record their addition problem on the recording sheet, keeping a running total as they play.

For the second round, each player gets four cards to which they add the unused card from the first round. The student, who is closest to 500 without going over, after five rounds, is the winner.

FORMATIVE ASSESSMENT QUESTIONS

- What is one way to quickly find the answer? Can you think of another way?
- What strategies would you use to be sure you don't go over 500?
- How do you decide which numbers to use? How do you choose which cards to use?

DIFFERENTIATION

Extension

- Students can play " 5,000" during which each player draws 7 cards and uses 6 to make 2, three-digit numbers whose sum is close to 1,000. After 5 rounds, the player with the sum closest to 5,000 without going over is the winner.

Intervention

- Plan for students with like abilities to play against each other.
- Students can play "100" during which each player draws 4 cards and adds the numbers on three cards to find a sum as close as possible to 20. After 5 rounds, the player with the sum closest to 100 without going over is the winner.
- Students who need a visual can use manipulatives such as base ten blocks, snap cubes, drawings, etc.

1	1	2	2
3	3	4	4
5	5	6	6
7	7	8	8
9	9	0	0

Name ______________________________________ Date ______________________

"500"

Number of Players: 2 or 3
Materials: One deck of 40 cards (4 each of the numbers 0-9)

Directions:

1. The goal of the game is to have a sum as close to but not over 500 at the end of five rounds.

2. To begin, shuffle the deck of cards.

3. Deal 5 cards to each player. Use four of the cards to make 2, two-digit numbers, saving the fifth card for the next round.

4. Try to get as close as possible to 100. Record your addition problem and sum on the recording sheet, keeping a running total as you play.

5. For the second round, each player gets four cards to which they add the unused card from the first round.

6. After five rounds, the winner is the player who is closest to 500 without going over.

TAKE 1,000
3.NBT.2

This task involves estimation with addition. It utilizes many mental math strategies developed in number talks and prior tasks.

ESSENTIAL QUESTIONS
- How can I learn to quickly calculate sums in my head?
- What strategies will help me add multiple numbers quickly and accurately?

MATERIALS
- A deck of cards containing two of each of the following numbers: 100, 200, 300, 400, 500, 600, 700, 800, 900, 500, 50, 950, 150, 850, 250, 750, 350, 650, 450, 550. (Copy 2 game cards sheets for each deck of cards)
- “Take 1,000 Game, Student Directions” Student Sheet

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION
This is a card game during which students must be the first to spot combinations of one thousand. This game can be adapted to eliminate the speed aspect to the game. Students can take turns turning over a card and placing it face up next to the other cards that are face up. If there is a sum of the numbers on any pair of cards that equals 1,000 the student gets to take those cards. If there is not a sum of 1,000, then the cards are left face up and the student’s turn ends. Play continues until all of the cards have been turned over. The player with the most cards at the end of the game wins. As students play, ask them to record their pairs of 1,000 as an addition number sentence. This gives students an opportunity to focus on the pairs that make 1,000 and provides a record of the game.

Task Directions

Students follow the directions below from the “Take 1,000 Game, Student Directions” Student Sheet.
Number of Players: 2
Materials: Deck of 40 Cards

Directions:
1. Your goal in this game is to make sets of one thousand.
2. Shuffle the cards well and lay them face down in a pile on the desk.
3. Turn the top card over and set it to the side where both partners can see it. Now turn the next card over and set it to the side of the first overturned card.
4. If the first two overturned cards equal one thousand when added together, try to be the first one to say, “One Thousand!” loudly enough for your partner to hear you. This student should prove answer by adding numbers out loud. First to notice a sum of 1,000 takes the cards.
5. If the first two cards do not make a set of one thousand, keep turning cards over and setting them next to the first overturned cards. When someone spots a combination of one thousand, they call out “One Thousand!” and the take the cards that total one thousand. Before student takes the cards, they should prove their answer by adding numbers out loud. Keep playing until all cards have been claimed or the overturned cards do not make a set of one thousand.

6. The player with the most cards at the end of the game is the winner.

FORMATIVE ASSESSMENT QUESTIONS

- What do you know about pairs of numbers that add to 1,000?
- What strategies are you using? How are they working for you?
- What can you do to find the answer quicker than your partner?
- Does 630 + 470 equal 1,000? How do you know?

DIFFERENTIATION

Intervention

- If two struggling students are going to play this game together, it may help to model the game during small group instruction first. While modeling the game, use the think-aloud strategy to model ways students can think about pairs to one thousand.
- Play a “Pairs to 100” game. Cards and directions can be found in Unit 6, Grade 2 frameworks. Or play a “Pairs to 20” game using two of each of the following cards: 1, 19, 2, 18, 3, 17, 4, 16, 5, 15, 6, 14, 7, 13, 8, 12, 9, 11, 10, 10.

Name ______________________ Date __________________________

Take 1,000 Game
Student Directions

Number of Players: 2
Materials: Deck of 40 Cards

Directions:

1. Shuffle the cards well and lay them face down in a pile on the desk.

2. Turn the top card over and set it to the side where both partners can see it. Now turn the next card over and set it to the side of the first overturned card.

3. Your goal in this game is to make sets of one thousand.

4. If the first two overturned cards equal one thousand when added together, try to be the first one to say, “One Thousand!” loudly enough for your partner to hear you. You should prove your answer by adding numbers out loud. If you are first to notice, you may take the cards that equal one thousand. If your partner is the first to notice, he or she gets to take the cards.

5. If the first two cards do not make a set of one thousand, keep turning cards over and setting them next to the first overturned cards. When someone spots a combination of one thousand, they call out “One Thousand!” and take the cards that total one thousand. Before anyone takes the cards, they must prove their answers out loud. Keep playing this way until all cards have been claimed or the overturned cards do not make a set of one thousand.

6. The player with the most cards at the end of the game is the winner.

50	100	150	200
250	300	350	400
450	500	550	600
650	700	750	800
850	900	950	500

Find the Unknown Number
3.OA.7

ESSENTIAL QUESTIONS
- How can you use multiplication facts to solve unknown factor problems?
- How are multiplication and division related?

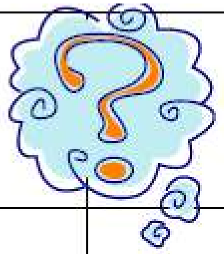
MATERIALS
- Ten-sided dice or number cards (1-10) or playing cards Ace through 10
- Find the Unknown Number partner cards (You may want to put this in a sheet protector or laminate for reuse)

TASK DESCRIPTION

Partners will take turns rolling the ten-sided dice or choosing a card from a face down pile. If Partner 1 can use the number he/she rolled/chose to correctly complete any equation on the “Find the Unknown” partner card, they can record the number in the correct spot. Partner 2 then takes a turn. The partner to fill in the division equations correctly first wins that round. Partners can play again or switch cards with another pair of partners.

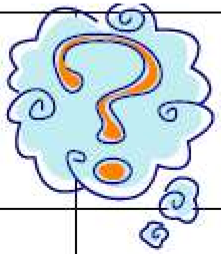
FORMATIVE ASSESSMENT QUESTIONS
- How do multiplication facts help in solving division equations?
- What strategy can you use to solve division equations?

Find the Unknown Number (Partner Card A)



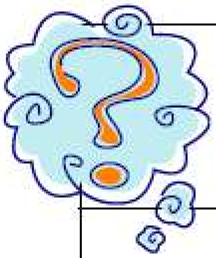
Partner 1	Partner 2
12 ÷ _______ = 2	18 ÷ 2 = ______
16 ÷ 4 = _______	_____ ÷ 1 = 7
5 ÷ 5 = ______	8 ÷ 4 = _______
18 ÷ _______ = 6	30 ÷ _______ = 6
_______ ÷ 2 = 4	20 ÷ _______ = 2

Find the Unknown Number (Partner Card B)



Partner 1	Partner 2
24 ÷ _______ = 6	20 ÷ 2 = ______
12 ÷ 4 = _______	_____ ÷ 1 = 3
6 ÷ 6 = ______	36 ÷ 4 = _______
60 ÷ _______ = 6	36 ÷ _______ = 6
_______ ÷ 2 = 5	16 ÷ _______ = 2

Find the Unknown Number (Partner Card C)



Partner 1	Partner 2
80 ÷ ______ = 8	32 ÷ 8 = ______
32 ÷ 4 = ______	_____ ÷ 1 = 7
7 ÷ 7 = ______	16 ÷ 4 = ______
18 ÷ ______ = 6	63 ÷ ______ = 7
______ ÷ 2 = 3	18 ÷ ______ = 2

Multiplication Chart Mastery
3.OA.7

In this task, students will explain and describe the patterns they find in the multiplication chart.

ESSENTIAL QUESTIONS

- What patterns of multiplication can we discover by studying a times table chart?
- How can we determine numbers that are missing on a times table chart by knowing multiplication patterns?

MATERIALS

- “Multiplication Chart Mastery” recording sheet
- Manipulatives
- Blank Multiplication Chart (partially filled in from Finding Factors Task)

TASK DESCRIPTION

Students may have the interpretation that they must fill in the multiplication chart from memory. It is important to be sure to make manipulatives available to students who may need them. As students discover and verbalize patterns in the multiplication chart, they find more strategies with which to remember multiplication and division facts. The more familiar students become with patterns and predicting successive numbers in patterns, the better prepared they will be for further understanding.

Part I:

Students may begin to fill in their own multiplication chart. Challenge them to fill in the facts they know. Discuss what patterns they discover. How will they find the products they are missing?

Part II:

Students will answer the questions on the “Multiplication Chart Mastery” recording sheet. Be sure to give students an opportunity to discuss their answers with peers and the teacher.

FORMATIVE ASSESSMENT QUESTIONS

- What patterns do you notice in the ___ column?
- If you think of 8 x 4 as 8 x 2 doubled, what is the product of 8 x 4? Will this strategy always work? How do you know?
- What strategy could you use to find the products for the eight facts?
- Where are examples of the commutative property on the multiplication chart?

DIFFERENTIATION

Extension:

- Have a student fill in a multiplication chart and purposely include six wrong items. Trade with a partner and try to be the first to identify the incorrect numbers on the chart and make corrections.

Name ________________________ Date ____________________

Multiplication Chart Mastery

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18			27	30
4	8	12	16	20	24			36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36			54	60
7	14		28	35		49		63	70
8	16			40			64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

1. Fred filled in this chart to practice his multiplication facts. Which fact does he seem to know best?

____

How do you know?

____

____

2. Fred has all his nines facts correct, even though he has not memorized them. Explain one strategy he might have used to fill in his nines on the chart.

____

____

3. Fred is missing some of threes and fours facts. Fill them in for him and explain how you would teach him to find these answers.

____

____

4. How could Fred use the fours facts to help him find the eights facts? Fill those in for him and explain your strategy.

____

____

5. Fred has done a great job filling in all the numbers on the diagonal. What do you notice about these numbers?

____

____

6. Do you see any other patterns on the multiplication chart? Describe at least one.

____

____

7. Explain how the commutative property helps you fill in facts on the multiplication chart. Give an example.

____

____

My Special Event!
3.OA.7

In this task, students will plan a party under $100.

ESSENTIAL QUESTIONS
- How is multiplication and division used to solve a problem?
- When can you use multiplication or division in real life?

MATERIALS
Planning Information sheet

TASK DESCRIPTION
Students will plan a special day, just for them! They have to keep the cost of their day under $100. Each student will use the Planning recording sheet to decide how many guests will be invited to enjoy their special day with them. Students will figure out the cost of how much food, drinks and items they will need per guest. They have the choice of planning for a small group with a lot of items or a large group with not as many items. The goal is to see which students use multiplication and division to determine the cost of the day and which students are using repeated addition or subtraction.

FORMATIVE ASSESSMENT QUESTIONS
- How did you determine how many guests you were going to invite?
    - How did you make sure that you stayed within your allotted budget?
    - How did your understanding of multiplication and division help you with planning?

DIFFERENTIATION
Extension:
- Students could be challenged to create their own list of supplies using a newspaper advertisement for a local party supply store. Increase the amount of the budget for the day.

Intervention:
- Provide the amount of guests that are coming for the day and then challenge the students to figure out what they could need for their day.

Name ____________________________ Date _____________

Planning Sheet
Student Recording Sheet

You get to plan a special day just for you! You parents are letting you pick what you want to do, eat, drink and who you will invite to share your special day with! Your task is to keep a budget under $100. You can invite whomever you want. You get to make all the decisions!

Use the price lists to find out how much you will spend. You must use at least one item in each category.

Food	**Cost Per Guest**
Pizza	**$2**
Hamburgers	**$2**
Chicken Fingers	**$3**
Ribs	**$5**
Steak	**$7**
Fish and Chips	**$8**

Drink	**Cost Per Guest**
Bottled Water	**$1**
Kool Aide	**$1**
Lemonade	**$2**
Fruit Punch	**$2**
Milkshake	**$3**
Root Beer Floats	**$4**

Activity	**Cost Per Guest**
Swimming	**$3**
Roller Skating	**$3**
Bowling	**$4**
Paint Ball	**$6**
Limo Ride	**$8**
Chuck e Cheese	**$10**
Six Flags	**$10**

Favors for Guests	**Cost Per Guest**
Stickers	**$1**
Balloons	**$1**
Yo-Yo	**$2**
Frisbee	**$2**
Crowns	**$2**
Disposable Camera	**$6**
Gift Card	**$10**

Assessment Check 1 - 3.OA, NBT, MD

1. **For the following items, choose Yes or No to show whether putting the number 7 in the box would make the equation true.**

   a. $10 \times \square = 70$ Yes☐ No☐

   b. $48 \div \square = 6$ Yes☐ No☐

   c. $63 \div \square = 9$ Yes☐ No☐

2. **For the following items, choose Yes or No if the equation is true.**

   a. $8 \times 9 = 81$ Yes☐ No☐
   b. $54 \div 9 = 24 \div 6$ Yes☐ No☐
   c. $7 \times 5 = 25$ Yes☐ No☐
   d. $8 \times 3 = 4 \times 6$ Yes☐ No☐
   e. $49 \div 7 = 56 \div 8$ Yes☐ No☐

3. **The number sentence below can be solved using tens and ones.**

   67 + 25 = __?__ tens and ___?___ ones

.

Circle one number from each column to make the number sentence true.

Tens	One
2	2
6	5
8	10
9	12

4. **Use the bus stop sign and the watch to answer the question.**

The time is 3:25 p.m. When is the bus scheduled to arrive next? Explain your answer.

NEW CONTENT

Common Core Standards – Fractions

GRADE 3 FRACTIONS	
3.NF.1 (SLO 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 a, b (SLO 2)	**Understand a fraction as a number on the number line; represent fractions on a number line diagram.** a. 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. b. 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 a-d (SLO 3)	**Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.** a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. 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.* d. 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.
3.G.2/3.NF.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.* Understand a fraction as a number on the number line; represent fractions on a number line diagram. Eg. Represent the equal parts of shapes as a unit fraction, e.g., a pizza cut into 8 equal slices has 8 slices and each slice has quantity 1/8 of the whole pizza.

Essential Concepts

- A fraction is a number
- A fraction is a quantity when a whole is partitioned into equal parts.
- The whole that the fraction refers to must be specified.
- Given congruent shapes, “equal parts” can refer to non-congruent parts that measure the same.
- Unit fractions are the basic building blocks of fractions in the same way that 1 is the basic building block of whole numbers.
- As the number of equal parts in the whole increases, the size of the fractional pieces decreases.
- The denominator represents the number of equal parts in the whole.
- The numerator is the count of the number of equal parts.
- Equivalent fractions represent the same size or the same point on a number line.
- When comparing fractions, each fraction must refer to the same whole.
- Fractions with common numerators or common denominators can be compared by reasoning about the number of parts or the size of the parts
- know fractions can represent parts of a whole, a point on a number line as well as distance on a number line
- understand the concept of numerator and denominator
- understand that the size of a fractional part is relative to the size of the whole (a half of a small pizza is smaller than a half of a large pizza but both represent one-half)
- compare and order unit fractions
- compare and order fractions with like denominators

Essential Questions

- How can fractions be represented?
- How does the denominator affect the size of the pieces?
- What do the denominator and numerator represent in a fraction?
- How can you compare unit fractions with same denominators? (i.e. 1/8 and 3/8)
- How can you compare fractions with the same numerator? (i.e. 3/6 and 3/4)
- How can you use visual models to compare simple equivalent fractions?
- What makes some fractions equivalent?
- How can fractions be represented on a number line?
- Which is greater: 2/8 or 2/3? What is your reasoning?

Connections to the Mathematical Practices

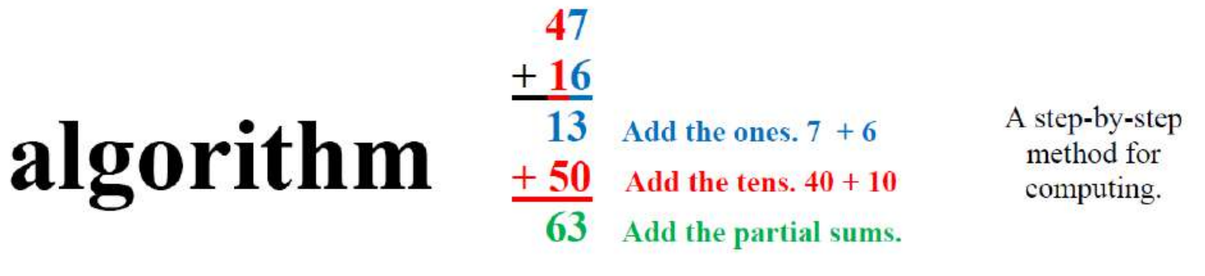
1	Make sense of problems and persevere in solving them
	In **third** grade, students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Third graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, “Does this make sense?” They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.
2	Reason abstractly and quantitatively
	Third graders should recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities.
3	Construct viable arguments and critique the reasoning of others
	In **third** grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like “How did you get that?” and “Why is that true?” They explain their thinking to others and respond to others’ thinking. Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. **Third** graders should evaluate their results in the context of the situation and reflect on whether the results make sense.
4	Model with mathematics
	Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. **Third** graders should evaluate their results in the context of the situation and reflect on whether the results make sense.
5	Use appropriate tools strategically
	Third graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper to find all the possible rectangles that have a given perimeter. They compile the possibilities into an organized list or a table, and determine whether they have all the possible rectangles.
6	Attend to precision
	As **third** graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the area of a rectangle they record their answers in square units.
7	Look for and make use of structure
	In third grade, students look closely to discover a pattern or structure. For instance, students use properties of operations as strategies to multiply and divide (commutative and distributive properties).
8	Look for and express regularity in repeated reasoning
	Students in third grade should notice repetitive actions in computation and look for more shortcut methods. For example, students may use the distributive property as a strategy for using products they know to solve products that they don’t know. For example, if students are asked to find the product of 7 x 8, they might decompose 7 into 5 and 2 and then multiply 5 x 8 and 2 x 8 to arrive at 40 + 16 or 56. In addition, third graders continually evaluate their work by asking themselves, “Does this make sense?”

Vocabulary

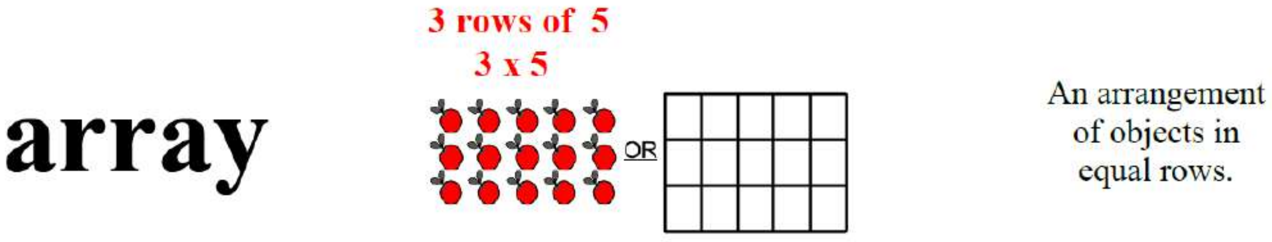
Visual Definition

The terms below are for teacher reference only and are not to be memorized by students.

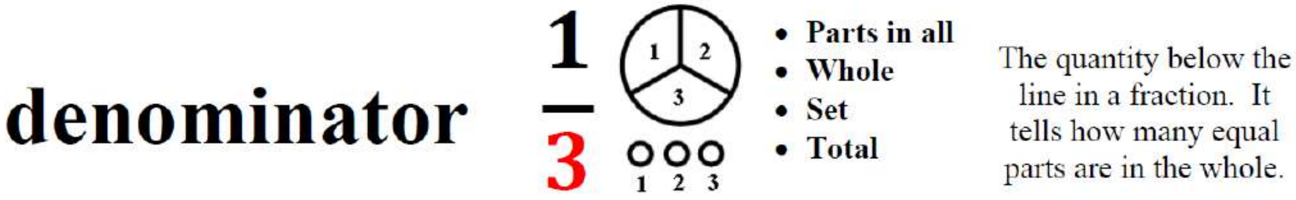
Teachers should first present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or use them with words, models, pictures, or numbers.



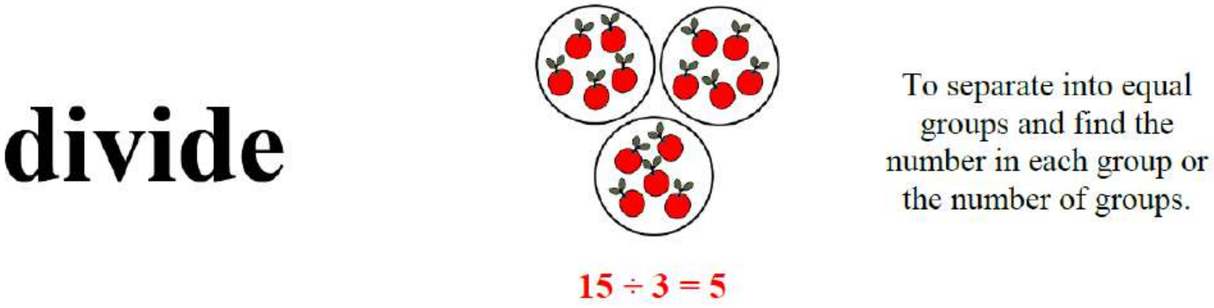
A step-by-step method for computing.



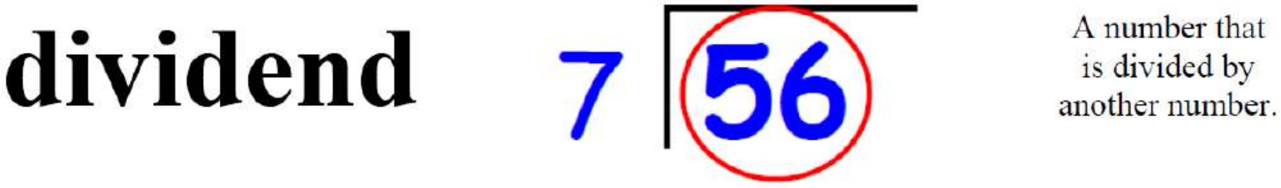
An arrangement of objects in equal rows.



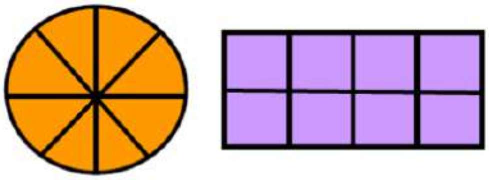
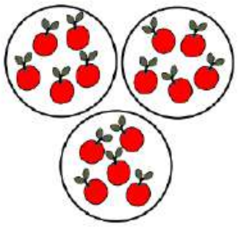
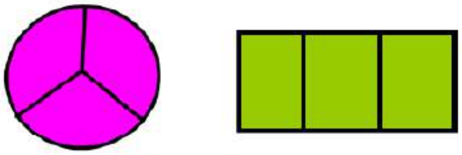
The quantity below the line in a fraction. It tells how many equal parts are in the whole.

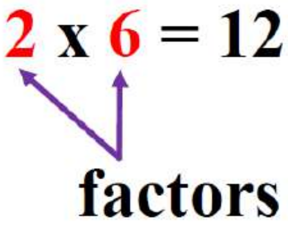
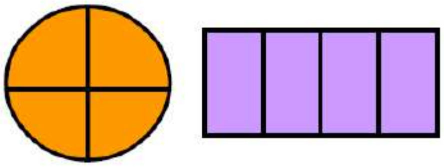
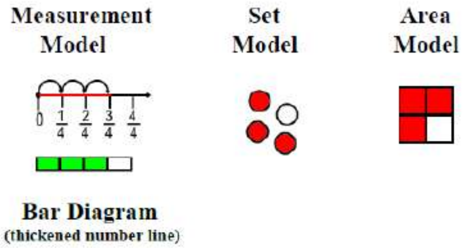
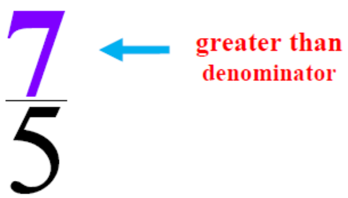
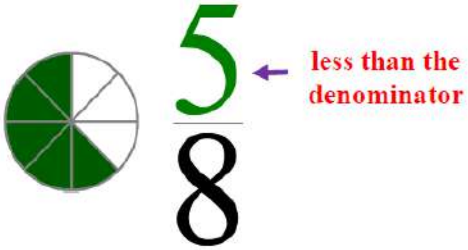


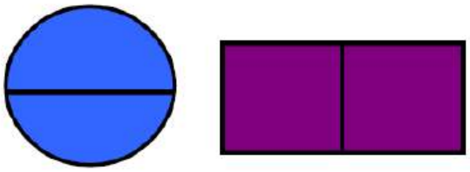
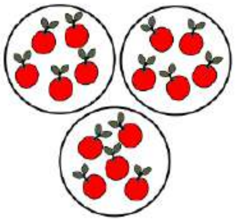
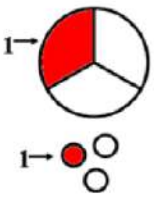
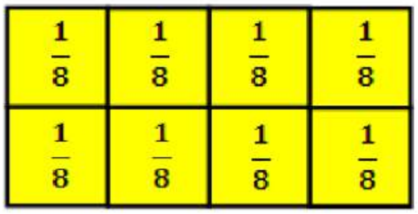
To separate into equal groups and find the number in each group or the number of groups.

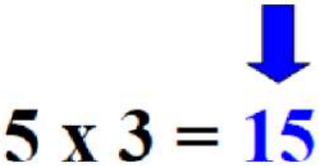
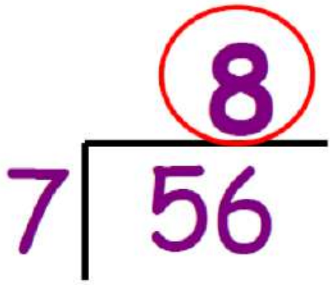
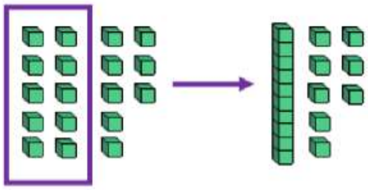
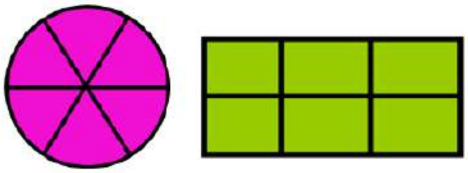


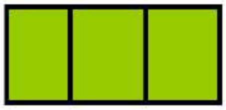
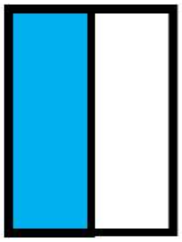
A number that is divided by another number.

divisor		The number by which another number is divided.
eighths		The parts you get when you divide something into eight equal parts.
equal groups	 There are 3 equal groups of 5.	Groups that contain the same number of objects. Whenever you divide, you separate items into equal groups.
equal parts	 3 equal parts	Parts of an object or group that have been divided equally into pieces.
equivalent fractions		Fractions that have the same value.

fact family	**Fact Family for 3, 5, 15** 3 x 5 = 15 15 ÷ 5 = 3 5 x 3 = 15 15 ÷ 3 = 5	A group of related facts that use the same numbers. (also known as related facts)
factor		The whole numbers that are multiplied to get a product.
fourths		The parts you get when you divide something into 4 equal parts.
fraction		A way to describe a part of a whole or a part of a group by using equal parts.
fraction greater than one		A fraction where the numerator is greater than the denominator.
fraction less than one		A fraction less than one. In a proper fraction the numerator is less than the denominator.

halves		The parts you get when you divide something into 2 equal parts.
multiply	 **3 x 5 = 5 + 5 + 5**	The operation of repeated addition of the same number.
numerator	$\frac{1}{3}$  - Parts shaded - Parts we are using	The number written above the line in a fraction. It tells how many equal parts are described in the fraction.
order	$\frac{2}{8}$ $\frac{2}{6}$ $\frac{2}{4}$ **In order from least to greatest.**	A sequence or arrangement of things. To order fractions, compare two fractions at a time.
partition	 $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ $\frac{1}{8}$ **eight $\frac{1}{8}$ equal parts**	An action to divide shapes into smaller parts.

partitive division **(sharing division)**	 **Justin has 12 balloons. He wants to share them evenly among 3 friends. How many balloons should he give each friend? 12 ÷ 3 = 4**	A division problem where the number of objects in each group is unknown. *How many in each group?*
product	 **5 x 3 = 15**	The answer to a multiplication problem.
quotative division **(measurement division)**	 **Justin has 12 balloons. If he gives 3 balloons to each friend, how many friends will get balloons? 12 ÷ 3 = 4**	A division problem where the number of groups is unknown. *How many groups?*
quotient		The answer to a division problem.
regroup	 **Regroup 18 ones as 1 ten and 8 ones.**	To rearrange the formation of a group.
sixths		The parts you get when you divide something into six equal parts.

thirds			The parts you get when you divide something into 3 equal parts.
unit fraction	$\frac{1}{2}$	 **Example**	A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.
whole	 **1 whole pie**	 **1 whole rectangle**	All of an object, a group of objects, shape, or quantity.

Potential Student Misconceptions

- **Students misunderstand the meaning of the numerator and denominator.** Students see the numbers in fractions as two unrelated whole numbers separated by a line.
  Read fractions with meaning. Example: ¾ read, "3 out of 4 equal parts." Have students count by fractions and highlight the different roles that the numerator and denominator have. Continually connect the vocabulary to models.

- **Students believe that fractions are not numbers.** Use number lines to demonstrate placement of fractions and whole numbers.

- **Students believe that the larger the denominator, the larger the piece.** This can result from students incorrectly memorizing "the larger the denominator the smaller the piece." Rather than simple memorization, have students make sense of this relationship themselves. For example, have students investigate whether they would prefer to eat one-hundredth of a pizza or one-fourth of a pizza. Have them defend their answer in terms of what you've heard other students say, that 100 is more than 4, so one-hundredth must be greater.

- **Students believe that the numerator alone determines the size of the fraction.** Fractions are a part-to-whole relationship. Have students create models of fractions, and associate the written fraction to the relationship between that part to its whole. Have students confront this relationship using a wide variety of fraction models. Continually connect the vocabulary for fraction names to models.
- **Students create models that do not represent equal groups.** Students do not understand that when partitioning a whole shape, number line, or a set into unit fractions, the intervals must be equal.

- **Students think all shapes can be partitioned the same way.**

- **Students have difficulty perceiving the unit on a number line diagram.** Students do not count correctly on the number line. For example, students may count the hash mark at zero as the first unit fraction. In the early stages of instruction, use area models and paper strips to highlight the importance of identifying the whole. Subdividing these models can transfer to subdividing a linear unit.

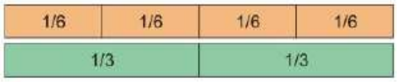
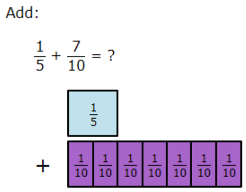
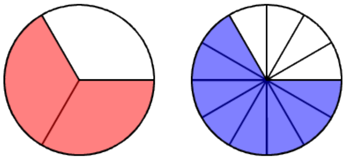
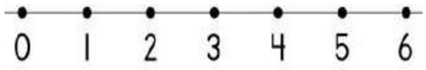
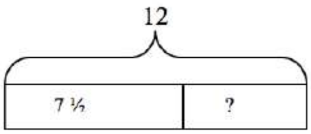
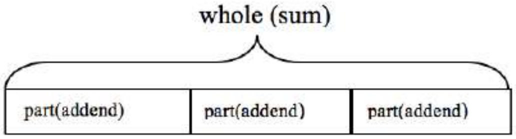
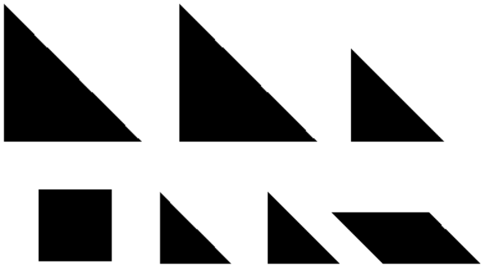
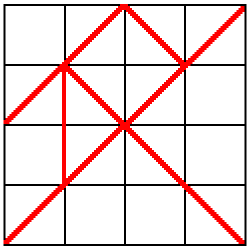
- **Students plot points based on understanding fractions as whole numbers instead of fractional parts.** For example: Students order fractions using the numerator or students order unit fractions by the denominator.

- **Students do not understand the importance of the whole of a fraction and identifying it.** For example, students may use a fixed size of ¼ based on the manipulatives used or previous experience with a ruler.

- **Students do not understand there are many fractions less than 1.**

- **Students do not understand fractions can be greater than 1.**

Teaching Multiple Representations – Fractions

Equal Partitioning and Unitizing ***Using Visual Fraction Models*** • **Fraction Strips** • **Fraction Circles** • **Number line**	   
Bar Model 	*Leticia read 7 ½ books for the read-a-thon. She wants to read 12 books in all. How many more books does she have to read?*   12 - 7 ½ = ? or 7 ½ + ? = 12 so Leticia needs to read 4 ½ more books.
Tangram Puzzle Choosing each piece of the Tangram set, students are asked identify the size of the pieces based upon • The original square • The size of a select piece • When assigning a value to each piece, for example when the large right triangle is equal to 2.	 
Equivalent Fractions	*For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

Benchmark Fractions	**1/2, 1/3, 1/4, 1/5, 1/6. 1/8, 1/10**
Abstract Representations	
Basic Mathematical Properties	**Additive Inverse** **Example:** $7 + (-7) = 0$
Algorithm	In general, $a/b+c/d=(ad+bc)/bd$

New Content Activities/Lessons

FRACTIONS EXPLORATION

ESSENTIAL QUESTIONS

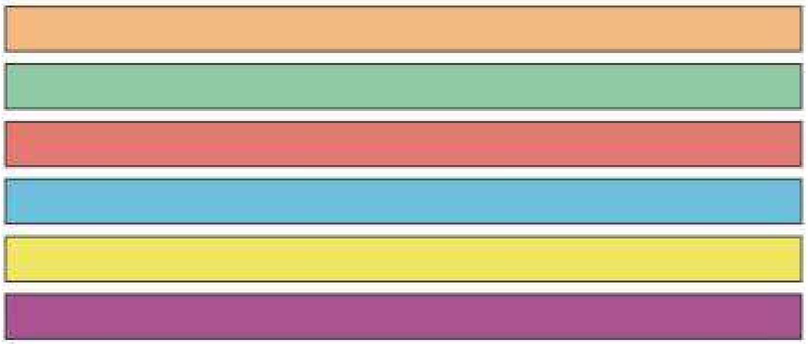
- What is a fraction?
- How can I represent fractions of different sizes?
- What relationships can I discover about fractions?

MATERIALS

- Fraction Exploration task sheet
- 9” x 12” sheets of paper in six different colors (cut into 1” x 12” strips) Each child will need 6 strips, one of each color.
- Scissors
- File folder (1 for each child)
- Glue or tape

To assess prior knowledge, ask students to create a list of ways they use fractions in their daily lives. Some examples may include dividing a snack in half (1/2), eating 3/8 of a pizza, using measuring cups or spoons while baking, money (half a dollar), time (quarter of an hour).

To begin the lesson, give students six strips of paper in six different colors. Specify one color and have students hold up one strip of this color. Tell students that this strip will represent the whole. Have students write “one whole” on the fraction strip. The term **whole** is included in the labeling instead of 1 because it helps eliminate confusion between the numeral 1 in fractions such as ½.



Next, ask students to pick a second strip and fold it into two equal pieces. Have students draw a line on the fold. Ask students what they think each of these strips should be called (one-half or ½). It is important, here, for students to understand how fractions are named. Discuss the names numerator and denominator with students. Have students label their strips accordingly using both the word and the fractional representation. Label both sides of the strip “1/2 one-half.”

Have students take out another strip, fold it in half twice, and divide it into four congruent pieces. Ask them what they think each of these strips should be called (one-fourth or ¼). Students should draw

lines on the folds and label the strips using both the word and the fraction. Label all four sections of the strip “1/4 one-fourth”. Repeat the process of folding in half and naming eighths.
Students will take out another strip, fold it in thirds and divide it into three congruent pieces. Ask them what they think each of these strips should be called (one-third or 1/3). Have students draw lines on the folds and label the strips using both the word and the fraction. Label all three sections of the strip “1/3 one-third”. Repeat the process of folding in thirds and then in half to create sixths. Label each section “1/6 one-sixth.”

After folding and labeling strips of paper for the whole, halves, thirds, fourths, sixths, and eighths, ask students to glue or tape the strips on their file folder in order (largest fractional pieces to smallest fractional pieces). Make sure the students line up the strips evenly so that they begin to see equivalences. Suggestion: Secure the ½ strip first with the half mark on the crease in the file folder. Place every other paper strip in line with one-half.

Have students work in small groups to answer the questions below. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions. Have groups (at least 2-3) share their solution to question number seven. Try to pick groups who presented different ways of dividing the sandwich.

FORMATIVE ASSESSMENT QUESTIONS

- Is your strip folded into equal parts? How do you know?
- What relationships did you discover about fractions?
- What does the numerator represent?
- What does the denominator represent?

Name: ______________________________ Date: _______________

EXPLORING FRACTIONS

1. Using complete sentences and math words, write 3 observations you and your group made about the Fraction Strips.

Use your Fraction Strips to answer the following questions.

2. How many thirds does it take to equal one whole?

3. How many sixths does it take to equal one whole?

4. What do you think three 1/8 strips might be called? How would you write that fraction?

5. If you made a 1/9 fraction strip, how many ninths would it take to make a whole?

Think a little deeper…

6. What would a 1/10 Fraction Strip look like? Sketch and label the Fraction Strip in the space below.

7. Pretend you are having a party for 6 people. For refreshments, you are serving a 12” sub sandwich. On the back of this paper, draw and label a 12” sub (just like your Fraction Strips). Show how you would equally divide the sandwich for 6 people. Use pictures, words, and numbers to explain your reasoning

COMPARING FRACTIONS I

Students will use their fraction bars from the previous lesson to find inequalities and express those inequalities as number sentences.

ESSENTIAL QUESTIONS

- How can I show that one fraction is greater (or less) than another using my Fraction Strips?
- How can I compare fractions when they have the same denominators?
- How can I compare fractions when they have the same numerators?

MATERIALS

- Strategies for Comparing Fractions task sheet
- Fraction strips from previous task

Students will need their six strips of paper in six different colors from the previous task. Briefly review concepts covered in previous lessons.

Part I

Guide students to compare fraction strips, this time encourage students to compare individual strips and explore which ones are longer and shorter. Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations from comparing the Fraction Strips. Have each group share some of their comments. Lead the groups to consider questions such as:

- What special relationships do you notice among the different colored strips?
- Place a ½ strip on your desk. How many strips are less than ½?
- Place a 1/8 strip on your desk. How many strips are less than 1/8?

Part II

Instruct students to compare two fraction strips: ½ and ¼. Discuss which one is longer and which one is shorter. Have students discuss how they might write the inequality statements: ½ > ¼ and ¼ < ½. Guide them to the use of the symbols if they don't do this independently. Repeat the activity with several additional fraction strips. Be sure to include equivalent fractions such as ½ = 2/4.

Part III

Same Denominators/Different Numerator:

Have students work in groups of 4. Ask them to arrange 3 groups of fractions in their work space. In row one, place 1 - 1/3 strip. In row two, place 2 – 1/3 strips. In row three, place 3 – 1/3 strips. On a sheet of paper, have the students write the names of the strips in order from shortest to longest (1/3, 2/3, 3/3). Encourage students to look for patterns. What do they observe about the denominators? (All are three.) What do they observe about the denominators? (They go in order getting larger each time.) How do the numerators relate to the size of the fraction strips? (The larger the numerator, the larger the strip of paper.) Why? (The larger the numerator, the more equal sized pieces you have.)

Ask students to repeat the above activity with their 1/4th strips. Discuss the students' observations.

Same Numerator/Different Denominator:
Have students place one of each color Fraction Strip in their work space. At this time, do not include one whole. Ask students to arrange the strips from shortest to longest. Have the students write the names of the strips in order from shortest to longest (1/8, 1/6, ¼, 1/3, 1/2). Encourage students to look for patterns. What do they observe about the numerators? (All are one.) What do they observe about the denominators? (They go in order getting smaller each time.) How do the denominators relate to the size of the fraction strips? (The smaller the denominator, the larger the strip of paper.) Why? (The larger the denominator, the more pieces it takes to make the whole.)
Repeat this activity using 2 of each strip. Ask students to once again arrange the pairs of strips in order from smallest to largest (2/8, 2/6, 2/4, 2/3, 2/2). Discuss the students' observations.

Part IV
Have students work in small groups to answer the questions in the task sheet. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions. At least two or three groups should share their solution to question number 6. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in their sandwich bag.

FORMATIVE ASSESSMENT QUESTIONS

- What relationships did you discover about fractions?
- How can you compare fractions with the same denominators?
- How can you compare fractions with the same numerators?

Name: _______________________________ Date: _______________

COMPARING FRACTIONS I

1. Using complete sentences and math words, write 3 observations you and your group made about fraction inequalities, comparing fractions with the same denominators, and comparing fractions with the same numerators.

Use your Fraction Strips to answer the following questions.

2. Write an inequality statement for the fractions ½ and 3/8.

3. Write two inequality statements using 1/6, 1/8, 1/3, 1/2, 1/4.

Think a little deeper…

4. Pretend you had fraction strips for 1/5. Put the following fractions in order from smallest to largest: 1/5, 5/5, 3/5, 4/5, 2/5. Draw a picture below to help explain your answer.

5. Using what you have learned about comparing fractions, put the following fractions in order from least to greatest: ¾, 3/7/ 3/3, 3/8. Draw a picture below to help explain your answer. Stretch your brain-where would 3/2 go? What might 3/2 look like?

6. For the class party, Robin and Shawn each made a pan of brownies. Their pans were exactly the same size. Robin sliced her brownies into 9 pieces. Shawn sliced his into 12 pieces. Which student had the largest brownie pieces? On the back of this paper, make a sketch of Robin and Shawn's brownies. Explain your reasoning using words, pictures, and numbers.

Comparing Fractions II

ESSENTIAL QUESTIONS

- What relationships can I discover about fractions?
- How can I compare fractions?
- What equivalent groups of fractions can I discover using Fraction Strips?

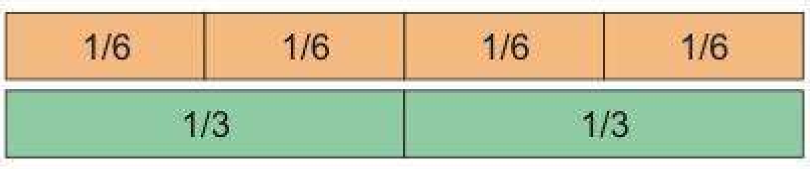
MATERIALS

- Comparing Fractions task sheet
- 9” x 12” sheets of paper in six different colors (cut into 1” x 12” strips) Each child will need 6 strips, one of each color.
- Scissors

Give students six strips of paper in six different colors. Repeat the Fraction Strip folding and labeling activity from the Fraction Exploration Task. This time, ask students to separate the Fraction Strips by cutting on the folds giving them 2 - ½ strips, 3 – 1/3 strips, and so forth. Give each student a plastic sandwich bag or envelope to store the strips. (You can also use fraction bars)
Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations about the separated Fraction Strips. Have each group share some of their comments. Lead the groups to consider questions such as:

- Do you see any special relationships among the different colored strips?
- Place a ½ strip on your desk. How many strips or combinations of strips are the same size as ½?
- When fractions are the same size, they are called *equivalent*. What other equivalent sets of fractions can you create?

Have students line up their fraction strips and find as many relationships as they can. For instance, they might notice that three of the 1/6 pieces are equal to four of the 1/8 pieces, or that two of the 1/3 pieces are equal to four of the 1/6 pieces. Have students record these relationships on paper. When they have finished, have them share the relationships they have discovered. Record the relationships on chart paper and discuss.



Students will notice that one whole is the same as 2/2, 4/4, 8/8, 3/3, or 6/6. Another example includes the relationship between ½, 2/4, 4/8, and 3/6. Tell students that when fraction strips are the same length, they represent equivalent fractions. Students may also notice that for each of these fractions, the numerator is ½ of the denominator.

Part II

Students will work in small groups to answer the questions in the activity sheet. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions.

Have groups (at least 2-3) share their solution to question numbers 6 and 7. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in a plastic sandwich bag.

Part III

Students can practice comparing fractions using the following activity:

> The friends below are playing red light-green light. Who is winning? Use your fraction strips to determine how far each friend has moved.
> Mary – ¾ Harry – ½ Larry – 5/6
> Sam – 5/8 Michael – 5/9 Angie – 2/3

FORMATIVE ASSESSMENT QUESTIONS

- What relationships did you discover about fractions?
- How can you compare fractions?
- What equivalent groups of fractions did you discover?

Name: ______________________________ Date: ______________

COMPARING FRACTIONS II

1. Using complete sentences and math words, write 3 observations you and your group made about the Fraction Strips.

Use your Fraction Strips to answer the following questions.

2. What fraction is equivalent to 2 of your 1/4 strips?

3. What fraction is equivalent to 3/6?

4. What fraction is equivalent to 6/8?

5. If you had made a fraction strip for 1/10s, how many tenths would it take to make to equal 1/2?

Think a little deeper…

6. In the space below, draw a Fraction Strip divided into fourths. Draw 2 additional shapes divided into fourths. Make one of your drawings a real-life example of something you might partition (divide) into fourths.

USING FRACTION STRIPS TO EXPLORE THE NUMBER LINE

Students create fraction number lines using strips of paper and use the number lines to find equalities and inequalities.

ESSENTIAL QUESTIONS

- What fractions are on the number line between 0 and 1?
- What relationships can I discover about fractions?
- How are tenths related to the whole?

MATERIALS

- Using Fraction Strips to Explore the Number Line Activity task sheet
- 9” x 12” sheets of paper in six different colors (cut into 1” x 12” strips) Each child will need one strip of paper in each color.
- Scissors
- File folder (1 for each child) or math journal
- Glue or tape

Students make and use a set of fraction strips to represent the interval between zero and one on the number line, discover fraction relationships, and work with equivalent fractions.

Part I

To begin the lesson, give students six strips of paper in six different colors. Specify one color and have students hold up one strip of this color. Tell students that this strip will represent the number line from zero to one. Have students glue or tape the strip to the back of their file folder or math journal. The students will label folder above the left-hand side of the strip “0” and above the right-hand edge of the strip “1.”

Next, ask students to pick a second strip and fold it into two equal pieces. Have students label above this strip with the numerals 0, ½, 1.

Have students take out another strip, fold it twice, and divide it into four congruent pieces. Have students label the space above the strip using 0, ¼, 2/4, ¾, 1. Repeat this process of folding, cutting, and naming strips for thirds, and sixths. Have students use a ruler and label the last strip in 12ths by drawing a line at every inch. This particular number line will represent 1 foot. The inches are showing fractions of a foot. 1/12, 2/12, and so on.

Part II

Arrange students in small groups of 2-3 students. Give them approximately ten minutes to write down their observations from comparing the Number Lines. Have each group share some of their comments. Lead the groups to consider questions such as:

- How are the Fraction Strips and Number Lines similar?
- How are they different?

Remind students that the fraction strip is equal to the length of a ruler which is one foot. Ask students to label ½ a foot with the letter A. Ask students to label 2/3 of a foot with B. Continue asking students to label fractional parts of a foot with letters.

Part III

Have students work in small groups to answer the questions below. The teacher should monitor the groups, asking questions, and encouraging students to explore the concept of fractions on the Number Line.

Have groups (at least 2-3) share their solution to question numbers 6 and 7. Try to pick groups who presented different ways of solving the problems. After this lesson, have students store their Fraction Strips in their sandwich bag.

FORMATIVE ASSESSMENT QUESTIONS

- What fractions are on the number line between 0-1?
- How did you determine the various fractions between 0-1?

Name: ______________________________ Date: ______________

USING FRACTION STRIPS TO EXPLORE THE NUMBER LINE

1. Using complete sentences and math words, write 3 observations you and your group made about fractions between 0 and 1 on the Number Line.

Use your Number Lines to answer the following questions.

2. How many sixths are between 0 and 1?

3. How many 12ths are equivalent to 1 whole?

4. What fraction on the Number Line is equivalent to 2/6?

Think a little deeper…

5. If 3/3 is equivalent to the whole number 1, how many thirds are in the whole number 2?

6. What would the fraction 12/4 represent? Draw a picture in the space below to explain your answer.

PATTERN BLOCKS

Students will partition pattern blocks using various sized wholes.

ESSENTIAL QUESTIONS

- How can I use pattern blocks to name fractions?
- How does the size of the whole affect the size of the fractions?
- Is ¼ always the same size? How do you know?

MATERIALS

- Pattern Blocks
- Pattern Blocks Activity Sheet

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Part I

Begin this task by presenting the students with 2 different sized pieces of construction paper. (If you wish, you can name it a pan of brownies or pizza.) Pose the question: Is ¼ always the same size? With the students fold the larger piece of paper into fourths, then do the same with the smaller piece. Verify with the students that each piece was evenly folded into fourths. Ask the question, “Which ¼ of a pan of brownies would you like to have?” This will lead to a discussion around the size of the whole.

Part II

Lead students in a discussion including questions such as:

- What if you use two yellow hexagon blocks to represent the whole?
- What fractional part of the whole will one yellow hexagon be?
- What block will represent ¼? What other relationships do you see?

Have students work together to complete the task sheet. Students should model each question with pattern blocks and make a sketch of the required blocks.

FORMATIVE ASSESSMENT QUESTIONS

- How did you determine ¼?
- How did the size of ½ change from the whole on page 1 to the whole on page 2?
- How does the size of the whole affect the size of the fractional piece?
- Can you find any equivalent fractions? How do you know?

PATTERN BLOCKS:

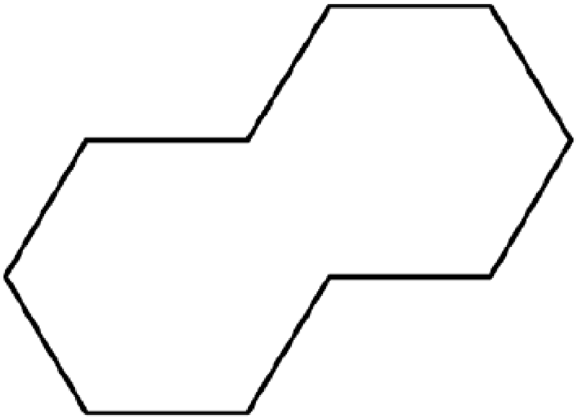
Name ________________________ Date ______________

Pattern Block Fractions

- Use the pattern blocks to solve the riddles below.
- Draw the shape and label each fractional part.

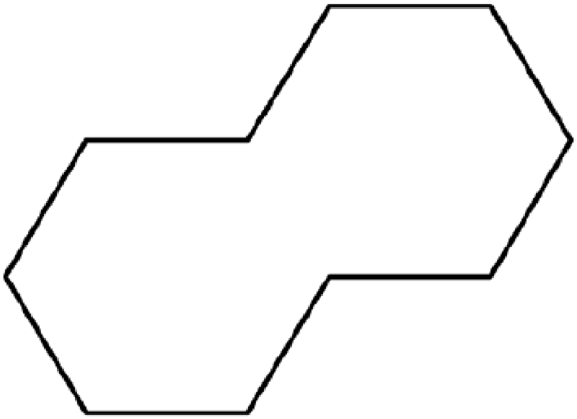
If this is one whole, what is ½?

(Draw and label)

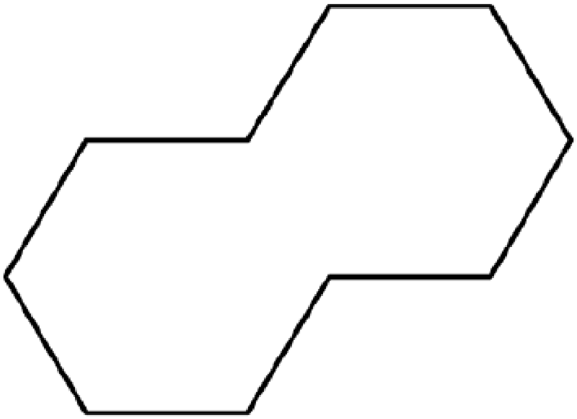


If this is one whole, what is ¼?

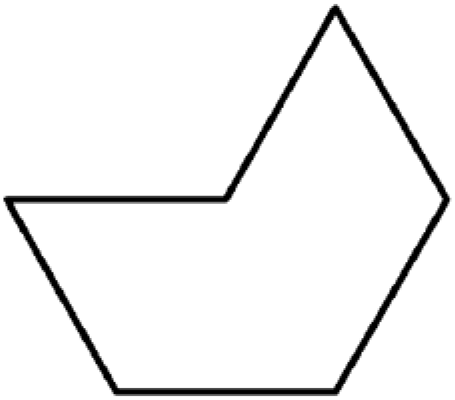
(Draw and label)



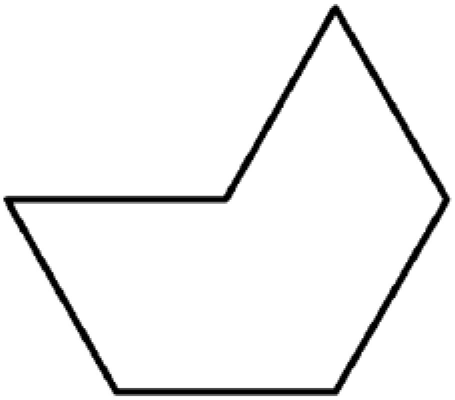
If this is one whole, what is 1/6?
(Draw and label)



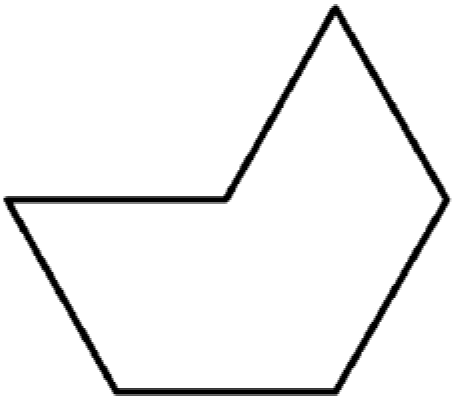
If this is one whole, what is ½?
(Draw and label)



If this is one whole, what is ¼?
(Draw and label)



If this is one whole, show 1 ½. (Draw and label)



MAKE A HEXAGON GAME

Students will play a game where they create a fraction with dice and build their fraction on hexagons using pattern blocks.

TASK DESCRIPTION

Instruct students to work with a partner. For the game, students will take turns rolling two dice. The largest number rolled is the denominator and the smaller number is the numerator. Students build the fractional amount rolled on the game board using pattern blocks. Students may use equivalent fractions. If students roll a fraction they cannot build, they lose a turn. Play continues until one player has covered all the hexagons on his game board.

FORMATIVE ASSESSMENT QUESTIONS

- What does the top number (numerator) tell us?
- What does the bottom number (denominator) tell us?
- What happened in the game if you rolled the same number on both dice?
- Did you have to trade triangles for other shape blocks? What equal trades did you make?

Build a Hexagon

Materials: game board for each player, dice, pattern blocks (hexagon, triangles, trapezoids, blue rhombi)

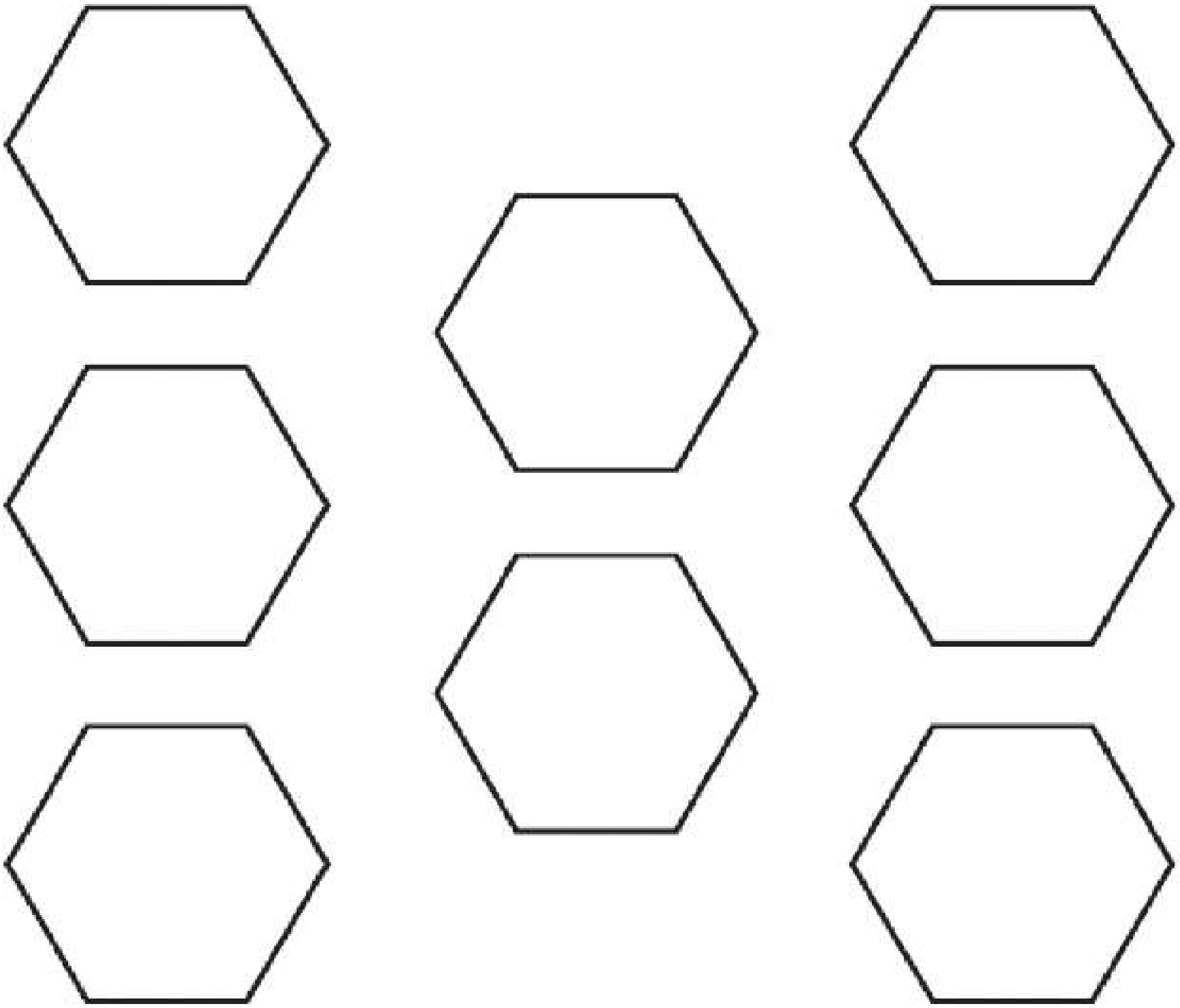
Work with a partner. Take turns to roll two dice. The largest number you roll is the denominator and the smaller number is the numerator.

1. Use pattern blocks to build the fractional amount you rolled on the game board. You may use equivalent fractions.

2. If you roll a denominator that you can't build, you lose a turn.

3. Keep going until one player has covered all the hexagons on his/her game board.

Build a Hexagon



PIZZAS MADE TO ORDER

Students will fill pizza orders by representing the ordered ingredients on the appropriate fractional parts of a pizza cut-out.

ESSENTIAL QUESTIONS

- What is a fraction?
- How can I represent fractions of different sizes?
- What relationships can I discover about fractions?
- What does the numerator of a fraction represent?
- What does the denominator of a fraction represent?
- What is a real-life example of using fractions?

MATERIALS

- Scissors
- Glue or paste
- Crayons
- One large sheet of black paper
- One half sheet of brown paper
- Small pieces of various colored paper including red, white, green, yellow, black
- Pizza Order Directions – One per child

TASK DESCRIPTION

Part I

To assess prior knowledge, brainstorm with students about food that is divided into equal pieces. Possible suggestions may include a chocolate bar, apple pie, pizza, and an orange.

Part II

To begin the lesson, give students a half sheet of brown paper. Instruct them to draw and cut out a circle from the brown paper. Then give each child a Pizza Order. Instruct the students to use their pencil to divide their circles into the fractional part used in the Pizza Order (fourths or eights). Then have the students trace over their pencil lines with a dark crayon. Next, give students small sheets of the colored paper (red, white, green, yellow, black). Instruct students to cut pieces of the colored paper to represent the pizza toppings. The toppings should be glued onto the appropriate number of pizza slices.

After the toppings have been successfully glued to the brown circle, give each student a sheet of black construction paper. Have the students glue their pizzas and Pizza Order Directions to the paper.

FORMATIVE ASSESSMENT QUESTIONS

- What fraction of your pizza is covered with peppers?
- What topping covers most of your pizza?
- Are black olives covering more or less than half your pizza?
- How did you divide your pizza into equal parts?
- How many equal parts did you need? How did you know?
- If your whole pizza was divided into fourths, how many slices did you cover with toppings? How would you write this as equivalent fractions? (4/4 = 1)
- If your pizza is covered with 1/8 mushrooms and 3/8 green peppers, does it have more mushrooms or green peppers? How do you know? (Encourage students to explain in terms of the pizza size and by comparing numerators in the fraction.)
- Some of you covered 4/8 of your pizzas with pepperoni. Can you name equivalent fractions for 4/8?
- Were any pizzas covered with ½ cheese? Why did your Pizza Order ask for 2/4 cheese?
- Do you see any other examples of equivalent fractions on the pizzas?

PIZZAS MADE TO ORDER: **PIZZA ORDER DIRECTIONS**

I would like to order a pizza that is 1/8 green peppers,
8/8 pepperoni, and 3/8 mushrooms.

I would like to order a pizza that is
¼ mushrooms, 2/4 cheese, and ¼ pepperoni.

I would like to order a pizza that is
1/8 black olives, 8/8 mushrooms, and
4/8 pepperoni.

I would like to order a pizza that is
¼ mushrooms, ¼ black olives, and
½ pepperoni.

I would like to order a pizza that is
¼ cheese, ¼ black olives, ¼ pepperoni, and
¼ green peppers.

Associated Illustrative Math Tasks

Naming the Whole for a Fraction (3.NF.1)

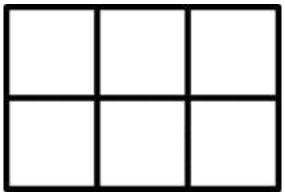
Mrs. Frances drew a picture on the board.

Then she asked her students what fraction it represents.

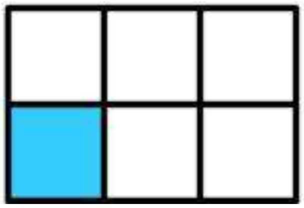
- Emily said that the picture represents $\frac{2}{6}$. Label the picture to show how Emily's answer can be correct.
- Raj said that the picture represents $\frac{2}{3}$. Label the picture to show how Raj's answer can be correct.
- Alejandra said that the picture represents 2. Label the picture to show how Alejandra's answer can be correct.

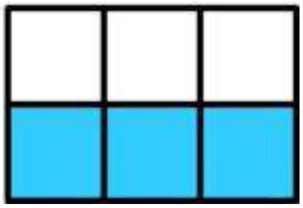
Halves, thirds and sixths (3.MD, 3.G., 3.NF)

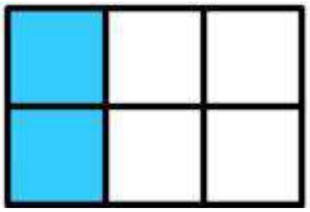
1. A small square is a square unit. What is the area of this rectangle? Explain.



2. What fraction of the area of each rectangle is shaded blue? Name the fraction in as many ways as you can. Explain your answers.

A.


B.


C.


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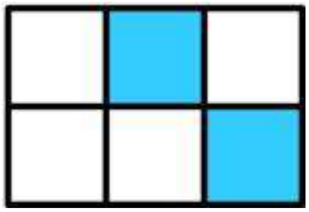

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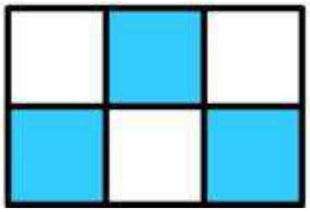
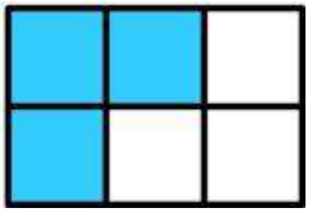
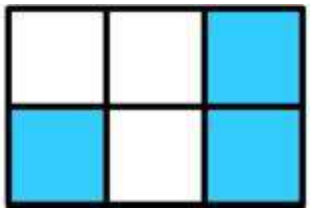
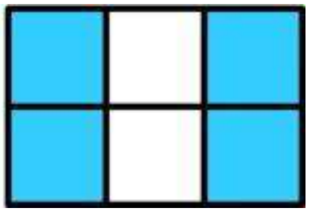
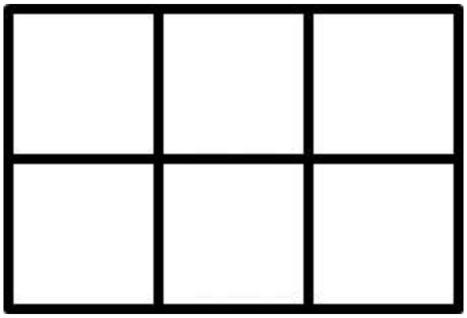


F.


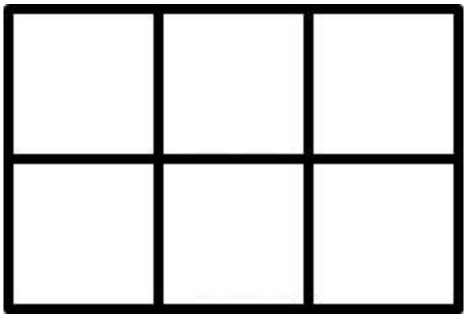
G.


H.


3. Shade $\frac{1}{2}$ of the area of rectangle in a way that is different from the rectangles above.



4. Shade $\frac{2}{3}$ of the area of the rectangle in a way that is different from the rectangles above.



Locating Fractions Less than One on the Number Line (3.NF.2)

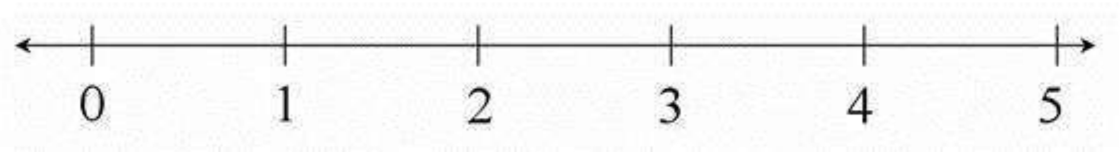
1. Mark and label the points $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, and\, \frac{4}{4}$ on the number line. Be as exact as possible.

2. Mark and label the point $\frac{2}{3}$ on the number line. Be as exact as possible.

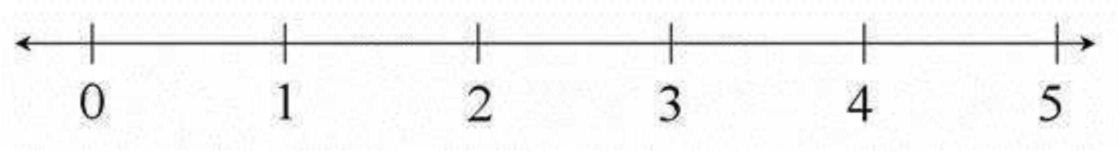
3. Mark and label the points $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, and\, \frac{1}{8}$ on the number line. Be as exact as possible.

Locating Fractions Greater than one on the number line (3.NF.2)

1. Mark and label points on the number line for $\frac{1}{2},\frac{2}{2},\frac{3}{2},\frac{4}{2},\frac{5}{2}, and\ \frac{6}{2}$.

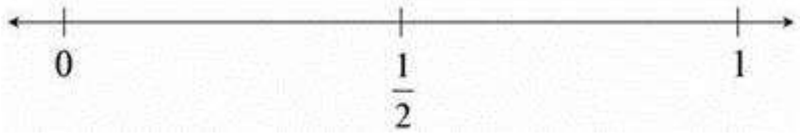


2. Mark and label a point on the number line for $\frac{11}{3}$. Be as exact as possible.



Closest to ½ (3.NF.2)

Which number is closest to $\frac{1}{2}$?



a. $\frac{1}{8}$

b. $\frac{3}{8}$

c. $\frac{7}{8}$

d. $\frac{9}{8}$

Find 1 (3.NF.2)

1. Locate 1 on the number line. Label the point. Be as exact as possible.

2. Locate 1 on the number line. Label the point. Be as exact as possible.

Find 2/3 (3.NF.2)

Label the point where $\frac{2}{3}$ belongs on the number line. Be as exact as possible.

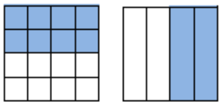
Which is Closer to 1? (3.NF.2)

Which is closer to 1 on the number line, $\frac{4}{5}\, or\, \frac{5}{4}$? Explain.

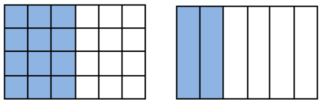
Assessment Check 2

1. Which two fraction models are equal?

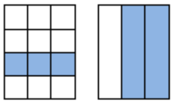
A.



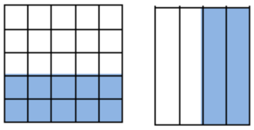
B.



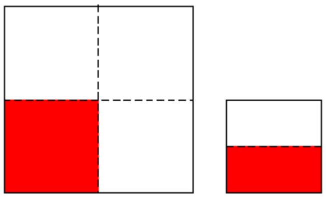
C.



D.



2. Bryce drew this picture:



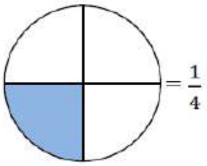
Then he said, “This shows that $\frac{1}{4}$ is greater than $\frac{1}{2}$.”

a. What was his mistake? Draw a picture that shows why $\frac{1}{2}$ is greater than $\frac{1}{4}$.

b. Chose **True** or **False** for each equation:

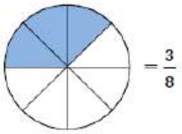
- $\frac{1}{4} > \frac{1}{2}$ ○ **True** ○ False
- $\frac{1}{4} < \frac{1}{2}$ ○ **True** ○ False
- $\frac{1}{4} = \frac{1}{2}$ ○ **True** ○ False
- $\frac{1}{2} > \frac{1}{4}$ ○ **True** ○ False
- $\frac{1}{2} < \frac{1}{4}$ ○ **True** ○ False

3. The circle shows $\frac{1}{4}$ shaded.

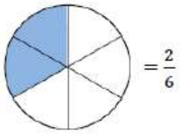


Which fractional part of a circle below is equal to $\frac{1}{4}$?

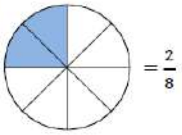
A.



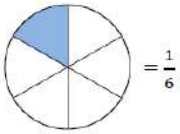
C.



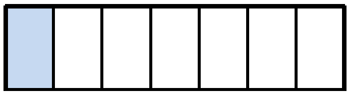
B.



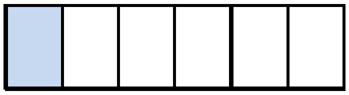
D.

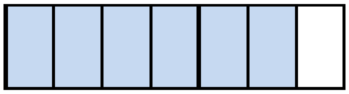


4. Which model appears to be exactly $\frac{1}{6}$ shaded?

A.


B.


C.


D.


5. Julia Is planting flowers. She wants to cover ¾ of the garden with flowers.

Which tile should be added to Julia's garden that will finish covering ¾ of her garden with flowers.

Possible Tiles:

a.


b.


c.

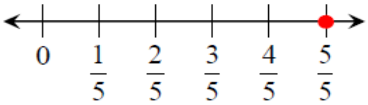

d.


e.


Julia's Garden

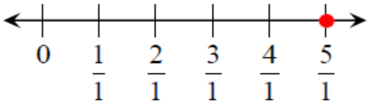
6. For each item, choose **Yes** or **No** to indicate whether each number graphed on the number line represents one whole.

a.



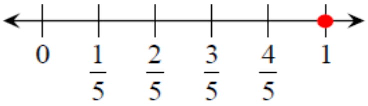
○ **Yes** ○ **No**

b.



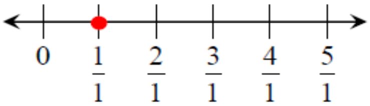
○ **Yes** ○ **No**

c.



○ **Yes** ○ **No**

d.



○ **Yes** ○ **No**

Teaching Tips

Digit Name vs. Digit Value

Teaching Tip 1	Stress place value in multiplication by distinguishing between the name of the digit and the value it stands for. The 2 in 24 stands for $2 \times 10 = 20$, not 2. Base-10 blocks and area model diagrams emphasize the value that each digit stands for because they use expanded notation to build the answer.

Drawing Rectangles for an Area Model

Teaching Tip 2	The area model is an alternative and efficient way to multiply. Encourage students to draw rectangles, even though the rectangles may not be drawn to scale. If students need to use base-10 blocks as a transitional step, change the numbers in the problems to match the quantity of blocks that are available.

Using an Area Model to Record Multiplication

Teaching Tip 3	**Is it okay to permit students to use the area model as a recording method for multiplication?** Yes. An area model not only helps to explain why the standard algorithm commonly taught in the United States for multiplication works, it is an efficient recording alternative. Some students (especially visual learners and those who have difficulty keeping numbers lined up in multiplication problems) may prefer it. Furthermore, this method has certain benefits. It illuminates important mathematical concepts (such as the distributive property), allows for computational flexibility (expanded notations allow students to use derived facts), and reinforces the concept of area. Finally, when students take algebra, they are likely to see the area model when they learn to multiply and factor polynomials.

Extensions and Sources

Online Resources

Common Core Tools

http://commoncoretools.me/
http://www.ccsstoolbox.com/
http://www.achievethecore.org/steal-these-tools

Manipulatives

http://nlvm.usu.edu/en/nav/vlibrary.html

http://www.explorelearning.com/index.cfm?method=cResource.dspBrowseCorrelations&v=s&id=USA-000

http://www.thinkingblocks.com/

Problem Solving Resources

***Illustrative Math Project**
http://illustrativemathematics.org/standards/k8
http://illustrativemathematics.org/standards/hs
The site contains sets of tasks that illustrate the expectations of various CCSS in grades K–8 grade and high school. More tasks will be appearing over the coming weeks. Eventually the sets of tasks will include elaborated teaching tasks with detailed information about using them for instructional purposes, rubrics, and student work.

***Inside Mathematics**
http://www.insidemathematics.org/index.php/tools-for-teachers
Inside Mathematics showcases multiple ways for educators to begin to transform their teaching practices. On this site, educators can find materials and tasks developed by grade level and content area.

IXL
http://www.ixl.com/

Sample Balance Math Tasks
http://www.nottingham.ac.uk/~ttzedweb/MARS/tasks/

New York City Department of Education
http://schools.nyc.gov/Academics/CommonCoreLibrary/SeeStudentWork/default.htm
NYC educators and national experts developed Common Core-aligned tasks embedded in units of study to support schools in implementation of the CCSSM.

***Georgia Department of Education**
https://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx
Georgia State Educator have created common core aligned units of study to support schools as they implement the Common Core State Standards.

Gates Foundations Tasks

http://www.gatesfoundation.org/college-ready-education/Documents/supporting-instruction-cards-math.pdf

Minnesota STEM Teachers' Center
http://www.scimathmn.org/stemtc/frameworks/721-proportional-relationships

Singapore Math Tests K-12
http://www.misskoh.com

Math Score:
Math practices and assessments online developed by MIT graduates.
http://www.mathscore.com/

Massachusetts Comprehensive Assessment System
www.doe.mass.edu/mcas/search

Performance Assessment Links in Math (PALM)

PALM is currently being developed as an on-line, standards-based, resource bank of mathematics performance assessment tasks indexed via the National Council of Teachers of Mathematics (NCTM).
http://palm.sri.com/

Mathematics Vision Project
http://www.mathematicsvisionproject.org/

***NCTM**
http://illuminations.nctm.org/

Assessment Resources

- *Illustrative Math: http://illustrativemathematics.org/
- *PARCC: http://www.parcconline.org/samples/item-task-prototypes
- NJDOE: http://www.state.nj.us/education/modelcurriculum/math/ (username: model; password: curriculum)
- DANA: http://www.ccsstoolbox.com/parcc/PARCCPrototype_main.html
- New York: http://www.p12.nysed.gov/assessment/common-core-sample-questions/
- *Delaware: http://www.doe.k12.de.us/assessment/CCSS-comparison-docs.shtml

PARCC Prototyping Project		
Elementary Tasks (ctrl+click)	Middle Level Tasks (ctrl+click)	High School Tasks (ctrl+click)
• **Flower gardens (grade 3)** • **Fractions on the number line (grade 3)** • **Mariana's fractions (grade 3)**	• **Cake weighing (grade 6)** • **Gasoline consumption (grade 6)** • **Inches and centimeters (grade 6)**	• **Cellular growth** • **Golf balls in water** • **Isabella's credit card** • **Rabbit populations** • **Transforming graphs of**

• School mural (grade 3) **• Buses, vans, and cars (grade 4)** **• Deer in the park (grade 4)** **• Numbers of stadium seats (grade 4)** **• Ordering juice drinks (grade 4)**	**• Anne's family trip (grade 7)** **• School supplies (grade 7)** **• Spicy veggies (grade 7)** **• TV sales (grade 7)**	**quadratic functions**

Professional Development Resources

Edmodo

http://www.edmodo.com

Course: iibn34

Clark County School District Wiki Teacher

http://www.wiki-teacher.com/wikiDevelopment/unwrappedSearch.php#contentAreaId=6&courseId=474

Learner Express Modules for Teaching and Learning

http://www.learner.org/series/modules/express/videos/video_clips.html?type=1&subject=math

Additional Videos
http://www.achieve.org/achieving-common-core; http://www.youtube.com/user/TheHuntInstitute/videos

Mathematical Practices

Inside Mathematics

http://www.insidemathematics.org/index.php/commmon-core-math-intro

Also see the ***Tools for Educators***

The Teaching Channel

https://www.teachingchannel.org

***Learnzillion**

https://www.learnzillion.com

Engage NY

http://www.engageny.org/video-library?f[0]=im_field_subject%3A19

**Adaptations of the these resources has been included in various lessons.*