

Grade 6 Go Math! Quarter 1 Planner
Chapter 1 Whole Numbers and Decimals

12-13 Days

BIG IDEA: In 6th grade, students use basic facts and algorithms for operations with rational numbers and notions of equivalence to transform calculations into simpler ones. Fluency and accuracy with multi-digit addition, subtraction, and division is the big idea, along with a spotlight on greatest common factors and least common multiples. Students build on previous learning of the multiplicative structure as well as prime and composite numbers. Here are some additional key ideas to keep in mind:

1. Estimating to Place the Decimal Point – Go Math suggests that you introduce the algorithm of decimal division with a connection to whole number division.
 - a. Since the decimal division algorithm is based on dividing without regard for the decimal points, in essence the students will be using the whole number division algorithm.
 - b. Students need not worry about the decimal point until they have divided.
 - c. The key to placing the decimal point in the quotient is being able to determine a reasonable estimate. Learning to estimate quotients to decimal division problems is very valuable in determining the reasonableness of solutions.
2. Estimate Solutions – Research indicates that using real-world situations helps students to overcome misconceptions related to decimals (Irwin, 2001). When students focus on number sense within problem contexts, they are more likely to check for reasonableness of their solutions. Students should check the reasonableness of the placement of the decimal point in solutions by estimating with whole number computation. For example, when multiplying 3.4×21.6 , students can check the reasonableness of the placement of the decimal point in the product, 73.44, by thinking, “ $3 \times 20 = 60$, so 73.44 makes sense because 7.344 would be too small and 734.4 would be too big.”

Adapted from Go Math: Teaching for Depth, pg. 3E.

Developing Computational Fluency – This resource gives 6th grade teachers a glimpse into what computation and fluency looks like in the previous grade levels, leading up to 6th grade. This will help 6th grade teachers understand what the students have already been exposed to, regarding the 4 major operations.

Critical Area Project: [Sweet Success](#), [Sweet Success Support Pages](#)

HMH Professional Development Videos:

- [Partial Quotients](#)
- [Greatest Common Factor](#)
- [Divide with Decimals](#)
- [Prime Factorization](#)
- [Subtracting Decimals](#)

Quarter 1 Fluency Resources:

- [Building Fluency Through Word Problems](#)
- [Building Fluency Through Number Talks](#)

ESSENTIAL QUESTION: How do you solve real-world problems involving whole numbers and decimals?

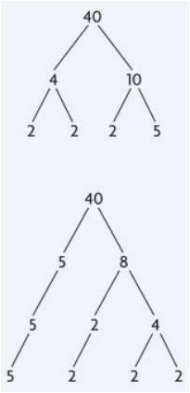
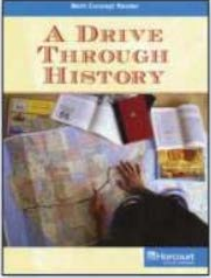

STANDARDS: 6.NS.2, 6.NS.3, 6.NS.4


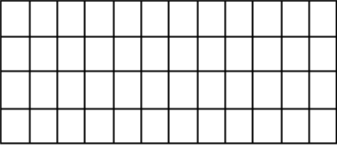

ELD STANDARDS:

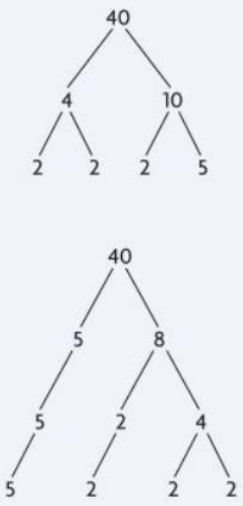
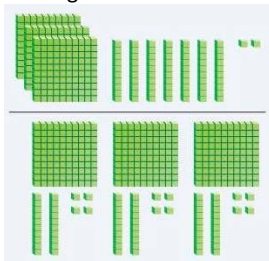
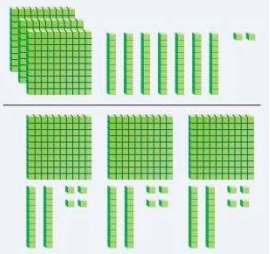
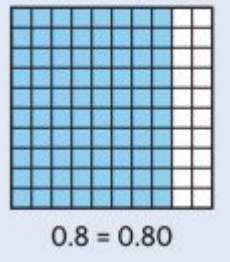
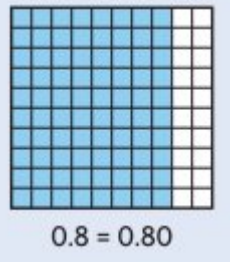
- ELD.PI.6.1- Exchanging information/ideas via oral communication and conversations.
- ELD.PI.6.3- Offering opinions and negotiating with/persuading others.
- ELD.PI.6.5- Listening actively and asking/answering questions about what was heard.
- ELD.PI.6.9- Expressing information and ideas in oral presentations.
- ELD.PI.6.11- Supporting opinions or justifying arguments and evaluating others’ opinions or arguments.
- ELD.PI.6.12- Selecting and applying varied and precise vocabulary.

Lesson	Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G6	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
1.1	Divide Multi-Digit Numbers 6.NS.2 Companion Pg. 37 MP 1 , MP 2 , MP 3 , MP 4	How do you divide multi-digit numbers?	Apply estimation to long division to begin long division algorithm (this is the first time that the long division algorithm appears in the CCSS), to determine numbers to use after each regrouping and to check	Base-Ten Blocks Base Ten Grid Paper Base Ten 15x20 Base Ten 50x70	Review division (area models, partial quotients) using this problem: James has 880 marbles that he wants to separate into 12 bags. If each bag	estimation, long division, compatible numbers, remainder	ELD Standards <ul style="list-style-type: none"> • ELD Standards • ELA/ELD Framework • ELPD Framework • ELL Math Instruction Framework 	Find $56,794 \div 338$. Write the quotient twice, once with the remainder as a fraction and once with a r .

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				<p>reasonableness. Apply to 1-digit, 2-digit divisors first. It sometimes helps to relate the algorithm to the Partial Quotients strategy used in 4th and 5th grade (see video below).</p> <p>HMH PD Video: Partial Quotients</p>		has the same number of marbles, how many full bags can he make?		<p>Access Strategies</p> <ul style="list-style-type: none"> • Organizing Learning for Student Access to Challenging Content • Student Engagement Strategies • Problem Solving Steps and Approaches 		
1.2	Prime Factorization	<p>6.NS.4 Companion Pg. 39</p> <p>MP 1, MP 7, MP 8</p>	How do you write the prime factorization of a number?	<p>Understand prime factorization as the breaking apart of a number into all its prime factors. A prime number is a number with 2 distinct factors, such as 2, 3, 5, 7, 11, 13, 17, etc.</p> <p>HMH PD Video: Prime Factorization</p>		Factor Trees Ladder Diagram	<p>Ask the students the following questions. Ask students to share their responses one question at a time.</p> <ol style="list-style-type: none"> 1. What are the factors of 8? 2. What is a factor? 3. List all the factors of 20. 4. List all the factors of 36. 	prime factorization, prime factors, ladder diagram	<p>Equitable Talk</p> <ul style="list-style-type: none"> • Accountable Talk Simply Stated • Equitable Talk Conversation Prompts • Accountable Talk Posters • Five Talk Moves Bookmark • Effective Math Talks <p>Cooperative Learning</p> <ul style="list-style-type: none"> • Cooperative Learning Role Cards • Collaborative Learning Table Mats • Seating Chart Suggestions <p>Math Word Wall - Grades 3-6</p> <p>Literature</p>  <p><i>A Drive Through History</i> From the <i>Grab-and-Go Differentiated Centers Kit</i> – Students read about how the Alvarez family uses multiplication and division to plan their vacation.</p>	<p>Find the prime factorization of the following:</p> <p>160</p>
1.3	Least Common Multiple	<p>6.NS.4 Companion Pg. 39</p> <p>MP 4, MP 6</p>	How can you find the least common multiple of two whole numbers?	<p>Find LCM by prime factorization or listing multiples. Students will use LCM to find a least common denominator and write equivalent fractions.</p>	<p>Prime Factorization, Listing Multiples</p>	<p>Mandy wants to put Yu-gi-oh cards in her binder. She can fit 9 cards in each page of her binder. 12 cards come in a pack, and she wants every card to be in the binder. If she buys 1 pack, how many pages does she need? Will there be any empty card slots? If she buys two packs, how many pages will she need and will there be any empty card slots? What is the least number of packs and pages she will need so that every card will fit in the binder without any empty card slots?</p> 	least common multiple, prime factorization	<p>Hot dogs come in packs of 8 and hot dog buns come in bags of 12. What is the least number of hot dog packs and bags of hot dog buns that you would need to buy so that you didn't have any left over?</p> <p>How is this similar to using the LCM?</p>		

1.4	Greatest Common Factor	6.NS.4 Companion Pg. 39 MP 2 , MP 4	How can you find the greatest common factor of two whole numbers?	Find GCF by prime factorization or listing factors. Students will use GCF to simplify fractional factors before multiplying, simplify fractional products, and write equivalent algebraic expressions HMH PD Video: Greatest Common Factor	Prime Factorization, Listing multiples, Distributive Property, Estimation, Multiplication Strategies, Base Ten Blocks, Long Division Strategies, Base Ten 15x20 Base Ten 50x70 Ladder Diagram	Find equivalent fractions for the following fractions: 3/6, 5/20, 72/100. Ask students to share answers and write them on the board. Then ask the students: "Which is written in simplest form?" "How do you know?" "How did the student come to this answer?" Discuss how that ties into the days topic, GCF.	Greatest Common Factor, prime factorization, prime factors, Distributive Property, sum as a product	 <i>Halfpipe</i> From the <i>Grab-and-Go Differentiated Centers Kit</i> – Students read about adding and subtracting decimals to rank snowboarders in a competition.	Find the GCF for the following: 66, 84
1.5	Problem Solving: Apply the Greatest Common Factor	6.NS.4 Companion Pg. 39 MP 1 , MP 4 , MP 5 , MP 6	How can you use the strategy <i>draw a diagram</i> to help you solve problems involving the CGF and the Distributive property?	Apply GCF and the Distributive Property to solve problems. HMH PD Video: Greatest Common Factor	Base Ten 15x20 Base Ten 50x70 Ladder Diagram	Show the following array and ask the students: "How many squares are there?" "Is there another way I can break this up to make it easier to figure out how many squares there are?"  Break up the array and write the equation using the distributive property. For example, $(4 \times 5) + (4 \times 7)$ Ask the students if there are any other ways we can break up the array as an example of the distributive property.	Associative Property of Addition, Greatest Common Factor	 <i>A Peek Into a Tiny World</i> From the <i>Grab-and-Go Differentiated Centers Kit</i> – Students read about using a stage micrometer to make measurements of tiny creatures. Model and Discuss: <i>About the Math</i> , pg. 9A	A shoe store salesman is stacking shoe boxes on shelves. He has 36 boxes of sandals and 30 boxes of sneakers. Each shelf will only have boxes of one type of shoe. Each shelf will have the same number of boxes. What is the greatest number of boxes that he can put on each shelf? How many shelves will there be with each type of shoe?
1.6	Add and Subtract Decimals	6.NS.3 Companion Pg. 38 MP 2 , MP 6 , MP 7	How do you add and subtract multi-digit decimals?	Review addition and subtraction of decimals (NBT 5.4). Use estimation and the inverse operation to check reasonableness of answers. Make sure to emphasize the use of estimation, as this is a key skill for working with larger whole numbers and rational numbers. HMH PD Video:	Decimal Models Decimal Place Value Chart Digit Tiles Base Ten Blocks	Use the link to display a lunch menu: Lunch Menu Have the students select some items to buy with \$15. Have the students total their cost and use or two pieces of student work to display and discuss.	tenths, hundredths, thousandths, difference, sum, order of operations		Write a word problem that involves adding or subtracting decimals. Include the solution.

				Subtracting Decimals					
1.7	Multiply Decimals	6.NS.3 Companion Pg. 38 MP 1 , MP 2 , MP 3 , MP 6 , MP 7 , MP 8	How do you multiply multi-digit decimals?	Extend understanding of multiplication of whole numbers to decimals. Make sure to emphasize the importance of estimating with whole numbers to determine the reasonableness of answer.	Decimal Models Decimal Place Value Chart	Use this string number talk to help students see how working with decimals works with similar numbers. Student have been exposed to moving decimals and adding zeros in 5 th grade. 1) 6×50 2) 6×5 3) 6×0.5 4) 6×0.05 1) 0.5×6 2) 0.5×0.60 3) 0.5×0.06 Here's an additional resource that may be helpful: Multiplication of Decimals	tenths, hundredths, thousandths, regroup, ones, tens, hundreds, product, order of operations		Explain how to mentally multiply a decimal number by 100.
1.8	Divide Decimals by Whole Numbers	6.NS.3 Companion Pg. 38 MP 1 , MP 2 , MP 6	How do you divide decimals by whole numbers?	Model decimal division using base-ten blocks. Extend understanding of division of whole numbers to decimals. Below is an example of 3.72 divided by 3 using base ten blocks. 	Decimal Place Value Chart Base Ten 15x20 Base Ten 50x70	Use this string number talk to help students see how working with decimals works. This idea builds on the previous day's connection. 1) $250 \div 5$ 2) $25.00 \div 5$ 3) $2.50 \div 5$	tenths, hundredths, thousandths, difference, subtract, quotient, average	<i>About the Math</i> , pg. 35A  <i>Model:</i> Have students model decimals using decimal place value mats, base ten blocks and/or decimal models. 	5 sisters shared \$250.50 equally. Soraya says that they should each get \$5.01. Do you agree or disagree with Soraya? Explain the importance of correctly placing the decimal point in the quotient of a division problem.
1.9	Divide with Decimals	6.NS.3 Companion Pg. 38 MP 1 , MP 2 , MP 8	How do you divide whole numbers and decimals by decimals?	Extend the pattern of division by powers of ten. Refer and extend the patterns that were developed during the previous days connections. HMH PD Video: Divide with Decimals	Decimal Place Value Chart Digit Tiles	Present problem from pg. 39A: Tom wants to buy a new video game that costs \$58.50. He knows he can save \$6.50 each week. To find how many weeks it would take him to save enough money to buy the video game, he used a calculator to divide \$58.50 by \$6.50 and got 90. Is 90 weeks a reasonable answer? Explain.	compatible numbers, divisor, quotient, order of operations	 -Use a decimal place value chart and/or base ten blocks to add and subtract decimals.	Solve the following: $475 \div 25 =$ $\$4.75 \div \$0.25 =$ Explain how dividing by a decimal is different from dividing by a decimals.

						<p>Here's an additional resource that may be helpful: Division of Decimals</p>	<p>-Use Base Ten Blocks to model Decimal Division.</p> <p>Vocabulary Strategies: <i>Vocabulary Builder-</i> -Write the word <i>multiple</i> on the board. Discuss with students what they know about multiples. Ask two volunteers to write the first eight nonzero multiples of 3 and 4 on the board. -Next write the word <i>common</i> in front of <i>multiple</i>. Discuss with students the meaning of common multiple. -Ask a volunteer to circle the common multiples of 3 and 4 which are on the list. -Now write the word <i>least</i> in front of <i>common multiple</i>. Discuss with students the meaning of <i>least common multiple</i>. -Have students identify the least common multiple of 3 and 4.</p> <p><i>Factors-</i> Using a similar activity as above, follow the <i>Vocabulary Builder</i> activity on pg. 17B in your TE.</p> 	<p>whole number and how it is similar.</p>
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ASSESSMENT:

[Go Math Prerequisite Skills Inventory](#)

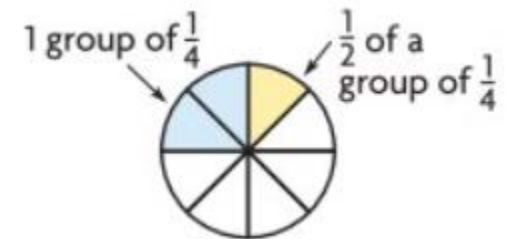
[Go Math Chapter 1 Test](#)

Go Math Chapter 1 Performance Task: [Orchestra Outing](#)

[Portfolio Assessment](#)

BIG IDEA: Students use visual fraction models and equations to divide whole numbers by fractions and fractions by fractions. 6th graders interpret the meaning of fractions, the meaning of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. It is critical for teachers to stress the importance of estimating so the students can determine the reasonableness of their answers. The standard 6.NS.1 focuses on the use of “visual fraction models and equations.” It’s important to teach the students how to solve division of fractions problems with *both* visual fraction models (fraction strips, pattern blocks, drawings, etc.) and equations (procedurally using the multiplicative inverse). Here are some additional key ideas to keep in mind:

1. *Strategies to Compare Fractions* – The ability to compare fractions is important for understanding operations with fractions.
 - a. Using the benchmark of $\frac{1}{2}$
 - b. Comparing fractions in which the number of pieces is the same (common numerators), so that the size of the pieces (denominators) can be compared
 - c. Comparing fractions with the same number of “missing” pieces
 - d. Comparing fractions in which the size of the pieces are the same (common denominators)
2. *Estimate Products and Quotients* – When students make sense of multiplication and division of fractions, they are more likely to recognize unreasonable answers.
 - a. Consider $\frac{7}{8} \div \frac{1}{4}$. Students know that the quotient should be close to 4 because the problem asks, “How many groups of $\frac{1}{4}$ of a whole are in $\frac{7}{8}$ of that whole?” and $\frac{7}{8}$ is close to 1.
 - b. Students should estimate answers to computations prior to performing the actual computations so that they will check for the reasonableness of their answers.
3. *Make Sense of Fraction Division* – Division of fractions is related to division of whole numbers. A meaningful interpretation of $\frac{3}{8} \div \frac{1}{4}$ is to determine how many groups of $\frac{1}{4}$ of the whole are in $\frac{3}{8}$ of the whole. (As seen in the model on the right)
 - a. Begin with a circle with $\frac{3}{8}$ shaded. There is 1 group of $\frac{1}{4}$ of the whole with $\frac{1}{8}$ of the circle left. That $\frac{1}{8}$ of the circle is half of another group of $\frac{1}{4}$.
 - b. Therefore, there is 1 group of $\frac{1}{4}$ and $\frac{1}{2}$ of another group of $\frac{1}{4}$ of the whole in $\frac{3}{8}$, so $\frac{3}{8} \div \frac{1}{4}$ is $1\frac{1}{2}$.



Adapted from Go Math: Teaching for Depth, pg. 49E.

HMH Professional Development Videos:

[Division of Mixed Numbers](#)

[Dividing of Fractions using Models](#) (Using paper fraction kits – an additional strategy for modeling fraction division)

ESSENTIAL QUESTION: How can you use the relationship between multiplication and division to divide fractions?

STANDARDS: 6.NS.1, 6.NS.4, 6.NS.6c

ELD STANDARDS:

ELD.PI.6.1- Exchanging information/ideas via oral communication and conversations.

ELD.PI.6.9- Expressing information and ideas in oral presentations.

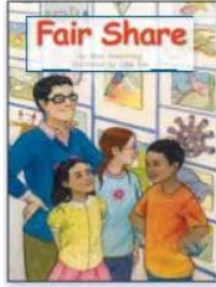
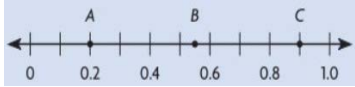
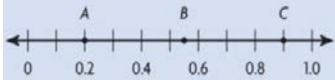
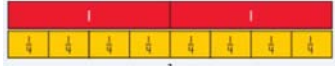
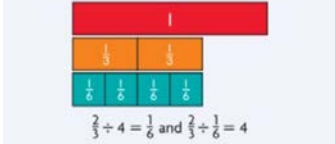
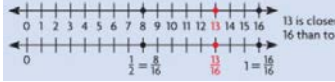
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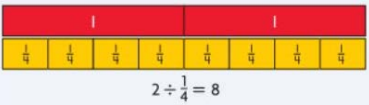
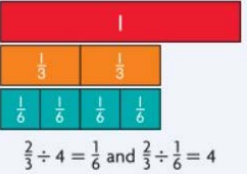
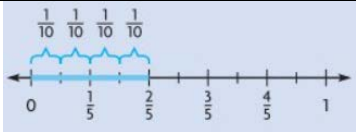
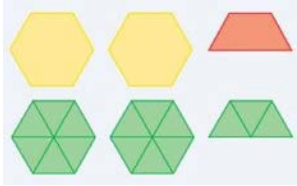
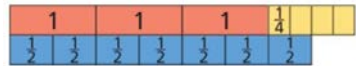
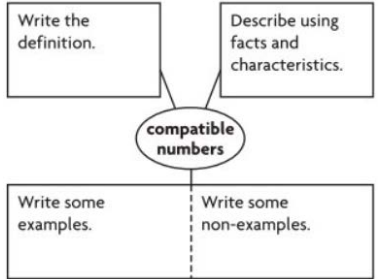
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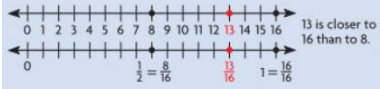
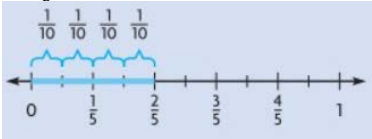
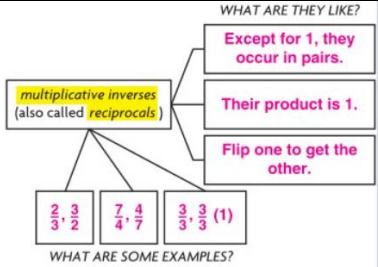

ELD.PI.6.5- Listening actively and asking/answering questions about what was heard.


ELD.PI.6.12- Selecting and applying varied and precise vocabulary.

Lesson	Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G6	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
2.1	Fractions and Decimals 6.NS.6c Companion Pg. 45 MP 2 , MP 4	How can you convert between fractions and decimals?	Convert fractions to decimals using long division. Students need to understand the connection between a fraction and a division problem.	Decimal Models Relating Fractions	1. Using a Decimal Place Value Chart , have the students write these numbers and ask them how to say them. (make sure to use proper place value terminology): 0.5, 0.43, 1.67	terminating, repeating decimals, simplest form		Plot the following three numbers on a number line: $\frac{3}{4}$, $2\frac{1}{2}$, 1.25

						<p>2. Next, have the students say these numbers: $\frac{5}{10}$, $\frac{43}{100}$, $1\frac{67}{100}$</p> <p>Help students to make connections and similarities between the numbers written as decimals and as fractions by creating a T-chart.</p>		<p>Literature</p>  <p><i>Fair Share</i> From the Grab-and-Go Differentiated Centers Kit –</p> <p>Students read about how to divide a wall space evenly to display each student’s artwork for the art fair.</p>	
2.2	Compare and Order Fractions and Decimals	<p>6.NS.6c Companion Pg. 45</p> <p>MP 4, MP 5</p>	How can you compare and order fractions and decimals?	<p>Use number lines to understand benchmark fractions. Also, convert fractions to decimals to compare on a decimal number line.</p> 	<p>Decimal Models Fraction Tile Mat Fraction # Line Templates</p>	<p>Ask students to answer the following questions:</p> <p>0.6 ○ 0.98</p> <p>0.8 ○ 0.08</p> <p>It may also be helpful to use a Decimal Place Value Chart. This will help facilitate a discussion about the value of digits and place value.</p>	numerator, denominator, equivalent fractions		<p>Explain how you would compare the numbers 0.4 and $\frac{3}{8}$.</p>
2.3	Multiply Fractions	<p>6.NS.4 Companion Pg. 39</p> <p>MP 2, MP 6</p>	How do you multiply fractions?	<p>Review multiplication of fractions. This is a 5th grade standard (5.NF.4), but it might be a good idea to review before moving on to division of fractions.</p>	<p>Fraction Area Squares</p>	<p>Juan has 4 pieces of rope. Each piece is exactly $\frac{3}{4}$ of a yard. How many yards of rope does Juan have altogether?</p>	simplest form, order of operations,	<p>Model and Discuss: <i>About the Math</i>, pg. 55A</p>  <p><i>About the Math</i>, pg. 69A</p>  <p>$2 \div \frac{1}{4} = 8$</p>  <p>$\frac{2}{3} \div \frac{1}{6} = 4$ and $\frac{2}{3} \div \frac{1}{8} = 4$</p> <p><i>About the Math</i>, pg. 73A</p>  <p>$\frac{1}{2} = \frac{8}{16}$, $\frac{13}{16}$, $1 = \frac{16}{16}$</p> <p><i>About the Math</i>, pg. 77A</p>	There were $3\frac{1}{2}$ pies left over. Laura and Simon shared the left over pies equally. Simon ate half of his share. How much pie does Simon have left?
2.4	Simplify Factors	<p>6.NS.4 Companion Pg. 39</p> <p>MP 3, MP 6</p>	How do you simplify fractions by using the GCF?	<p>To help students understand the process for simplifying fractional factors before multiplying, demonstrate using the Commutative Property of Multiplication.</p> <ul style="list-style-type: none"> The problem $\frac{2}{5} \times \frac{7}{10}$ on page 63 can be written as $\frac{2 \times 7}{5 \times 10}$. The Commutative Property states that the order of the factors doesn't matter, so $2 \times 7 = 7 \times 2$, and $\frac{2 \times 7}{5 \times 10} = \frac{7 \times 2}{5 \times 10}$. The fraction $\frac{7 \times 2}{5 \times 10}$ can then be written as $\frac{7}{5} \times \frac{2}{10}$. This product shows that you are actually simplifying the fraction $\frac{2}{10}$ when you divide the numerator and denominator of $\frac{2 \times 7}{5 \times 10}$ by 2. 	<p>Fraction Tile Mat Multiplication Table Ladder Diagram</p>	<p>Please simplify the following fractions:</p> <p>1. $\frac{4}{16}$</p> <p>2. $\frac{12}{28}$</p> <p>Ask the students to explain how they determined their answers.</p>	simplify, product, GCF, numerators, factors	<p>Show 2 ways to multiply $\frac{2}{15} \times \frac{3}{20}$. Then tell which way is easier and justify your choice.</p>	

2.5	Investigate - Model Fraction Division	6.NS.1 Companion Pg. 34 MP 1, MP 4, MP 5	How can you use a model to show division of fractions?	<p>• $\frac{7}{5} \times \frac{2 \div 2}{10 \div 2} = \frac{7}{5} \times \frac{1}{5} = \frac{7}{25}$</p>  <p>$2 \div \frac{1}{4} = 8$</p> <p>The model above shows the division of a whole number by a fraction. The strips in the top row represent the dividend, 2, and the strips in the bottom row represent the divisor, $\frac{1}{4}$. Then number of strips in the bottom row represents the quotient, 8.</p>  <p>$\frac{2}{3} \div 4 = \frac{1}{6}$ and $\frac{2}{3} \div \frac{1}{6} = 4$</p> <p>The model above can be used to model both the division of a fraction by a whole number and the division of a fraction by a fraction. In both cases, the strip in the top row provides a reference of 1 whole and the strips in the middle row represent the dividend, $\frac{2}{3}$. This model can also be used to divide a fraction by a whole number. The strips in the bottom row represent the divisor, 4, and the size of each strip in the bottom row represents the quotient.</p> <p>HMH PD Video: Division of Mixed Numbers Dividing of Fractions using Models</p>	Fraction Strips Fraction Tile Mat Fraction # Line Templates Legos	Have the students use fraction strips to model the following problems. Read the prompts with the problems. <ol style="list-style-type: none"> $1 \div \frac{1}{3}$ "How many $\frac{1}{3}$ are in 1 whole?" $\frac{3}{4} \div \frac{1}{8}$ "How many $\frac{1}{8}$ are in $\frac{3}{4}$?" 	fraction models	 <p><i>About the Math, pg. 81A</i></p>  <p><i>About the Math, pg. 85A</i></p>  <p>Vocabulary Strategies: <i>Graphic Organizer, pg. 73B-</i> Have students help you complete this graphic organizer for <i>compatible numbers</i>.</p>  <p><i>Word Definition Map, pg. 77B-</i> Encourage students to draw context and information from the text, prior knowledge, and the glossary to complete the word map.</p>	Explain how to use a model to show $\frac{2}{3} \div \frac{1}{6}$ and $\frac{2}{3} \div 4$.
2.6	Estimate Quotients	6.NS.1 Companion Pg. 34 MP 1	How can you use compatible numbers to estimate quotients of fractions and mixed numbers?	Understand using compatible numbers as a strategy to check the reasonableness of answers when dividing fractions. Round fractions between 0 and 1 to either $\frac{1}{2}$ or 1.	Fraction Strips Fraction Tile Mat Pattern Blocks Legos Number Lines	Ask the students the following questions: <ol style="list-style-type: none"> What would be a reasonable answer for $12 \div \frac{5}{6}$? How do you know? 	compatible numbers, quotient, possible estimates		Which is a reasonable estimate for the following: $5 \frac{5}{8} \div \frac{1}{2}$ A. 3

				 <p>HMH PD Video: Division of Mixed Numbers</p>		<p>3. Would 60 be a reasonable answer? What about 20? What about 5? *Ask the students “Why or why not?” after each response.</p>			
2.7	Divide Fractions	<p>6.NS.1 Companion Pg. 34</p> <p>MP 1, MP 7, MP 8</p>	<p>How do you divide fractions?</p> <p>Students benefit from using multiple representations of the same concept. The students have used fraction strips, but show them how to use number lines to divide fractions. For example, use $\frac{2}{5} \div 4$ as shown below.</p>  <p>HMH PD Video: Division of Mixed Numbers</p>	<p>Fraction Strips Fraction Tile Mat Dividing Fractions-Find the Pattern Pattern Blocks Legos Number Lines</p>	<p>Have students use pattern blocks or fraction strips to solve the following problems. Give the students a context, such as “We’re sharing pie...”.</p> <ol style="list-style-type: none"> $1 \div 3$ $\frac{1}{2} \div 3$ $\frac{1}{4} \div 3$ (Students may need to use fraction tiles for this problem.) 	reciprocal, multiplicative inverse		<p>B. 11 C. 6 D. 8</p> <p>Explain how you know.</p>	
2.8	Investigate - Model Mixed Number Division	<p>6.NS.1 Companion Pg. 34</p> <p>MP 2, MP 4, MP 5</p>	<p>How can you use a model to show division of mixed numbers?</p> <p>Use pattern blocks and bar models/tape diagrams to model division of mixed numbers. If you are using pattern blocks, first model the dividend with pattern blocks. Then place pattern blocks that represent the divisor over the blocks that represent the dividend. For example, the model below shows $2\frac{1}{2} \div \frac{1}{6}$. The top row represents the divisor, and the bottom row represents how you would cover them.</p>  <p>HMH PD Video: Division of Mixed Numbers</p>	<p>Fraction Strips Fraction Tile Mat Pattern Blocks Bar Models (Tape Diagrams) Number Lines</p>	<p>Give students pattern blocks and ask them to model and solve the following problems using the pattern blocks.</p> <ol style="list-style-type: none"> $2\frac{1}{2} \div \frac{1}{2}$ $2\frac{1}{2} \div \frac{1}{6}$ 	Mixed number, quotient, whole numbers	<p>Maria has $7\frac{1}{2}$ yards of fabric. She is making banners for her class. Each banner needs to be $\frac{5}{6}$ of a yard long. How many banners can she make?</p>		
2.9	Divide Mixed Numbers	<p>6.NS.1 Companion Pg. 34</p> <p>MP 1, MP 6</p>	<p>How do you divide mixed numbers?</p> <p>Review strategies of converting mixed numbers and division of fractions to extend to division of mixed numbers. It is important for students to understand that when you divide a</p>	<p>Fraction Strips Fraction Tile Mat Dividing Fractions-Find the Pattern Pattern Blocks</p>	<p>Give students fractions tiles or the Fraction Tile Mat and ask them to model and solve the following problem. $2\frac{2}{3} \div \frac{1}{6}$</p>	Mixed numbers, quotient, simplest form	<p>Explain how you would find how many $1\frac{1}{2}$ cup servings there are in a</p>		

				<p>number by a fraction that is between 0 and 1, the quotient will be greater than the dividend. Many teachers in previous grades have a tendency to tell the students that this is not possible. You can use the example of $3\frac{1}{4} \div \frac{1}{2}$ shown below (pg. 85A) to illustrate this point.</p>  <p>HMH PD Video: Division of Mixed Numbers</p>	Number Lines				pot that contains $22\frac{1}{2}$ cups of soup.
2.10	Problem Solving - Fraction Operations	6.NS.1 Companion Pg. 34 MP 1 , MP 2	How can you use the strategy use a model to help you solve a division problem?	In this lesson, students extend their work in using concrete models to using pictorial models to represent division of fractions problems.	Fraction Strips, Fraction Tile Mat Pattern Blocks Number Lines Bar Models/Tape Diagrams	Give the students the following problem and say: "The last couple of days we have been dividing fractions using pattern blocks and fraction tiles. Today, I'd like you to solve this problem by drawing a model." $3\frac{1}{2} \div \frac{1}{4}$ *It may be helpful to give the students a Fraction Tile Mat to help the students reason about their model.	model, equivalent		Eva had $1\frac{2}{3}$ boxes of cereal. Each day she eats $\frac{1}{6}$ of the box. If she had $\frac{1}{3}$ of the box left over, how many days did Eva eat cereal?

ASSESSMENT:

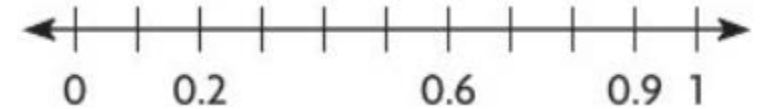
[Go Math Chapter 2 Test](#)

Go Math Chapter 2 Performance Task: [Clock Fractions](#)

Critical Area Project 1 (*The Number System*): [Sweet Success](#) (See Chapter 1 TE, pg. 1), [Sweet Success Support Pages](#)

BIG IDEA: In 6th grade, students use fractions, decimals, and integers to represent real-world situations. They extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical, which helps 6th graders move from number lines to coordinate grids. The focus is to learn about negative numbers, their relationship to positive numbers, and the meaning and uses of absolute value. This is the foundation for working with rational numbers, algebraic expressions and equations, functions, and the coordinate plane in 7th and 8th grades. Here are some additional key ideas to keep in mind:

- Rational Numbers – Students with a deep understanding of rational numbers know that they are a natural extension of whole numbers that allow us to solve problems that can't be solved with just whole numbers or integers. Develop conceptual understanding by emphasizing the following:
 - A rational number can be represented as a fraction in an infinite number of ways.
 - A rational number can be represented as a decimal.
 - Between any two rational numbers there are infinitely more rational numbers.
 - Every rational number can be expressed as a fraction, but not every fraction is a rational number, e.g. $\frac{\pi}{5}$.
- Absolute Value – The absolute value of a number represents its distance from zero on the number line regardless of direction.
 - Emphasizing absolute value as a representation of distance, not unlike miles between cities, helps students understand why the absolute value of a number is always positive.
 - Understanding absolute value supports students when finding horizontal or vertical distances between two points in the coordinate plane.
 - This definition of absolute value will be used all the way through calculus.
- The Number Line Model – The number line is a powerful tool for representing both positive and negative rational numbers. Advantages of utilizing the number line during instruction include:
 - The number line develops a sense of the relative magnitude of number by providing a visual image of how much greater one fraction is than another or how close together two decimals are (as shown on the right).
 - The number line provides a context for understanding fractions that is both more versatile than and different from part-whole models. Also, students should be very familiar with its use, beginning in 1st grade.
 - Placing a fraction on a number line helps students see a fraction as a single number rather than as two numbers with separate values.



Adapted from Go Math: Teaching for Depth, pg. 99E.

HMH Professional Development Videos:

- [Absolute Value](#)
- [Distance in the Coordinate Plane](#)
- [Absolute Values and Opposites](#)

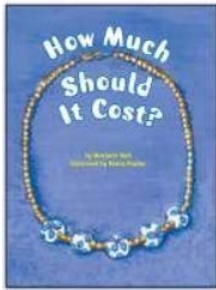
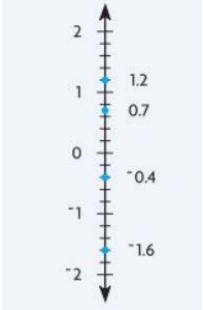
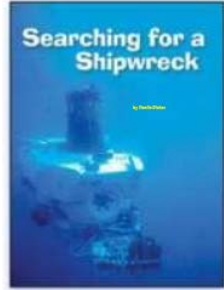
ESSENTIAL QUESTION: How do you write, interpret, and use rational numbers?

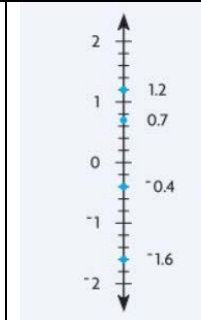
STANDARDS: 6.NS.5, 6.NS.6a, 6.NS.6b, 6.NS.6c, 6.NS.7a, 6.NS.7c, 6.NS.7d

ELD STANDARDS:

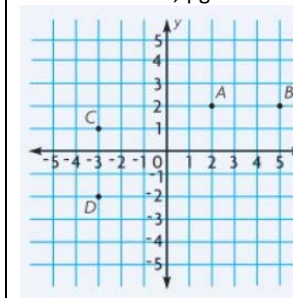
- ELD.PI.6.1- Exchanging information/ideas via oral communication and conversations.
- ELD.PI.6.3- Offering opinions and negotiating with/persuading others.
- ELD.PI.6.5- Listening actively and asking/answering questions about what was heard.
- ELD.PI.6.9- Expressing information and ideas in oral presentations.
- ELD.PI.6.11- Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
- ELD.PI.6.12- Selecting and applying varied and precise vocabulary.

Lesson	Standards & Math Practices	Essential Question	Math Content/Strategies	Models/Tools Go Math! Teacher Resources G6	Connections (ENGAGE prior knowledge)	Vocabulary	Academic Language Support	Journal
3.1	Understand Positive and Negative Numbers 6.NS.5 6.NS.6a Companion Pg. 44, 45	How can you use positive and negative numbers to represent real-world quantities?	Understand the meaning of 0 in real world situations. Understand positive and negative numbers as quantities from 0.	Integer # Line Integer # Line 2 Integer Mat	Create a T-chart of examples of positive and negative numbers (opposites). For example:	integers, opposites, situation, number line, distance		Give 3 examples of when negative numbers are used in daily life.

		MP 5 , MP 6 , MP 7		HMH PD Video: Absolute Value		<table border="1"> <tr> <td>+</td> <td>-</td> </tr> <tr> <td>Above sea level</td> <td>Below sea level</td> </tr> <tr> <td>Degrees above zero</td> <td>Owing money</td> </tr> <tr> <td></td> <td></td> </tr> </table>	+	-	Above sea level	Below sea level	Degrees above zero	Owing money			Literature  <i>How Much Should It Cost?</i> From the <i>Grab-and-Go Differentiated Centers Kit</i> – Students read the book and learn about negative integers as Rosa repays a loan from her father.	
+	-															
Above sea level	Below sea level															
Degrees above zero	Owing money															
3.2	How can you compare and order integers?	6.NS.7a 6.NS.7b Companion Pg. 47 MP 5 , MP 8	How can you compare and order integers?	Compare and order fractions by using their relative position on a number line. Understand that numbers become greater as you move right on a horizontal number line or up on a vertical number line. Also make sure to emphasize that the further a negative number is from zero, the less it is worth. Use real world examples like temperature help with their understanding of this idea.	Integer # Line Integer # Line 2 Thermometer Checkbooks	Have students build a number line from positive 17 to negative 17 using the Integer # Line . Ask the students to place small Base 10 blocks on the number line to represent the following numbers. After the students place their blocks, ask them: “Which is the greatest? Which is the least?” 1. 0, 7, -2 2. -12, 3, -4 3. 14, 4, -15	absolute value, temperatures, from least to greatest, vertical number line, integers		Explain how to use a number line to compare 2 negative integers. Give an example.							
3.3	Rational Numbers and the Number Line	6.NS.6a 6.NS.6c Companion Pg. 45 MP 2 , MP 4 , MP 7	How can you plot rational numbers on a number line?	Understand a rational number as a point on a number line. Recognize that numbers with opposite signs have locations on opposite sides of 0. 	Integer # Line Integer # Line 2 Integer # Line 3 Thermometer	Have students build a number line from positive 2 to negative 2 in $\frac{1}{4}$ increments using the Integer # Line 3 . Ask the students to place small Base 10 blocks on the number line to represent the following numbers. 1. $0, \frac{1}{2}, -\frac{1}{2}$ 2. 0.25, -0.25 3. $1\frac{1}{2}, -\frac{3}{4}, -1\frac{1}{4}$	rational number, absolute value, temperatures, from least to greatest, vertical number line, integers, magnitude	 <i>Searching for a Shipwreck</i> From the <i>Grab-and-Go Differentiated Centers Kit</i> – Students read the book and learn how integers can describe the sinking of the <i>Titanic</i> and the discovery of its ruins. Model and Discuss: <i>About the Math</i> , pg. 109A	Describe how to plot $-3\frac{3}{4}$ on a number line.							
3.4	Compare and Order Rational Numbers	6.NS.7a 6.NS.7b Companion Pg. 47 MP 1 , MP 5	How can you compare and order rational numbers?	Understand how to change fractions and decimals to the same form and plot on a number line to use to order from least to greatest. Models and real-life concepts help students understand rational numbers.	Integer # Line Integer # Line 2 Integer # Line 3 Number Line	Have students build a number line from positive 2 to negative 2 in $\frac{1}{4}$ increments using the Integer # Line 3 . Ask the students to place small Base 10 blocks on the number line to represent the following numbers. After the students place their blocks, ask them: “Which is the greatest? Which is the least?” 1. $0, \frac{1}{4}, -\frac{3}{4}$ 2. 0.5, -0.25, -1.25 3. $1\frac{3}{4}, -\frac{3}{4}, -1\frac{1}{2}$	Common denominators, elevations, absolute value, vertical number line, integers		Describe 2 situations in which it would be helpful to compare or order positive and negative rational numbers.							



About the Math, pg. 135A



Vocabulary Strategies:

Examples and Nonexamples, pg. 101B-
Have students use the chart below to brainstorm examples and nonexamples of integers and opposites.

	Examples	Nonexamples
Integers	-2, 7	-2.1, $\frac{1}{2}$
Opposites	1 and -1	1 and 0

Real-World Examples, pg. 119B-
Have students work in small groups or pairs to find real-world examples of *absolute value*. Have them explain how the example shows absolute value in the given situation. Use recent news stories, science experiments, magazines, the internet, or textbooks.

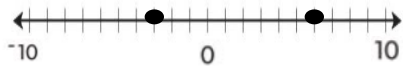
Semantic Mapping, pg. 127B-

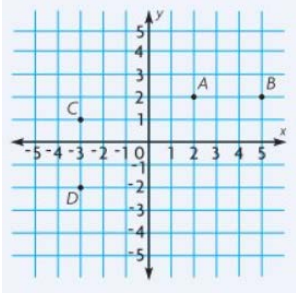
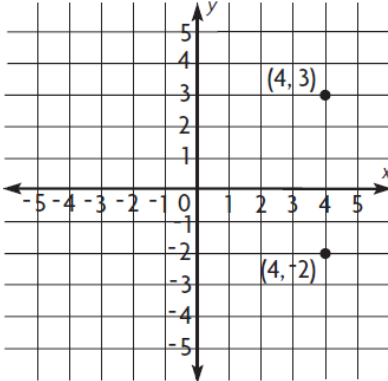
								<p>List the new vocabulary words on the board. Work with students to complete a semantic map for <i>coordinate plane</i>, emphasizing this term's relationship to each of the other vocabulary words.</p>	
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END OF FIRST QUARTER

DRAFT

START OF SECOND QUARTER

3.5	Absolute Value	6.NS.7c Companion Pg. 47 MP 2 , MP 3 , MP 4 , MP 8	How can you find and interpret the absolute value of rational numbers?	Understand absolute value as the distance from 0. Using real-world examples, such as two people living the same distance from a location, but in different directions, can be helpful to students. HMH PD Video: Absolute Value Absolute Values and Opposites	Integer # Line Integer # Line 2 Number Line	Present a real-world scenario: Cecily has -30 dollars in her account. Explain what that means.	magnitude, absolute value, number line	Write 2 different real-world examples. One should involve the absolute value of a positive number, and the other should involve the absolute value of a negative number.
3.6	Compare Absolute Value	6.NS.7d Companion Pg. 47 MP 1 , MP 2	How can you interpret comparisons involving absolute value?	Understand absolute value as the distance from 0. Determine absolute values in real-life situations and use absolute values to compare which is greater. HMH PD Video: Absolute Values and Opposites	Integer # Line Integer # Line 2 Coordinate Plane Coordinate Plane 2 Coordinate Plane-First Quadrant	Ask the students the following question: "What is the depth of a diver at an elevation of -30 ft?" *Use this question to help the students understand how absolute value can be used in real-life contexts.	quadrants, line symmetry, line of symmetry	Give 2 numbers that fit this description: a number is less than another number but has a greater absolute value. Describe how you determined the numbers.
3.7	Rational Numbers and the Coordinate Plane	6.NS.6c Companion Pg. 45 MP 6 , MP 8	How do you plot ordered pairs of rational numbers on a coordinate plane?	Understand the order of (x, y) coordinates in an ordered pair. Use the ordered pair to move the given distance and plot on a coordinate plane. Make sure to stress the importance of the order of x and y.	Integer # Line Integer # Line 2 Coordinate Plane Coordinate Plane 2 Coordinate Plane-First Quadrant	See if students can explain the difference between the locations of: 1. (3,2), and (2,3) 2. (-3,2) and (-2,3)	coordinate plane, x-axis, y-axis, origin, ordered pair, x-coordinate, y-coordinate	Describe how to graph the ordered pair (-1, 4.5).
3.8	Ordered Pair Relationships	6.NS.6b Companion Pg. 45 MP 4 , MP 7	How can you identify the relationship between points on a coordinate plane?	Recognize the quadrants of a coordinate plane and identify if values will have + or - signs in each quadrant. Understand how reflections across an axis affect the signs of the coordinates.	Coordinate Plane Coordinate Plane 2 Coordinate Plane-First Quadrant Desmos.com	Plot (3,1), (-3,1), (-3,-1), (3,-1) and discuss how the coordinates change and how this relates with their locations.	reflection, quadrants, line symmetry, line of symmetry reflection	Explain to a new student how a reflection across the y-axis changes the coordinates of the original point.
3.9	Distance on the Coordinate Plane	6.NS.8 Companion Pg. 49 MP 1 , MP 5 , MP 8	How can you find the distance between two points that lie on a horizontal or vertical line on a coordinate plane?	Use the absolute value to find the distance between two points on a coordinate plane. Use graphing to help understand the position of points in the four quadrants.	Coordinate Plane Coordinate Plane 2 Coordinate Plane-First Quadrant Desmos.com	Ask the students the following question: 1. What is the distance between the two points?  2. How can you use the absolute value to find the distance between the two points?	distance, coordinate plane, coordinates, vertical line, y-axis	Graph the points (-3,3), (-3,7), and (4,3) on a coordinate plane. Explain how to find their distance from (-3,3) to (-3,7) and from (-3,3) and (4,3).

				 <p>HMH PD Video: Distance in the Coordinate Plane</p>		*You can also show a vertical number line and have the students practice the same exercise.			
3.10	Problem Solving • The Coordinate Plane	6.NS.8 Companion Pg. 49 MP 1 , MP 5 , MP 6	How can you use the strategy <i>draw a diagram</i> to help you solve a problem on a coordinate plane?	<p>Understand a word problem may have multiple pieces of information, including starting point, movements and distances. Use information in the problem to graph positions on a coordinate plane and find the solution to the problem.</p> <p>HMH PD Video: Distance in the Coordinate Plane</p>	Coordinate Plane Coordinate Plane 2 Coordinate Plane-First Quadrant Desmos.com Maps	<p>Ask the students the following question:</p> <p>What are the two coordinates needed to create a rectangle in which the two remaining vertices are exactly 6 units apart from the points on the graph?</p> 	coordinate plane, graph the location, located at	Write a problem that can be solved by drawing a diagram on a coordinate plane.	
<p>ASSESSMENT: Go Math Chapter 3 Test Go Math Chapter 3 Performance Task: Negative Numbers Through History **Common Assignment - Critical Area 1 (<i>The Number System</i>) Performance Assessment: Math Carnival</p>									