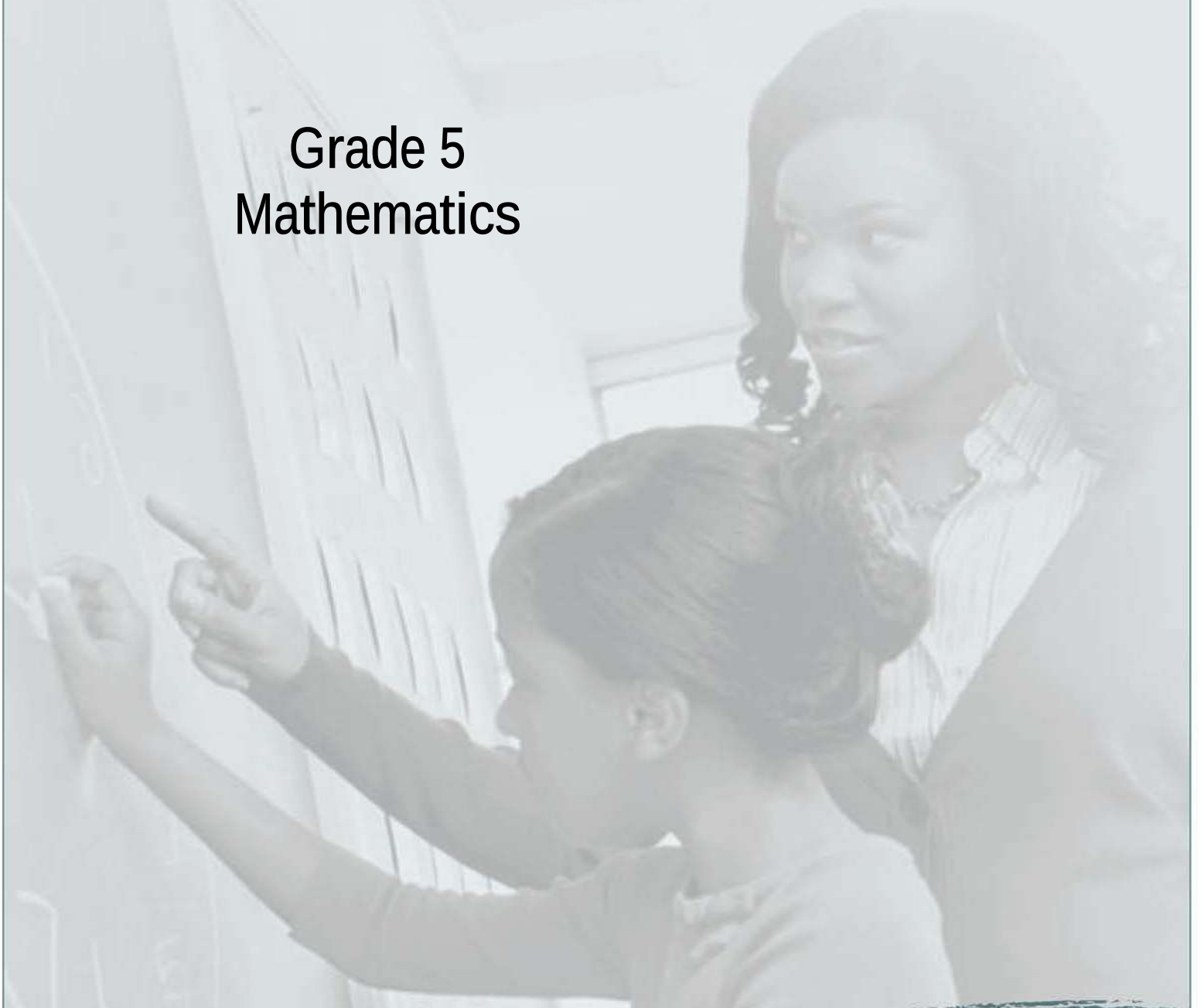
Louisiana Believes.

GLE Grade-Level Expectations

COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Grade 5 Mathematics



Transitional Curriculum

REVISED 2012

LOUISIANA DEPARTMENT OF EDUCATION

Grade 5
Mathematics

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2012 Louisiana Transitional Comprehensive Curriculum
Course Introduction

The Louisiana Department of Education issued the first version of the *Comprehensive Curriculum* in 2005. The *2012 Louisiana **Transitional** Comprehensive Curriculum* is aligned with Grade-Level Expectations (GLEs) and *Common Core State Standards (CCSS) as outlined in the 2012-13 and 2013-14 Curriculum and Assessment Summaries posted at http://www.louisianaschools.net/topics/gle.html. The Louisiana Transitional Comprehensive Curriculum* is designed to assist with the transition from using GLEs to full implementation of the CCSS beginning the school year 2014-15.

Organizational Structure
The curriculum is organized into coherent, time-bound units with sample activities and classroom assessments to guide teaching and learning. Unless otherwise indicated, activities in the curriculum are to be taught in 2012-13 and continued through 2013-14. Activities labeled as 2013-14 align with new CCSS content that are to be implemented in 2013-14 and may be skipped in 2012-13 without interrupting the flow or sequence of the activities within a unit. New CCSS to be implemented in 2014-15 are not included in activities in this document.

Implementation of Activities in the Classroom
Incorporation of activities into lesson plans is critical to the successful implementation of the Louisiana Transitional Comprehensive Curriculum. Lesson plans should be designed to introduce students to one or more of the activities, to provide background information and follow-up, and to prepare students for success in mastering the CCSS associated with the activities. Lesson plans should address individual needs of students and should include processes for re-teaching concepts or skills for students who need additional instruction. Appropriate accommodations must be made for students with disabilities.

Features
Content Area Literacy Strategies are an integral part of approximately one-third of the activities. Strategy names are italicized. The link (view literacy strategy descriptions) opens a document containing detailed descriptions and examples of the literacy strategies. This document can also be accessed directly at http://www.louisianaschools.net/lde/uploads/11056.doc.

Underlined standard numbers on the title line of an activity indicate that the content of the standards is a focus in the activity. Other standards listed are included, but not the primary content emphasis.

A *Materials List* is provided for each activity and *Blackline Masters (BLMs)* are provided to assist in the delivery of activities or to assess student learning. A separate Blackline Master document is provided for the course.

The *Access Guide to the Comprehensive Curriculum* is an online database of suggested strategies, accommodations, assistive technology, and assessment options that may provide greater access to the curriculum activities**.** This guide is currently being updated to align with the CCSS. Click on the *Access Guide* icon found on the first page of each unit or access the guide directly at http://sda.doe.louisiana.gov/AccessGuide.

Grade 5
Mathematics
Unit 1: Addition and Subtraction of Whole Numbers and Decimals

Time Frame: Approximately six weeks

Unit Description

Unit 1 focuses on whole numbers and decimals with a deeper understanding of place value. The unit provides the opportunity for students to become computationally fluent in addition and subtraction of whole numbers. The unit also focuses on beginning work with addition and subtraction of decimals.

Student Understandings

Students will understand the place value system. They will understand the operations of addition and subtraction. They will understand numbers, ways of representing numbers, relationships among numbers, and patterns in numbers. They will add and subtract whole numbers fluently and add and subtract decimals using models and drawings and strategies based on place value.

Guiding Questions

1. Can students determine the steps and operations to use to solve a word problem involving addition or subtraction without assistance?
2. Can students use mental mathematics strategies in checking the reasonableness of computations with whole numbers?
3. Can students proficiently add and subtract whole numbers?
4. Can students solve simple equations and inequalities involving addition or subtraction of whole numbers?
5. Can students read, write, and compare decimals to thousandths.
6. Can students round decimals?
7. Can students add and subtract decimals using models, drawings and strategies based on place value?

Unit 1 Grade Level Expectations (GLEs) and Common Core State Standards (CCSS)

Grade-Level Expectations	
GLE #	**GLE Text and Benchmarks**
Number and Number Relations	
7.	Select, sequence, and use appropriate operations to solve multi-step word problems with whole numbers (N-5-M) (N-4-M)
8.	Use the whole number system (e.g., computational fluency, place value, etc.) to solve problems in real-life and other content areas (N-5-M)

9.	Use mental math and estimation strategies to predict the results of computations (i.e., whole numbers, additions and subtraction of fractions) and to test the reasonableness of solutions. (N-6-M) (N-2-M)
Algebra	
14.	Find solutions to one-step inequalities and identify positive solutions on a number line (A-2-M) (A-3-M)
CCSS for Mathematical Content	
CCSS#	**CCSS Text**
Number and Operations in Base Ten	
5.NBT.1	Recognize that in a multi-digit number, a digit in one place is 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$. b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
5.NBT.4	Use place value understanding to round decimals to any place.
5.NBT.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
ELA CCSS	
CCSS#	**CCSS Text**
Writing Standards	
W.5.2a	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group-related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
Language Standards	
L.5.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships.

Sample Activities

Activity 1: Place Value of Whole Numbers (GLE: 8; CCSS: 5.NBT.1)

Materials List: place value manipulatives, Place Value Chart BLM, pencils, The Internet (optional)

Have students work in groups of 4. Give each group a set of place value manipulatives, such as beans and cups, connecting cubes, base-ten blocks, or other manipulatives and a copy of the Place Value Chart BLM. For part of the activity, it is easier if students can take the materials apart. Give students a number, such as 134. Using the materials, have each student in the group model the number in a different way and record their models in the place value chart.

Hundreds	Tens	Ones
1	3	4
	13	4
		134
1		34

There are different ways to model 134. The first way is the standard way to model the number. Students need to understand that there is 1 hundred in 134, 13 tens in 134, and 134 ones in 134. There are 3 tens in the tens place and the 3 tens have a value of 30, but there are 13 tens in the number. Have students model a few more numbers. Bring in the idea of expanded notation: 1 hundred + 3 tens + 4 ones = $1(100)+3(10)+4(1) = 100+30+4$. Expand these ideas to larger numbers.

Allow students to use the manipulatives to investigate place value relationships. Give them a number such as 222. Ask them if they can see any relationship in the digits and their places in the number. Assist students in their understanding that each place represents 10 times what it represents in the place to its right and $1/10^{th}$ of what it represents in the place to its left. The digit 2 in the hundreds place has a value of 200. The digit 2 in the tens place has a value of 20. The digit 2 in the ones place has a value of 2. 200 is 10 times 20, 20 is 1/10 of 200.

This is a key concept for students to understand. Display the numbers 134 and 143. Tell students that in the number 134, it should be understood that the 4 is a different value than the 4 in 143. The 4 in 134 represents 4 ones or 4, where the 4 in 143 represents 4 tens or 40. The 4 in 143 is one place to the left of the 4 in 134, and its value is 10 times greater. Therefore, the 4 in 134 is $1/10^{th}$ the value of the 4 in 143. Give some examples of this with larger numbers.

Draw a place value chart similar to this one on the board and give students a second copy of the Place Value Chart BLM.

Millions			Thousands			Ones		
hundred millions	ten millions	millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones

Write the number 3,248 in the correct columns in the chart. Use a strip of paper to cover the digits 2, 4, and 8, and the words above the digits. Have students read what is uncovered, 3 thousands. Uncover the digit, 2. Have students read this as 32 hundreds. Uncover the digit, 4. Have students read this as 324 tens. Finally, uncover the digit 8. This is read as 3248 ones. Continue with other numbers. Use numbers from real-life applications, such as the moon is 233,812 miles from Earth. The Guinness Book of World Records is a great place to find these applications. The website www.nctm.org has a good lesson on understanding a million. Access the page directly at http://illuminations.nctm.org/index_d.aspx?id=367. The teacher can also go to the www.nctm.org website. From the NCTM.org site, click on *Lesson and Resources,* then click on *Illuminations.* This will open a new page. Click *Lessons,* check *Grades 3–5, and NUM.* In the search box, type *Count on Math.* When *Count on Math* comes up, click on it and then select *Making Your First Million*. It involves real-life applications and estimation.

Activity 2: Mental Math Strategies (GLE: 8, 9; CCSS: W.5.2a)

Materials List: math learning logs, pencils

Give students a problem such as $49+34$ to compute mentally. Tell them to give an exact answer, not an estimate. Some students may use compensation. They may think: I can add $50+34$ to get 84, but I added one too many, so $84-1=83$. Or they may think: I can add $50+33$ to get 83. I took 1 from the 34 and gave it to the 49. Some students may break apart the numbers to add $40+30=70$ and $9+4=13$, so $70+13=83$. Or they may think $49+30=79$, so $79+4=83$. There are probably countless other way that students can find the answers; just make sure they explain their reasoning. Students need to see and hear how others use mental math strategies.

Continue to give other problems involving subtraction, not just addition. Subtraction is often harder to do mentally than addition. Counting up can help students to subtract mentally. For example, for the problem 83 – 65, some students might think: I add 5 to 65 to get to 70. From 70 to 83 is 13, so 5 + 13 = 18. Sometimes, a combination of strategies works best. Write the

following player scores on the board. Ask students what math strategies they would use to determine the total scores of the following basketball players:

- **Player A** scored *16 + 11 + 14 =*
- **Player B** scored *12 + 17 + 13 =*
- **Player C** scored *7 + 15 + 13 =*

Some students may use compatible numbers and properties to find the scores of each player *(16 + 14 + 11 = 30 + 11 = 41; 17 + 13 + 12 = 30 + 12 = 42; 7 + 13 + 15 = 20 + 15 = 35)*, then use compensation to find the total: 40 + 40 + 35 + 3 = 115 + 3 = 118. Ask students to give examples of when they might use a certain strategy. A critical part of becoming proficient in mental math strategies is to be able to explain your reasoning. Give students the problem 84 – 35. Have students maintain a math *learning log* (view literacy strategy descriptions). *Learning logs* are used to help students keep track of learning during class and the collaboration process. They are created by using a composition notebook, a spiral notebook, or can be created using loose leaf paper bound with construction paper. *Learning logs* are use to record ideas, questions, reactions, new understandings, and reflections. These logs allow students to think about what they are learning and write down questions/reflections about their learning experience. Upon completion, *learning logs* provide a guide for follow-up activities and evaluation methods. In their math *learning logs*, have them explain in words, numbers, or pictures how they would use mental math to find the answer.

Activity 3: Rounding Whole Numbers (GLE: 8, 9)

Materials List: paper, pencils, Internet access

Although there are other estimation strategies, such as front-end estimation, compatible numbers, and clustering, rounding is an important strategy. Begin rounding by discussing why multiples of 10 are used in rounding. Help students to realize that rounding makes it possible to use numbers that are easy to compute. Emphasize that when you say round to the nearest 10 (or 100, or 1000) you are asking students to find the closest 10 or 100 or 1000. To do this, help them to determine what two tens, or two hundreds, or two thousands, etc. a number is between. Drawing a number line can help.

Give students a number such as 289. (If students are proficient in rounding with smaller numbers, use larger numbers, but ask the same types of questions.) Ask questions such as these: If you are rounding to the nearest hundred, between which two hundreds is 289? *(200 and 300)* Which hundred is it closer to? *(300)* If you are rounding to the nearest ten, between which two tens is 289? *(28 tens and 29 tens)* To which ten is it closer? *(29 tens or 290)* Discuss the fact that numbers such as 5, 50, 500 are exactly in the middle, so if given a number such as 250, the number should be rounded up to 300. Be sure to include some of the rounding problems that confuse students such as the following problems: Round 25 to the nearest hundred *(0)*, round 98 to the nearest 10 *(100)*, and round 245 to the nearest hundred *(200)*.

Extend the rounding ideas to larger numbers. Instruct students to explain how they arrived at their answers. Give real-world examples such as these: 200,000 people live in Shreveport; do

you think this is an estimate or an exact figure? If you had rounded the population to the nearest hundred-thousand, which of the following could have been the actual population? 262,461; 198,364; 209,999; or 252,125 *(198,364; 209,999)*. Explain your reasoning. Teachers can find the populations of different cities in the United States at http://www.census.gov/popest/.

Activity 4: To Add or Subtract (GLE: 7, 8; CCSS: L.5.6)

Materials List: index cards (17 per student), Addition and Subtraction Self-awareness Chart BLM (2 pages), pencils

Before beginning this activity, have students complete a *vocabulary self-awareness* chart (view literacy strategy descriptions). *Vocabulary Self-awareness* is a strategy that allows students to gauge their prior knowledge of the terminology that will be used in understanding the concept. *Vocabulary Self-awareness* highlights the students' understanding of what is already known as well as what is still needed to learn. Provide students with the Addition and Subtraction Self-awareness Chart BLM. Do not give students definitions or examples at this point.

Word/Phrase	**+**	**√**	**–**	**Example**	**Definition**
Altogether					
Decrease					
Difference					
Down					
Earn					
In all					
Increase					
Increment					
Less					
Loss					
Minus					
More					
Plus					
Spend					
Sum					
Total					
Up					

Ask students to rate their understanding of each word with either a "+" (understands well), a "√" (some understanding), or a "–" (don't know). During and after completing this activity, students should return to the chart and fill in examples and definitions in their own words. The goal is to have all plus signs at the end of the activities.

Have students write the following words on their index cards (1 word per card): *altogether, in all, total, increment, plus, earn, more, increase, sum, up, minus, spend, less, decrease, loss, difference, down.*

Have students shuffle all the cards. Inform them that they would be required to sort the words based on the operation associated with the word (addition words and subtraction words).

Addition Words

altogether	in all	total
increment	plus	earn
more	increase	sum
up		

Subtraction Words

minus	spend	less
decrease	loss	difference
down		

After sorting the words, allow students to work with a partner to discuss the reasonableness of their lists. Have students work with their partners to create 3 word problems; one with an addition word, one with a subtraction word, and one with both an addition and subtraction word. After partners have created the word problems and checked for solvability, have them write their multi-step word problem on an index card and place in a class pile. Shuffle the cards and choose a few of the problems to solve with the class. When time permits throughout the unit, return to the problems to solve with the class.

Activity 5: Addition and Subtraction (GLEs: 7, 8, 9)

Materials List: paper, pencils

Even though the operations of addition and subtraction should have been mastered, review these concepts with the students. Give problems in context and have students estimate before they actually add or subtract the numbers. Writing the answer in a complete sentence can help students determine if their answers are reasonable.

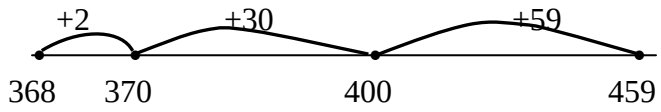
For addition, focus on partial sums, emphasizing the place value of the digits. Give an example such as this: The school play ran for two nights. The first night, 368 people attended; the second night, 459 people attended. How many attended in the two nights? Ask students to estimate the answer. Accept estimates between 700 and 900. The following problems are examples of using partial sums.

$$\begin{array}{r} 368 = 300 + \ 60 + \ 8 \\ +459 = 400 + \ 50 + \ 9 \\ \hline 700 + 110 + 17 \end{array}$$

or

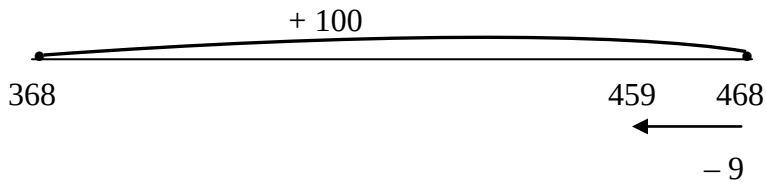
$$\begin{array}{rl} 368 & \\ +459 & \\ \hline 17 & 8 + 9 = 17 \\ 110 & 60 + 50 = 110 \\ 700 & 300 + 400 = 700 \\ 827 & \end{array}$$

For subtraction, use a number line and the strategy of counting up. The school is trying to sell 459 tickets to the play. They have sold 368. How many more must they sell to reach their goal? $459 - 368 =$ _____ or 368 + _____ = 459



$2 + 30 + 59 = 91$

or



$100 - 9 = 91$

Make sure that you give subtraction problems involving zeros.

For example:
$$\begin{array}{r} 508 \\ -149 \\ \hline \end{array}$$

Remind students that there are 50 tens in this number, so 508 could be renamed as 49 tens + 18 ones.

$$\begin{array}{r} {\scriptstyle 49\ \ 18} \\ 5\cancel{0}8 \\ -149 \\ \hline \end{array}$$

This is also a good problem to use the count up strategy. To reinforce the idea that addition and subtraction are inverse operations, show students how to check a subtraction problem by using addition and why it works. Continue giving students addition and subtraction problems, in

context, always asking for an estimate first. To reinforce estimation, have students discuss which strategy they used. Have students write the word problems that you will use. Sometimes, give an answer to their written problems and ask students if the answer you stated is reasonable or not. Encourage students to write problems that have more than one step, involving both addition and subtraction. Encourage students to try to do problems mentally before they use paper and pencil. Estimation, mental math, and computation should be fully integrated at this grade level.

Activity 6: Addition and Subtraction *Text Chains* (GLEs: 7, 8, 9; CCSS: W.5.2a)

Materials List: paper, pencils

Use math *text chains* (view literacy strategy descriptions) to practice addition and subtraction. The *text chain* strategy is a strategy that allows students to demonstrate their understanding of newly learned material and gives students the opportunity to apply content area concepts through writing. Math *text chains* involve a small group of students writing a story problem using the math concepts being learned and then solving the problem.
For example, one group might start a *text chain* with the first student writing the opening sentence of this problem.

There are 436 students at Washington Elementary.

The student passes the paper to the student sitting to the right. That student writes the next sentence in the story, which might be:

There are 521 students at Lincoln Elementary.

The paper is passed again to the right. This student writes the question for the story.

How many more students are at Lincoln than at Washington?

The paper is now passed to the fourth student who must solve the problem and write the answer in a complete sentence.

Answer: There are 85 more students at Lincoln Elementary.

Tell students that their problems can involve more than one operation and can involve estimation. Be sure that students check the *text chains* for logic and accuracy once they are completed. You can also allow groups to exchange their *text chains* to check for accuracy.

Activity 7: My First Job: U. S. Census Bureau (GLE: 7, 8; CCSS: L.5.6)

Materials List: U. S. Census Bureau Data Sheet BLM, calculators (optional), pencils

With this activity, students will be asked to *question the content* of the activity after reading the activity prompt *Questioning the Content (QtC)* (view literacy strategy descriptions) which encourages students to interact with the information they encounter by asking questions of the content. Prior to starting the activity, provide students with the types of questions they will be expected to ask about the content (in this activity, a math scenario). Display the questions below. These questions should be accessible whenever needed. Model the *QtC* process by demonstrating how the questions can be asked in a manner that is applied directly to the activity. Put the students in groups of four to practice questioning the content and completing the activity.

Monitor and provide additional modeling and clarification. Through continued use of this strategy, students will independently initiate the questioning process.

Goals and Queries for this QtC Activity	
Goal	**Query**
Initiate discussion	What is the content about?
	What is the overall message?
	What is being talked about?
Focus on content's message	It says this, but what does it mean?
	Why was this word used?
Link information	How does that connect with what was said earlier?
Identify problems with understanding	Does that make sense?
	Is this explained clearly? Why or why not?
	What do we need to figure out or find out?
Encourage students to refer to the text to find support for interpretations and answers to questions	Did the content tell me that?

Provide students with the U. S. Census Bureau Data Sheet BLM. Allow a student to read the activity prompt aloud as everyone reads along silently.

Content: It is your first day of work at the U. S. Census Bureau. They were impressed with your interview and believe you have the mathematical skills to proof the Census report before it is printed and distributed to the public. They have assembled a Louisiana team to perform the task and you are one of the members. First, you've been asked to check the population change in the "Change" column to make sure the change in population for each region from 2000-2010 is correct. Then you will give the total population for the entire United States in the year 2010. In addition to this task, you are asked to find the population change for the state of Louisiana and enter that information in the table. You will work with your team in order to complete these tasks.

Allow students to work in their groups to question the content using the questions given earlier in the lesson. Monitor the students' progress and provide clarification as needed. When the students have completed answering the questions, allow them to complete the activity. When all are nearly finished, allow the students to participate in grand discussion about the activity and how the questions asked and answered help in comprehension of the tasks needed to be completed.

Activity 8: Balances/Scales (GLEs: 14)

Materials List: number or pan balances, objects to count, paper, pencils

Introduce students to the concepts involved in solving equations and inequalities. Emphasize that adding or subtracting the same amount to both sides of an equation or inequality does not change the relationship. Using a balance can help them understand this concept. Have the students use the balances and similar objects (marbles, tiles, plastic counters) to create an equation or an inequality. Have them write number sentences to show the reading of the balances: $8 > 6$, $15 = 15$, 4 + 1 = 2 + 3, etc.

Using the balance, show students that adding or subtracting the same amount to both sides of an equation or inequality does not change the relationship. For $15 = 15$, if you add 5 to both sides, you still get an equation. It becomes $20 = 20$. For $8 > 6$, if you subtract 4 from both sides, the left side of the inequality will still be greater than the right side. The inequality will now read $4 > 2$.

Also, give problems such as 4 + 3 = 9 – □.
Apply these ideas to larger numbers that cannot be done on the scales. If 595 = 595, does the equation change if you subtract 110 from both sides? *(No, 485 = 485)* If 1043 < 1141, does the inequality change if you add 56 to both sides? *(No, 1099 < 1196)*

Activity 9: Bean Math (GLEs: 14)

Materials List: beans, small cups, Equation Mats BLM, Inequality Mats BLM, pencils, paper

Have students work in pairs to create equations using beans, small cups and the Equation Mats BLM. The cup should represent the variable or unknown value. To model a number sentence such as, $x + 7 = 15$, ask students to place an empty cup and 7 beans next to it on one side of the equal sign and 15 beans on the other side. To find the solution to the number sentence, ask students to use metal math, thinking about how many beans should be put in the cup to have this side of the number sentence equal 15. Or have them remove 7 beans from both sides of the equation to find that $x = 8$. Emphasize that, in the equation $x + 7 = 15$, 7 beans were added, so to get x alone, you need to subtract 7 from both sides. The equation $x + 7 = 15$ can be written as $x + 7 - 7 = 15 - 7$. Therefore, $x = 8$. Subtraction is harder to model using beans and cups. For $x - 3 = 7$, place a cup on one side of the mat and 7 beans on the other. Ask, how many beans have to be in the cup so that you can subtract 3 and still have 7. There must be 10 beans in the cup. In the equation, $x - 3 = 7$, 3 is being subtracted from x; to get x alone, add 3 to both sides of the equation. The equation $x - 3 = 7$ can be written as $x - 3 + 3 = 7 + 3$. Therefore, $x = 10$. Remind students that if you do something to one side of the equation, you must do it to the other side. Have one student model a number sentence and another student solve it, explaining what they are doing as they go along. Students should write the equations that are being modeled throughout the lesson.

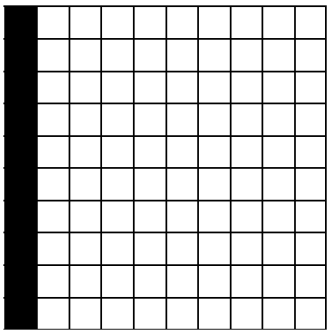
Also introduce the idea of solving inequalities by modeling $x + 3 > 5$. Give students a copy of the Inequality Mats BLM. Ask students what number of beans could be put in the cup to make the sentence true. *(3, 4, 5 …)* Students can also use a number line to solve the problems, but at this time they should use just whole numbers in the solution.

Activity 10: Place Value of Decimals (CCSS: 5.NBT.1, 5.NBT.3a)

Materials List: Hundreds Grid BLM, Place Value Chart with Decimals BLM, pencils, math learning logs

Have students work in pairs. Give each student a copy of the Hundreds Grid BLM and a copy of the Place Value Chart with Decimals BLM. Explain to the students that they are going to work with numbers less than one whole unit. Tell them to consider each grid on the Hundreds Grid BLM as 1 whole. Ask students to describe one of the grids. (Each grid has been broken into 10 rows and 10 columns or into 100 small squares.) Ask students how many squares are needed to make 1 whole unit (100), how many squares are in one row or column (10), and how many rows and columns are in the grid (10).

Have the students shade in ten of the squares in the first column as shown.



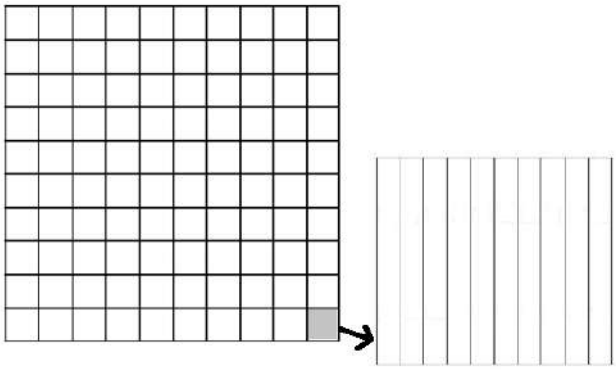
Tell students that they have just shown 10 parts shaded out of 100 parts or 10/100. 10/100 can be represented as the decimal 0.10. Have the students write the decimal 0.10 near their representation and on their Place Value Chart with Decimals BLM. Have students think about the column shaded and ask if a fraction could be written for the number of columns shaded compared to the whole unit. (1 of the 10 columns is shaded and the fraction is 1/10.) Tell students that the decimal equivalent for 1/10 is 0.1 Have them show 0.1 on their Place Value Chart with Decimals BLM. Ask students to explain why 0.1 is equal to 0.10.

Whole Numbers			And	Decimals		
hundreds	tens	ones	•	tenths	hundredths	thousandths
		0	.	1	0	
		0	.	1		
		0	.	1	3	

Give students a number, such as 0.13. Have students record this number in the place value chart. Have students find similarities and differences in the number 0.13 and 0.10 (i.e., both numbers are decimals, they both contain one tenth; 0.13 has 3 more hundredths than 0.10). Have students work with their partners to represent 0.13 on their hundreds grid. Students should see that 1 column or 0.1 is shaded plus 3 hundredths more (0.03) is shaded. This realization can lead to discussing the expanded form of 0.13 which is 0.1 + 0.03. The expanded form can also be written as 1 tenth + 3 hundredths or as 1(0.1) + 3(0.01).

Give students other decimals to represent such as 0.05, 0.27, 2.78, and 50.12 on a grid, in the Place Value Chart BLM, and in expanded form.

Remind students that each square is 1/100 of the grid. Pose these questions, "What if one square in the grid were divided into 10 columns? What fractional amount would one of the columns in the small square represent?" (1/1000) Have the students visualize the one square divided into 10 sections as shown.



Give students the following information: Each little piece of the square represents 1/1000 of the 1 whole unit. There would now be 10 rows × 10 columns × 10 little columns or 1000 little tiny pieces. 1/1000 is written as a decimal as 0.001. 1 large column or row represents 1/10 or 0.1, 1 small square represents 1/100 or 0.01, and one tiny column in 1 small square represents 1/1000 or 0.001. The digits in the tenths place are 10 times greater than the digits in the hundredths place and are 100 times greater than the digits in the thousandths place.

Ones			And	Decimals		
hundreds	tens	ones	•	tenths	hundredths	thousandths
		0	.	0	0	1
		0	.	0	1	0
		0	.	1	5	0

Using decimals such as 0.023, 0.005, 4.015, and 10.047, give students adequate practice recording decimals on their Place Value Chart with Decimals BLM. Students should write the fraction equivalent and decimal number for each decimal represented.

Just as hundredths numbers could be written in expanded form, so can thousandths numbers be written in expanded form. Ask the following questions about 7.145: How many ones are in the number? (7) How many tenths are in the number? (1) How many hundredths are in the number? (4) How many thousandths are in the number? (5) How could you write this number in expanded form? [7 + 0.1 + 0.04 + 0.005 or 7 ones + 1 tenth + 4 hundredths + 5 thousandths or 7(1) + 1(0.1) + 4(0.01) + 5(0.001).]When adequate time is given, have students write a summary of what they have learned in their math *learning logs* (view literacy strategy descriptions).

Activity 11: Decimals on a Number Line (CCSS: 5.NBT.3b)

Materials List: Place Value Chart with Decimals BLM, centimeter ruler, pencils, copy paper

Have students work with partners. Have each partner draw a number line from 0 to 1 with tick marks for every tenth. Instruct students to use the tick marks on the ruler to mark off equal intervals on the number line they are to create. This will aid in plotting decimals accurately within each interval. Have students label the tick marks in tenths. Have students plot the following numbers on the number line and label each point: 0.3, 1.0, 0.5, and 0.9. Have the partners compare the decimals on the number line. Have students discuss which numbers are close to 1 whole (one number is exactly 1 whole), which numbers are close to zero, and which numbers are close to ½.). Ask the students to discuss with their partner how their number line could be used to help them in comparing decimals. Have the students share their reasoning with the class.

Tell the students they could also use a place value chart to assist them in comparing decimals. Give each student a Place Value Chart with Decimals BLM. Have them compare the following sets of decimals using the signs >, <, and =.

35.689, 35.625	15.20, 15.200	0.998, 1.634	0.639, 0.068
0.212, 0.906	0.21, 0.43	1.99, 2.85	10.203, 10.202

Remind students to line the decimals up putting each number in its correct place. Have them start with the largest place value, compare those digits, move to the next place value, compare those digits, etc. For example, in the problem 35.689 and 35.625, the tens digits, the ones digits, and the tenths digits are all the same. Students should look at the hundredths place to decide which number greater or if the 2 numbers are equal. Allow students to share their explanations with the class.

Activity 12: Filling the Place Value Position (CCSS: 5.NBT.1, 5.NBT.3a, W.5.2a)

Materials List: pencils, Place Value Global, Inc., Letterhead BLM, Place Value Global Inc. – Example Letter (optional)

Have students, in a group of 4, review place value as it relates to ten thousands, thousands, hundreds, tens, ones, tenths, hundredths, and thousandths. Students may use place value manipulatives, place value charts, and drawings to help understand the magnitude of numbers. Students should understand that a digit in the tens place is ten times as much as a digit in the ones place and a digit in the ones place is $1/10^{th}$ the size of a digit in the tens place. Ask questions comparing the sizes of digits in the other places such as: In which place is a digit 10 times more than a digit in the hundreds place?

Ask students to demonstrate their understanding of place value by completing a *RAFT writing* (view literacy strategy descriptions) assignment. This form of writing gives students the freedom to project themselves into unique roles and to look at content from unique perspectives. From these roles and perspectives, *RAFT writing* can be used to describe a point of view, envision a potential job or assignment, or solve a problem. It is the kind of writing that when crafted appropriately, should be creative and informative.

R – Role (role of the writer – human resource manager of Place Value Global, Inc.)
A – Audience (to whom the *RAFT* is being written – one of two applicants for a job opening in the ones place. (Applicant A is the tenths place (1/10) and Applicant B is the tens place (10).
F – Form (the form the writing will take – a letter)
T – Topic (the subject of the focused writing – to write a letter turning either one down for the job offer.

Have students work together to create a draft letter and check each other's work for correct composition, audience awareness, sentence formation, word usage, mechanics, and spelling. Check the formation of their draft to make sure they understand why neither applicant would be right for the job. Help them to understand the tenth is under-qualified in that it is $1/10^{th}$ too little to hold the ones place and the ten is 10 times too much to hold the ones place. When the students are ready to write their final draft, give them a copy of the Place Value Global, Inc. Letterhead BLM to give their final draft a formal look.

The groups should share their writing with the class. Students should listen for accuracy and logic in each *RAFT*.

Students may need some help in writing their letter. An example letter is included in the Blackline Masters. Here are some suggestions that could be made to assist them in writing this type of letter:

1. Thank the individual for his/her interest in the company.
2. Point out the applicant's strong point such as ability to hold his/her place and give the digit in that place its value, work well with other place values, ability to adjust when it becomes more than 9, or needs to take one more from the place to the immediate right of it (i.e., regrouping ability) or other found relevant information.

3. Explain to the candidate that you are not able to extend an offer (give a job) and explain why using a phrase such as "We are pursuing (We are in need of) a candidate who more closely fits our job requirements." In this section, students should be able to convey that the tenth is $1/10^{th}$ less than the needed place value (under qualified) or 10 times more than the needed place value (over qualified).
4. Encourage the applicant to watch for other company openings that might be applicable (related) to their skills.
5. Wish the candidate well in his/her job searching.

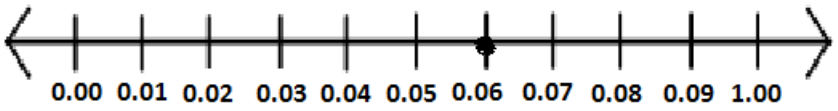
The Place Value Global, Inc.- Example Letter BLM can also be used as a guide to writing.

Activity 13: Rounding Decimals (GLE: 9; CCSS: 5.NBT.4)

Materials List: paper, pencils, base ten blocks (optional), Place Value Chart with Decimals BLM (optional), Number Line BLM, math learning logs, The Internet (optional)

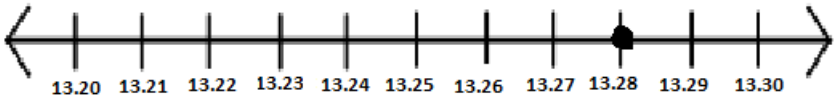
Review rounding with whole numbers and give a couple of examples. Have students round to the nearest ten and hundred. Discuss why multiples of 10 are used in rounding. Help students to realize that rounding makes it possible to use numbers that are easy to compute. Emphasize that when you say round to the nearest 0.1 (or 0.01, or 0.001), you are asking students to find the closest 0.1 (or 0.01, or 0.001). To do this, help them to determine what two tenths, (or two hundredths, or two thousandths, etc.) a number is between. Distribute the Place Value Chart with Decimals BLM and the Number Line BLM to students to support their work with rounding.

Give students a number such as 0.06 (If your students are proficient in rounding with smaller numbers, use larger numbers, but ask the same types of questions.) Ask questions such as these: If you were going to round to the nearest tenth, between which two tenths is 0.06? *(0.0 and 0.1)* Which tenth is it closer to? *(0.1)* Have them use their Number Line BLM to help them identify that 0.06 is closer to 0.1 (0.10) than to 0 (0.00).



Discuss the fact that decimal numbers such as 0.5, 0.05, and 0.005 are exactly in the middle, so these decimal numbers should be rounded up to the next place value. Therefore, if given a number such as 0.250, the number should be rounded up to 0.300. Be sure to include some of the rounding problems that confuse students such as the following problems: Round 0.25 to the nearest one *(0)*, round 0.98 to the nearest tenth *(1.0)*, and round 0.245 to the nearest hundredth *(0.20)*. Further the questions to include decimal numbers with whole numbers. Give students a number such as 13.28. Ask questions such as these: If you are rounding to the nearest tenth, between which two tenths is 13.28? *(13.2 and 13.3)* Which tenth is it closer to? *(13.3)*

Give students the number 13.283. Ask questions such as these: If you are rounding to the nearest tenth, between which two tenths is 13.28? *(13.2 and 13.3)* Which tenth is it closer to? *(13.3)* If students are confused, remind them that 13.2 is equivalent to 13.200 and 13.3 is equivalent to 13.300. Ask if 13.283 is closer to 13.200 or 13.300. (*13.200*) Tell student that if the zeros are used, it would be assumed that that the number had been rounded to the nearest thousandth. To indicate that that the number has been rounded to the nearest tenth, the answer must be written in tenths; therefore, the answer is 13.2. If you are rounding to the nearest hundredth, between which two hundredths is 13.287? *(13.28 and 13.29)* Again, students may need to be prompted to write equivalent values for 13.28 and 13.29 as 13.280 and 13.290, respectively. To which hundredth is it closer? Why? *(13.28 because 13.283 is closer to 13.280. To indicate rounding to the nearest hundredth, the number must be written in hundredths.)*



Extend the rounding ideas to larger numbers. Instruct students to explain how they arrived at their answers. Give real-world examples such as these: The gas prices at five Baton Rouge gas stations were $3.19, $3.21, $3.23, $3.25, and $3.34. If rounded to the nearest dollar, would a resident be able to identify the best price of gas for the money he/she intends to spend? What if it were rounded to the nearest hundredth (penny)? Would he/she be able to identify the best price? Explain your reasoning. Have students work alone or with a partner to answer the problems and prompt them to write their responses in their math *learning logs* (view literacy strategy descriptions). Randomly choose a student to share their responses to the class.

Activity 14: Will My Budget Allow? (CCSS: 5.NBT.4)

Materials List: paper, pencil, calculator (optional)

Display the following chart:

Groceries Placed for Value 			
Items and Prices *(Prices are subject to value based on rounding to the nearest place value as agreed upon by the store clerk. The store clerk has final say on determined prices.)*			
Cheese	$0.278	Peanut Butter	$2.372
Cereal	$0.570	Ground Beef	$1.911
Milk	$0.683	Eggs	$0.952
Bag of Fruit	$0.889	Ham	$3.046

Bread	$0.745	Chicken	$0.546
Bundle of Vegetables *(spinach, broccoli, asparagus, tomatoes, carrots, cauliflowers, green beans)*	$1.032	*Basket of Fruits (apples, oranges, grapes, berries, melons, bananas)*	$1.365

Have students work in groups of four. Have one person in the group act as the store clerk and the other members act as purchasers who will create a meal with items sold. Their meal must consist of these food groups: grains, fruits/vegetables, dairy, and meat. Have the store clerk determine to which place value each item will be rounded. For instance, the store clerk may determine that all items will be rounded to the nearest hundredth. All purchasers will have to round each item to the nearest hundredth before determining how much money they will spend. Have purchasers choose as many items as they believe their budget of $5.00 will allow. The store clerk will check their prices based on the rounded value and calculate the cost of the items on each list. Have the group discuss the rounding strategies used to find the price of the items and compare estimates and estimation strategies used. Have the members repeat the activity taking turns as the store clerk.

Activity 15: Probable Comparisons (CCSS: 5.NBT.3b)

Materials List: Probable Comparisons BLM, Probable Comparisons Spinner BLM, paper clip, pencils, math learning logs

Have students work with partners. Give each student a Probable Comparisons BLM, a Probable Comparisons Spinner BLM, and a paper clip. Inform the students that they will compare decimals with their partners based on the comparison that is spun. Have students inspect the spinner to see that it is separated into thirds with a section for greater than >, less than <, or equal to =. Have students take turns spinning the spinner. Students can use a pencil to hold the paper clip secure as another student spins the paper clip on the spinner. The students will use the decimals on their Probable Comparisons BLM to compare. When the first person to spin finds the comparison, he/she will choose two of the three decimals in the set and make a comparison. For example: Partner A spins "less than <" and chooses two of the numbers from the set 10.03, 10.02, and 10.030 to compare. Partner A says "10.02 is less than < 10.03" to complete the comparison. The pair must agree on the comparison. Once they do, they move on to the next set of decimals taking turns until all sets are completed.

Have the students complete a *SPAWN writing* (view literacy strategy descriptions) activity that asks a "What If" in a thought-provoking activity that relates to comparison situations. *SPAWN writing* is a strategy that allows students to respond to prompts that stimulate students' meaningful thinking about text they have read and topics they have learned. Ask students to answer this prompt: In real-world situations, a lower number may be desired and, at other times, a higher number may be the number of choice. What if you were ill? Which temperature would you rather have knowing that the normal body temperature is 98.6°? (101.5, 101.7) Why would you make that choice?

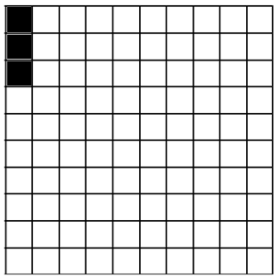
Working with a partner, have students discuss their answers and write them in their *learning logs* (view literacy strategy descriptions). Have students share their responses with the class as they listen for accuracy and logic.

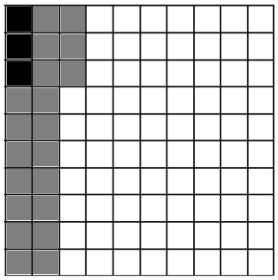
2013-14
Activity 16: Adding with Decimals (CCSS: 5.NBT.7)

Materials List: Hundreds Grid BLM, pencils, math learning logs

Students will use their knowledge of place value to add decimals.

Have students work in pairs. Explain to the students that they are going to add decimals. Distribute the Hundreds Grid BLM and remind students that each grid is 1 whole unit that has been broken into the 10 × 10 grid containing 100 small squares. Have each partner use a hundred grid to shade in squares to show 3 hundredths as shown.





0.03
+0.20
0.23

Tell the students to add 2 tenths to 3 hundredths by shading the squares. Have them count the total number of squares they have shaded and write the decimal number (0.23). Demonstrate how to write the addition expression 0.03 + 0.2 and discuss ways to solve the problem other than using a visual model. Students may want to solve by writing the problem vertically as shown above while others may solve the problem horizontally or mentally. Tell students that someone in the class last year got an answer of 0.5 and someone else got an answer of 0.05. Ask students to explain what they think these students did incorrectly. Give emphasis to the importance of lining up the like places or thinking about the place value of each digit to avoid errors in addition.

Have students circle ten of the squares in the first column of the grid. Tell students that they have just shown 10 parts shaded out of 100 parts. This value can be shown as 0.1 (one tenth). Ask them how many tenths are in 0.23 (2). Ask students if the addition 0.03 + 0.2 can be written as 0.03 + 0.20. Help the students realize that 0.2 (two tenths) is the same as 0.20 (twenty hundredths). Let students know that if they choose to write the decimal as 0.2 or 0.20, it will not change the value of their answer. Allow the students to choose the way that is more comfortable for them to use when adding.

Give students another problem of this type such as 7 tenths + 4 hundredths. Have them demonstrate the problem using a hundreds grid first, and then solve the problem. Allow partners

to check each other's work. Ask students to explain how they solved the problem. Ask if they wrote the problem vertically, and if so, why did they do this.

Have the students use the understanding gained in earlier problems to solve the following problems: 0.63 + 0.9, 0.16 + 0.58, and 0.08 + 0.05. Guide the students to solve the addition problems by first deciding how they will solve the problem. If the students decide to expand the decimals, give assistance as needed. In the first problem 0.63 + 0.9, students may choose to add 0.60 + 0.03 + 0.90. In doing so, they will add all decimals as hundredths and get 153 hundredths or 1.53. If they choose to solve the problems vertically, have them align the decimals vertically as shown. Have students add each place and regroup numbers that exceed 9.

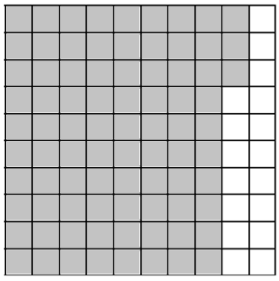
$$\begin{array}{r} {\scriptstyle 1} \\ 0.63 \\ +0.90 \\ \hline 1.53 \end{array}$$

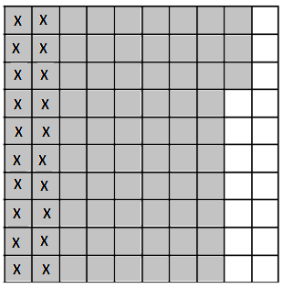
Discuss with the students the methods that are being used to add, including aligning like places, adding zeros when needed, and regrouping. Ask students to share what methods have been beneficial as they solve their problems and why. Ask students to solve other problems with addition and subtraction of decimals such as: 0.73 + 0.9, 0.09 + 0.08, or 0.57 + 0.19. Have students check their problems with their partners. In their math *learning logs* (view literacy strategy descriptions), have students explain what strategies they found helpful as they added decimal numbers. Have them to also explain why these strategies were helpful.

2013-14
Activity 17: Subtracting with Decimals (CCSS: 5.NBT.7)

Materials List: Hundreds Grid BLM, pencils, math learning logs

Have students work in pairs. Explain to the students that they are going to subtract decimals. Distribute the Hundreds Grid BLM. Have each partner use a hundred grid to lightly shade in squares to show 83 hundredths as shown.





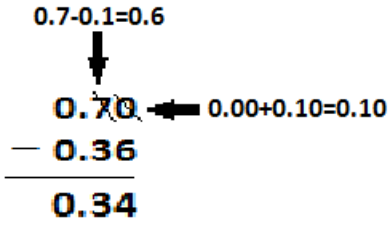
$$\begin{array}{r} 0.83 \\ -0.20 \\ \hline 0.63 \end{array}$$

Tell the students to subtract 2 tenths from the 83 hundredths by putting an X on the hundredths subtracted. Ask them to count the total number of shaded squares without an X and write the decimal number (0.63). Demonstrate how to write the subtraction 0.83 − 0.2 and discuss ways to solve the problem other than using a visual model. Students may want to solve by writing the

problem vertically and adding a zero, as shown above, while others may solve the problem horizontally or mentally. Have students solve the problem. If the student chooses to solve the problem vertically, give emphasis to the importance of lining up the like places to avoid errors in subtraction.

Give students other problems of this type such as 0.75 – 0.13, 0.86 – 0.42, 0.68 − 0.12. Have them demonstrate the problem using a hundreds grid first, and then solve the problem by writing it vertically. Allow partners to check each other's work.

Have the students work the problem 0.7 – 0.36 with their partners. If students choose to write the problem vertically, remind students to put the numbers in vertical columns, align the decimal points, and start subtracting from the right to left. Remind students that when the digit's being subtracted is larger than the digit above it, regrouping is necessary. Ask students what they might do to 0.7 to help with subtracting. (Write 0.7 as 0.70.)



Have students regroup 1 tenth from the tenths place as 10 hundredths in the hundredths place. Students can now subtract 6 hundredths from ten hundredths. Give the students other subtraction problems such as 0.75 – 0.16, 0.5 – 0.37, 0.75 – 0.48, 0.30 – 0.19 to solve with their partners.

Review with the students the steps that have been used to subtract, including aligning like places, adding zeros when needed, and regrouping. In their math *learning logs* (view literacy strategy descriptions), have students explain what strategies they found helpful as they added decimal numbers. Have them to also explain why these strategies were helpful.

Sample Assessments

General Assessments

- Portfolio assessments could include the following:
  - Anecdotal notes made during teacher observation.
  - Any of the journal entries, or one of the explanations from the specific activities
  - Corrections to any of the missed items on tests
- On any teacher-made written tests, the teacher could include at least one of the following.
  - One problem that requires the use of manipulatives or drawings such as this: Using some type of base-ten manipulative or drawing, the students will show why 184 < 203 or 0.1 > 0.09.
  - One question that requires the student to explain his/her reasoning such as this: How many hundredths are in the number 1.541?

  - One problem involving real-life such as this: Since numbers and mathematics are used all the time during the day, have the students list two times that an exact answer is needed to answer a question, and two times that an estimate is all that is needed.
- Journal entries could include the following:
  - Have students estimate the answer to the following problem: $409 - 298 =$ _____
  - Mr. Mistake worked the following problem, 1.76 + 489, and got an answer of 6.65. Have the student explain why his/her answer is not reasonable, and what mistake was made.
  - Have the student explain in writing find the sum of 0.57 and 0.34.

Activity-Specific Assessments

- Activity 3: 2, 3, 5, 9 Have students use each digit in the rectangle to write a number that …
  - rounded to the nearest thousand is 3000 (possible answer 3,295).
  - rounded to the nearest hundred is 3900 (3,925).
  - rounded to the nearest ten is 3590 (3,592).

- Activity 6: Give students the numbers 225, 500, 32, 20. Have them write word problems that involve …
  - only addition.
  - only subtraction.
  - both addition and subtraction.

- Activity 7: Have students create a double bar graph with the corrected information from their Census Bureau Data Sheet BLM. Students should exhibit the ability to round numbers to display on the graph.

- Activity12: In addition to the student writing assignments and RAFT answers, use the RAFT assignments to assess students' ability to identify role, audience, format, and topic as well as their ability to incorporate their understanding of place value with regards to the writing prompt correctly in their planning, draft, and final product.