Georgia
Standards of Excellence
Curriculum Frameworks

Mathematics

GSE Fifth Grade
Unit 2: Adding and Subtracting with Decimals

Georgia Department of Education

Richard Woods, Georgia's School Superintendent
"Educating Georgia's Future"

Unit 2: ADDING AND SUBTRACTING WITH DECIMALS

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<mark>IF YOU HAVE NOT READ THE 5th GRADE CURRICULUM OVERVIEW IN ITS ENTIRETY PRIOR TO USE OF THIS UNIT, PLEASE **STOP** AND CLICK HERE</mark>
https://www.georgiastandards.org/Georgia-Standards/Frameworks/5th-Math-Grade-Level-Overview.pdf
Return to the use of this unit once you've completed reading the Curriculum Overview. Thank you.

OVERVIEW

In this unit students will:
- Solve problems by understanding that like whole numbers, the location of a digit in a decimal number determines the value of the digit.
- Understand that rounding decimals should be "sensible" for the context of the problem.
- Understand that decimal numbers can be represented with models.
- Understand that addition and subtraction with decimals are based on the fundamental concept of adding and subtracting the numbers in like position values.

UNDERSTAND THE PLACE VALUE SYSTEM

Mathematically proficient students communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language. The terms students should learn to use with increasing precision with this cluster are: **place value, decimal, decimal point, patterns, multiply, divide, tenths, thousands, greater than, less than, equal to, ‹, ›, =, compare/ comparison, round.**

MGSE5NBT.1 Recognize that in a multi-digit number, a digit in one place represents 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.

Students will work with place values from thousandths to one million.

This standard calls for students to reason about the magnitude of numbers. Students should work with the idea that the tens place is ten times as much as the ones place, and the ones place is $\frac{1}{10}$ the size of the tens place. In 4th grade, students examined the relationships of the digits in numbers for whole numbers only. This standard extends this understanding to the relationship of decimal fractions. Students use base ten blocks, pictures of base ten blocks, and interactive images of base ten blocks to manipulate and investigate the place value relationships. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons.

Before considering the relationship of decimal fractions, students express their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

Example:
A student thinks, "I know that in the number 5555, the 5 in the tens place (5555) represents 50 and the 5 in the hundreds place (5555) represents 500. So, a 5 in the hundreds place is ten times as much as a 5 in the tens place or a 5 in the tens place is $\frac{1}{10}$ of the value of a 5 in the hundreds place. Based on the base-10 number system, digits to the left are times as great as digits to the right; likewise, digits to the right are $\frac{1}{10}$ of digits to the left. For example, the 8 in 845 has a value

of 800 which is ten times as much as the 8 in the number 782. In the same spirit, the 8 in 782 is $\frac{1}{10}$ the value of the 8 in 845. To extend this understanding of place value to their work with decimals, students use a model of one unit; they cut it into 10 equal pieces, shade in, or describe $\frac{1}{10}$ of that model using fractional language. ("This is 1 out of 10 equal parts. So, it is $\frac{1}{10}$. I can write this using $\frac{1}{10}$ or 0.1.") They repeat the process by finding $\frac{1}{10}$ of a $\frac{1}{10}$ (e.g., dividing $\frac{1}{10}$ into 10 equal parts to arrive at $\frac{1}{100}$ or 0.01) and can explain their reasoning: "0.01 is 1/10 of $\frac{1}{10}$ thus is $\frac{1}{100}$ of the whole unit."

In the number 55.55, each digit is 5, but the value of the digits is different because of the placement.
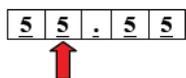
The 5 that the arrow points to is $\frac{1}{10}$ of the 5 to the left and 10 times the 5 to the right. The 5 in the ones place is $\frac{1}{10}$ of 50 and 10 times five tenths.
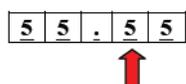
The 5 that the arrow points to is $\frac{1}{10}$ of the 5 to the left and 10 times the 5 to the right. The 5 in the tenths place is 10 times five hundredths.

This standard references expanded form of decimals with fractions included. Students should build on their work from 4th grade, where they worked with both decimals and fractions interchangeably. Expanded form is included to build upon work in MGSE.5.NBT.2 and deepen students' understanding of place value. Students build on the understanding they developed in fourth grade to read, write, and compare decimals to thousandths. They connect their prior experiences with using decimal notation for fractions and addition of fractions with denominators of 10 and 100. They use concrete models and number lines to extend this understanding to decimals to the thousandths. Models may include base ten blocks, place value charts, grids, pictures, drawings, manipulatives, technology-based, etc. They read decimals using fractional language and write decimals in fractional form, as well as in expanded notation. This investigation leads them to understanding equivalence of decimals $(0.8 = 0.80 = 0.800)$.

Comparing decimals builds on work from 4th grade.

Example:

Some equivalent forms of 0.72 are:

$^{72}/_{100}$ $^{70}/_{100} + {}^{2}/_{100}$

$^{7}/_{10} + {}^{2}/_{100}$ 0.720

$7 \times ({}^{1}/_{10}) + 2 \times ({}^{1}/_{100})$ $7 \times ({}^{1}/_{10}) + 2 \times ({}^{1}/_{100}) + 0 \times ({}^{1}/_{1000})$

$0.70 + 0.02$ $^{720}/_{1000}$

Students need to understand the size of decimal numbers and relate them to common benchmarks such as 0, 0.5 (0.50 and 0.500), and 1. Comparing tenths to tenths, hundredths to hundredths, and thousandths to thousandths is simplified if students use their understanding of fractions to compare decimals.

Examples:
Comparing 0.25 and 0.17, a student might think, "25 hundredths is more than 17 hundredths". They may also think that it is 8 hundredths more. They may write this comparison as $0.25 > 0.17$ and recognize that $0.17 < 0.25$ is another way to express this comparison.

Comparing 0.207 to 0.26, a student might think, "Both numbers have 2 tenths, so I need to compare the hundredths. The second number has 6 hundredths and the first number has no hundredths so the second number must be larger. Another student might think while writing fractions, "I know that 0.207 is 207 thousandths (and may write $\frac{207}{1000}$). 0.26 is 26 hundredths (and may write $\frac{26}{100}$) but I can also think of it as 260 thousandths ($\frac{260}{1000}$). So, 260 thousandths is more than 207 thousandths.

MGSE5.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.**

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MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place.
<u>Rounding</u>
Students should go beyond simply applying an algorithm or procedure for rounding. The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. Students should have numerous experiences using a number line to support their work with rounding.

Example:
Round 14.235 to the nearest tenth.

Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30).

14.2   14.3
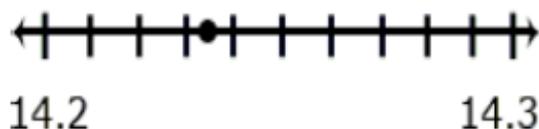
Students should use benchmark numbers to support this work. Benchmarks are convenient numbers for comparing and rounding numbers. 0, 0.5, 1, 1.5 are examples of benchmark numbers.

Example:
Which benchmark number is the best estimate of the shaded amount in the model below? Explain your thinking.

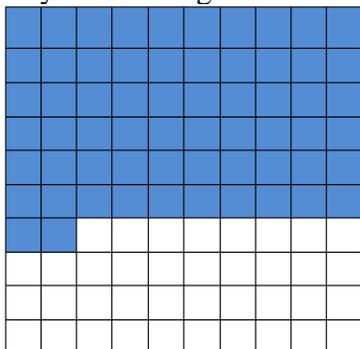**MGSE5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.**

This standard builds on the work from 4th grade where students are introduced to decimals and compare them. In5th grade, students begin adding, subtracting, multiplying, and dividing decimals. This work should focus on concrete models and pictorial representations, rather than relying solely on the algorithm. The use of symbolic notations involves having students record the answers to computations ($2.25 \times 3 = 6.75$), but this work should not be done without models or pictures. This standard includes students' reasoning and explanations of how they use models, pictures, and strategies.

This standard requires students to extend the models and strategies they developed for whole numbers in grades 1-4 to decimal values. Before students are asked to give exact answers, they should estimate answers based on their understanding of operations and the value of the numbers**. In this unit, students will only add and subtract decimals. Multiplication and division are addressed in Unit 3.**

Examples:

- **3.6 + 1.7**
A student might estimate the sum to be larger than 5 because 3.6 is more than 3½ and 1.7 is more than 1½.
- **5.4 – 0.8**
A student might estimate the answer to be a little more than 4.4 because a number less than 1 is being subtracted.

Students should be able to express that when they add decimals, they add tenths to tenths and hundredths to hundredths. So, when they are adding in a vertical format (numbers beneath each other), it is important that they write numbers with the same place value beneath each other. This understanding can be reinforced by connecting addition of decimals to their understanding of

addition of fractions. Adding fractions with denominators of 10 and 100 is a standard in fourth grade.

Example: 4 - 0.3

3 tenths subtracted from 4 wholes. One of the wholes must be divided into tenths.

The solution is 3 and $^7/_{10}$ or 3.7.

Example:

A recipe for a cake requires 1.25 cups of milk, 0.40 cups of oil, and 0.75 cups of water. How much liquid is in the mixing bowl?

Student 1: 1.25 + 0.40 + 0.75

First, I broke the numbers apart. I broke 1.25 into 1.00 + 0.20 + 0.05. I left 0.40 like it was. I broke 0.75 into 0.70 + 0.05.

I combined my two 0.05's to get 0.10. I combined 0.40 and 0.20 to get 0.60. I added the 1 whole from 1.25. I ended up with 1 whole, 6 tenths, 7 more tenths, and another 1 tenth, so the total is 2.4.
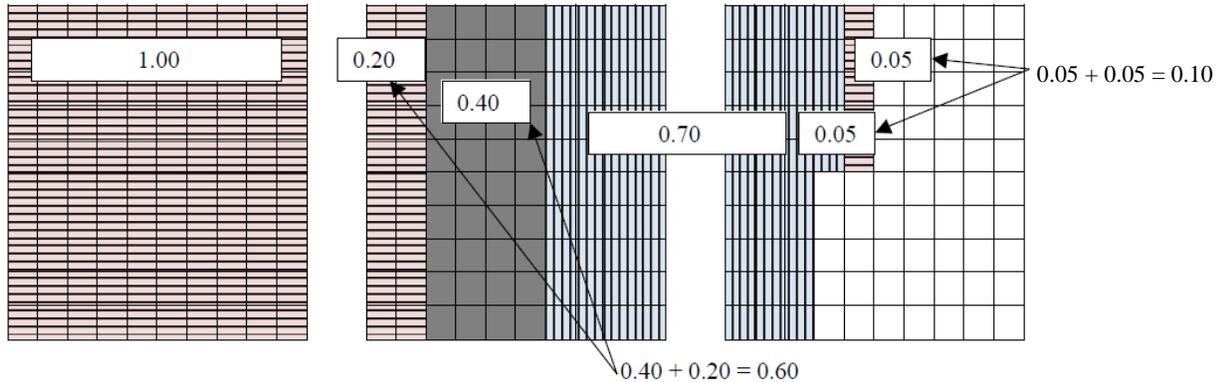
Student 2

I saw that the 0.25 in the 1.25 cups of milk and the 0.75 cups of water would combine to equal 1 whole cup. That plus the 1 whole in the 1.25 cups of milk gives me 2 whole cups. Then I added the 2 holes and the 0.40 cups of oil to get 2.40 cups.
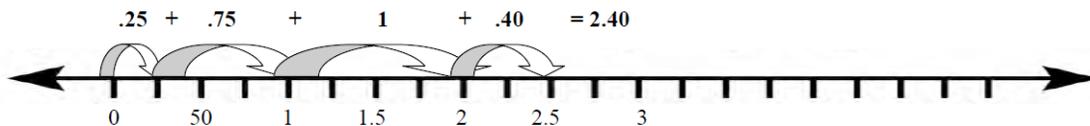
Example of Multiplication:

A gumball costs $0.22. How much do 5 gumballs cost? Estimate the total, and then calculate. Was your estimate close?
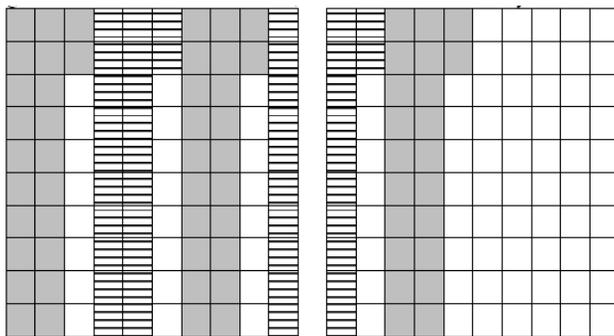
I estimate that the total cost will be a little more than a dollar. I know that 5 20's equal 100 and we have 5 22's. I have 10 whole columns shaded and 10 individual boxes shaded. The 10 columns equal 1 whole. The 10 individual boxes equal 10 hundredths or 1 tenth. My answer is $1.10.

My estimate was a little more than a dollar, and my answer was $1.10. I was really close.

For more detailed information about unpacking the content standards, unpacking a task, math routines and rituals, maintenance activities and more, please refer to the Grade Level Overview.

STANDARDS FOR MATHEMATICAL PRACTICE
This section provides examples of learning experiences for this unit that support the development of the proficiencies described in the Standards for Mathematical Practice. These proficiencies correspond to those developed through the Literacy Standards. The statements provided offer a few examples of connections between the Standards for Mathematical Practice and the Content Standards of this unit. The list is not exhaustive and will hopefully prompt further reflection and discussion.

1. **Make sense of problems and persevere in solving them.** Students solve problems by applying and extending their understanding of addition and subtraction to decimals. Students seek the meaning of a problem and look for efficient ways to solve it. They determine situations when decimal numbers should be rounded and when they need to be exact.

2. **Reason abstractly and quantitatively.** Students demonstrate abstract reasoning to connect decimal quantities to fractions, and to compare relative values of decimal numbers. Students round decimal numbers using place value concepts.

3. **Construct viable arguments and critique the reasoning of others.** Students construct arguments using concrete referents, such as objects, pictures, and drawings. They explain

calculations with decimals based upon models and rules that generate patterns. They explain their thinking to others and respond to others' thinking.

4. **Model with mathematics.** Students use base ten blocks, drawings, number lines, and equations to represent decimal place value, addition, and subtraction. They determine which models are most efficient for solving problems.

5. **Use appropriate tools strategically.** Students select and use tools such as graph paper, base ten blocks, and number lines to accurately solve problems with decimals.

6. **Attend to precision.** Students use clear and precise language, (math talk) in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to decimal place value and use decimal points correctly

7. **Look for and make use of structure.** Students use properties of operations as strategies to add and subtract with decimals. Students utilize patterns in place value and powers of ten and relate them to rules and graphical representations. Students also use structure to read, write, and compare decimals.

8. **Look for and express regularity in repeated reasoning.** Students use repeated reasoning to understand algorithms and make generalizations about patterns. Students connect place value and properties of operations to fluently add and subtract decimals.

Mathematical Practices 1 and 6 should be evident in EVERY lesson

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 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.

MGSE5.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.

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place.

MGSE5.NBT.7 Add, subtract, ~~multiply, and divide~~ decimals to hundredths, using concrete models, 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

(NOTE: Addition and subtraction are taught in this unit, but the standard is continued in Unit 3: Multiplication and Division with Decimals.)

BIG IDEAS

- Students will understand that like whole numbers, the location of a digit in decimal numbers determines the value of the digit.
- Students will understand that rounding decimals should be "sensible/reasonable" for the context of the problem.
- Students will understand that decimal numbers can be represented with models including fractions.
- Students will understand that addition and subtraction with decimals are based on the fundamental concept of adding and subtracting the numbers in like position values.
- Addition and subtraction with decimals are based on the fundamental concept of adding and subtracting the numbers in like position values---a simple extension from whole numbers.

ESSENTIAL QUESTIONS

- What is the relationship between decimals and fractions?
- How can we read, write, and represent decimal values?
- How are decimal numbers placed on a number line?
- How can rounding decimal numbers be helpful?
- How can you decide if your answer is reasonable?
- How do we compare decimals?
- How are decimals used in batting averages?
- How can estimation help me get closer to 1?
- How can I keep from going over 1?
- Why is place value important when adding whole numbers and decimal numbers?
- How does the placement of a digit affect the value of a decimal number?
- Why is place value important when subtracting whole numbers and decimal numbers?
- What strategies can I use to add and subtract decimals?
- How do you round decimals?
- How does context help me round decimals?

CONCEPTS AND SKILLS TO MAINTAIN

It is expected that students will have prior knowledge/experience related to the concepts and skills identified below. It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.

1. Number sense to the tenths place
2. Place value of whole numbers through the millions place
3. Addition and subtraction of whole numbers
4. Representations of fractions as tenths

5. Expressing fractions as decimal numbers
6. Using a number line with decimals

Fluency: Procedural fluency is defined as skill in carrying out procedures flexibly, accurately, efficiently, and appropriately. Fluent problem solving does not necessarily mean solving problems within a certain time limit, though there are reasonable limits on how long computation should take. Fluency is based on a deep understanding of quantity and number.

Deep Understanding: Teachers teach more than simply "how to get the answer" and instead support students' ability to access concepts from a number of perspectives. Therefore, students are able to see math as more than a set of mnemonics or discrete procedures. Students demonstrate deep conceptual understanding of foundational mathematics concepts by applying them to new situations, as well as writing and speaking about their understanding.

Memorization: The rapid recall of arithmetic facts or mathematical procedures. Memorization is often confused with fluency and automaticity. Fluency implies a much richer kind of mathematical knowledge and experience.

Number Sense: Students consider the context of a problem, look at the numbers in a problem, and make a decision about which strategy would be most efficient in each particular problem. Number sense is not a deep understanding of a single strategy, but rather the ability to think flexibly between a variety of strategies in context.

Fluent students:

- flexibly use a combination of deep understanding, number sense, and memorization.
- are fluent in the necessary baseline functions in mathematics so that they are able to spend their thinking and processing time unpacking problems and making meaning from them.
- are able to articulate their reasoning.
- find solutions through a number of different paths.

For more about fluency, see: http://www.youcubed.org/wp-content/uploads/2015/03/FluencyWithoutFear-2015.pdf and: https://bhi61nm2cr3mkdgk1dtaov18-wpengine.netdna-ssl.com/wp-content/uploads/nctm-timed-tests.pdf

STRATEGIES FOR TEACHING AND LEARNING

- Students should be actively engaged by developing their own understanding.
- Mathematics should be represented in as many ways as possible by using graphs, tables, pictures, symbols, and words.
- Appropriate manipulatives and technology should be used to enhance student learning.
- Students should be given opportunities to revise their work based on teacher feedback, peer feedback, and metacognition, which includes self-assessment and reflection.

- Students need to write in mathematics class to explain their thinking, talk about how they perceive topics, and justify their work to others.

Instructional Strategies (Place Value)

In Grade 5, the concept of place value is extended to include decimal values to thousandths. The strategies for Grades 3 and 4 should be drawn upon and extended for whole numbers and decimal numbers. For example, students need to continue to represent, write and state the value of numbers including decimal numbers. For students who are not able to read, write and represent multi-digit numbers, working with decimals will be challenging. Money is a good medium to compare decimals. Present contextual situations that require the comparison of the cost of two items to determine the lower or higher priced item. Students should also be able to identify how many pennies, dimes, dollars and ten dollars, etc., are in a given value. Help students make connections between the number of each type of coin and the value of each coin, and the expanded form of the number. A dime is worth 10 times as much as a penny, but only 1/10 as much as a dollar. Build on the understanding that it always takes ten of the number to the right to make the number to the left. The place value to the right is always 1/10 of the place to its left. Number cards, number cubes, spinners and other manipulatives can be used to generate decimal numbers. For example, have students roll three number cubes, then use those digits to create the largest and smallest numbers to the thousandths place. Ask students to represent the number using numerals, words, and expanded form.

Instructional Resources/Tools

National Library of Virtual Manipulatives; Base Block Decimals, Students use a Ten Frame to demonstrate decimal relationships.
http://nlvm.usu.edu/en/nav/frames_asid_264_g_2_t_1.html?from=grade_g_2.html

Instructional Strategies (Decimal Addition and Subtraction)

Students have used various models and strategies to solve problems involving addition and subtraction with whole numbers, such as use of the properties, base ten blocks and number lines. They should apply these strategies and models to decimals before using standard algorithms. With guidance from the teacher, they should understand the connection between the standard algorithm and their strategies. Students should be able to see the connections between the algorithm for adding and subtracting multi-digit whole numbers and adding and subtracting decimal numbers. As students developed efficient strategies for whole number operations, they should also develop efficient strategies with decimal operations.

Students should learn to estimate decimal computations before they compute with pencil and paper. The focus on estimation should be on the meaning of the numbers and the operations, not on how many decimal places are involved. For example, to estimate the sum of 32.84 + 4.1, the estimate would be about 37. Students should consider that 32.84 is closer to 33 and 4.1 is closer to 4. The sum of 33 and 4 is 37. Therefore, the sum of 32.84 + 4.1 should be close to 37. Estimates should be used to check answers to determine whether they're reasonable.

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.
The terms below are for teacher reference only and are not to be memorized by the students. Teachers should present these concepts to students with models and real-life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

- **decimal**
- **fraction**
- **decimal point**
- **hundredths**
- **ones**
- **place value**
- **rounding**
- **tenths**
- **thousandths**

Mathematics Glossary
http://www.corestandards.org/Math/Content/mathematics-glossary/glossary

TASKS

Scaffolding Task	Tasks that build up to the learning task.
Constructing Task	Constructing understanding through deep/rich contextualized problem-solving tasks.
Practice Task	Tasks that provide students opportunities to practice skills and concepts.
Performance Task	Tasks that may be a formative or summative assessment that checks for student understanding/misunderstanding and or progress toward the standard/learning goals at different points during a unit of instruction.
Culminating Task	Designed to require students to use several concepts learned during the unit to answer a new or unique situation. Allows students to give evidence of their own understanding toward the mastery of the standard and requires them to extend their chain of mathematical reasoning.
Intervention Table	The Intervention Table provides links to interventions specific to this unit. The interventions support students and teachers in filling foundational gaps revealed as students work through the unit. All listed interventions are from New Zealand's Numeracy Project.

Formative Assessment Lesson (FAL)	Lessons that support teachers in formative assessment which both reveal and develop students' understanding of key mathematical ideas and applications. These lessons enable teachers and students to monitor in more detail their progress towards the targets of the standards.
CTE Classroom Tasks	Designed to demonstrate how the GSE and Career and Technical Education knowledge and skills can be integrated. The tasks provide teachers with realistic applications that combine mathematics and CTE content.
3-Act Task	A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. More information along with guidelines for 3-Act Tasks may be found in the *Guide to Three-Act Tasks* on georgiastandards.org.

Task Name	Task Type/Grouping Strategy	Content Addressed	Standards	Task Description
Decimal Designs	Constructing Task/Pairs	Creating graphic representations of decimals	MGSE5.NBT.3	Draw designs and identify the parts as fractions and decimals
Making "Cents" of Decimals	Scaffolding Task/Individual/Pairs	Using decimals in money	MGSE5.NBT.3	Learning decimals using groups of 100 pennies
In the Paper	Practice Task/Pairs	Relating quantity to decimal numbers	MGSE5.NBT.3	Ordering decimals and writing/modeling numbers less than one
High Roller Revisited	Scaffolding/Pairs	Place value, comparing decimals	MGSE5.NBT.1 MGSE5.NBT.3	Creating the largest possible number with dice
Decimal Garden	Performance Task/Individual	Relating fractions to decimal numbers	MGSE5.NBT.3	Creating a garden expressed in tenths
Decimal Lineup	Practice Task/Pairs	Ordering decimals	MGSE5.NBT.3	Ordering decimals on a number line
Reasonable Rounding	Constructing Task/Pairs	Rounding decimals	MGSE5.NBT.3 MGSE5.NBT.4	Rounding decimals
Batter Up!	Performance Task/Individual	Using data/rounding	MGSE5.NBT.3 MGSE5.NBT.4	Constructing a bar graph of batting averages
Hit the Target	Practice Task/Pairs	Adding decimals	MGSE5.NBT.3	Using mental strategies to add decimals
Ten is the Winner	Practice Task/Pairs	Adding decimals	MGSE5.NBT.7	Adding decimals using dice
It All Adds Up	Constructing Task/Pairs	Adding decimals	MGSE5.NBT.7	Adding decimals
Rolling Around with Decimals	Practice Task/Pairs	Subtracting decimals	MGSE5.NBT.7	Subtracting decimals to the hundredths place
The Right Cut	Achieve CCSS-CTE Classroom Tasks	Adding, subtracting, and comparing decimals	MGSE5.NBT.7	Adding and subtracting decimals

[Competitive Eating Records](#)	3-Act Task Culminating Task	Solving problems by rounding, adding, and subtracting decimals	MGSE5.NBT.4 MGSE5.NBT.7	Wondering about competitive eating records
[Check This](#)	Culminating Task	Problem Solving and Operations with Money	MGSE5.NBT.3 MGSE5.NBT.4 MGSE5.NBT.7	Real life adding and subtracting decimals

If you need further information about this unit, visit the GaDOE website and reference the unit webinars.
https://www.georgiastandards.org/Archives/Pages/default.aspx

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The Intervention Table provides links to interventions specific to this unit. The interventions support students and teachers in filling foundational gaps revealed as students work through the unit. All listed interventions are from New Zealand's Numeracy Project.

Cluster of Standards	Name of Intervention	Snapshot of summary or Student I can statement. . .
Understand the place value system. **MGSE5.NBT.1 MGSE5.NBT.3 MGSE5.NBT.4**	Close to 1000	Recall the number of tens and hundreds in 100s and 1,000s
	Rocket Where Will I Fit?	Identify and order decimals to three places.
	Squeeze – Guess My Number	Read decimals with tenths, counts forwards and backwards in tenths, order decimals with tenths.
	Decimal Card Ordering	Read decimals with tenths, counts forwards and backwards in tenths, order decimals with tenths.
	Who Wins?	Identify and order decimals to three places.
	Sherpa (Tensing)	Multiply by 10s, 100s, 1000s, and other multiples of 10.
	Traffic Lights	Recall groupings within 100. *(This activity is written for whole numbers but is easily adaptable to working with decimals)*
	Zap Whole Numbers	Find out how many ones, tens, hundreds, and thousands are in all of a whole number.
Perform operations with multi-digit whole numbers and with decimals to hundredths. **MGSE5.NBT.7**	A Little Bit More/ A Little Bit Less	Derive multiplication facts from 2, 5- and 10-times tables.
	Bug Flip Multiplication	Derive multiplication facts from 2, 5- and 10-times tables.
	Don't Subtract - Add!	Solve subtraction problems by using reversing.
	Fun with Fives	Derive multiplication facts from 2, 5- and 10-times tables.
	Multiplication Smorgasbord	Solve multiplication and division problems by using place value and compensation strategies.
	Multiplication Madness	Find the product of 3 single-digit numbers using strategies.
	Adding with Decimal Fractions	Solve problems that involve adding decimals.
	How Can Two Decimals So Ugly Make One So Beautiful?	Solve problems that involve adding/subtracting decimals.

CONSTRUCTING TASK: Decimal Designs

Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 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.

MGSE5.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 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (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.

BACKGROUND KNOWLEDGE

Students should have had prior experiences and/or instruction with writing fractions and understanding their value. Students' understanding of decimal numbers develops in grades 4-5 as follows:

   4th Grade – Investigate the relationship between fractions and decimal numbers, limit to tenths and hundreds, order two-digit decimals
   5th Grade – Compare and order decimals to thousandths place, rounding, 4 operations with decimals

During the introduction or mini-lesson, students may need specific instruction on writing and reading fractions and decimals. For example, the 10-frame below shows 5 out of 10 shaded boxes. As a fraction, that would be written as $\frac{5}{10}$, and read, "five tenths." As a decimal, it would be written as 0.5, and read, "five tenths."
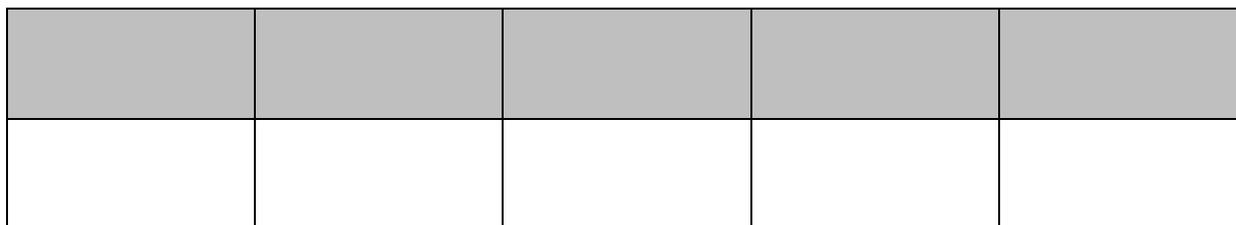
The 100 grid below shows 28 shaded squares out of 100. As a fraction, that would be $\frac{28}{100}$, and read, "twenty-eight hundredths." As a decimal, it would be written as 0.28 and read, twenty-eight hundredths."

COMMON MISCONCEPTIONS

A common misconception that students have when trying to extend their understanding of whole number place value to decimal place value is that as you move to the right of the decimal point, the number increases in value. Reinforcing the concept of powers of ten is essential for addressing this issue.

A second misconception that is directly related to comparing whole numbers is the idea that the longer the number the greater the number. With whole numbers, a 5-digit number is always greater that a 1-, 2-, 3-, or 4-digit number. However, with decimals a number with one decimal place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. One method for comparing decimals it to make all numbers have the same number of digits to the right of the decimal point by adding zeros to the number, such as 0.500, 0.120, 0.009 and 0.499. A second method is to use a place-value chart to place the numerals for comparison.

ESSENTIAL QUESTIONS

- What is the relationship between decimals and fractions?
- How can we read, write, and represent decimal values?

MATERIALS

- "Decimal Designs" student recording sheet
- "Decimal Designs, Table" student recording sheet (2 pages; copy page 2 on the back of page 1)
- Crayons or colored pencils

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this activity, students will draw designs on 10-frames and on hundredths grid and identify the shaded and unshaded parts of the grid as fractions and decimals.

In this task, students will work with occurrences out of 10 and 100, translating them into fractions and then decimals.

Comments
This lesson could be introduced by sharing shaded 10-frames and 100 grids to represent a fraction or decimal. For example, share with students some of the designs below.
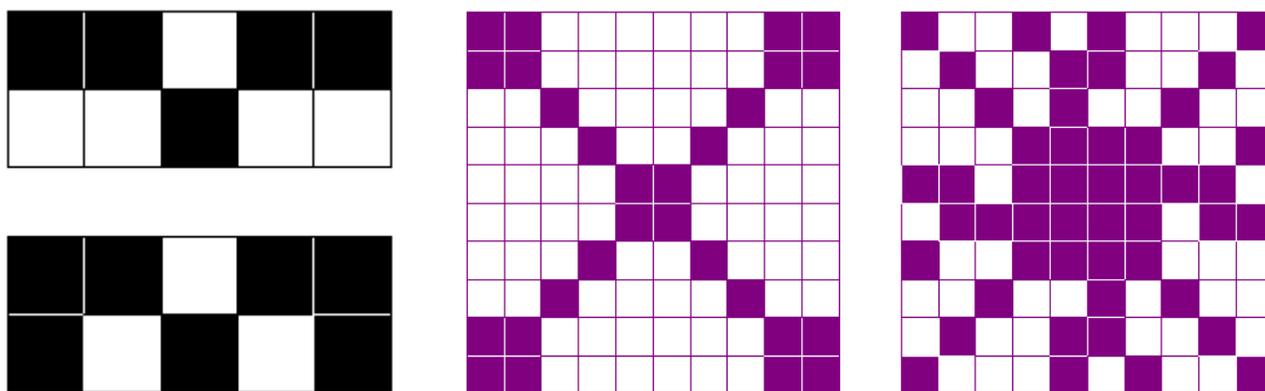
Discuss strategies students could use to count the number of shaded squares. Did they use multiplication? (e.g. Did they count the number of shaded squares in one part and multiply that number by the number of identical parts in the design? Did they count the number of unshaded

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squares and subtract from 100?) Once students have determined the decimal and fraction for their favorite design ask students to share their thinking.

Finding the number of shaded squares is one way to give students an opportunity to think about pairs that make 100. As students make their decimal designs on the 10 x 10 grid, ask them if they have more shaded or unshaded. If they have more shaded, ask them to count the number of squares that are UNSHADED and subtract that number from 100 (i.e. think about what number added to the number of unshaded squares would equal 100). This is a great opportunity to review numbers that add up to 100 and for students to explain how they know how many squares are shaded.
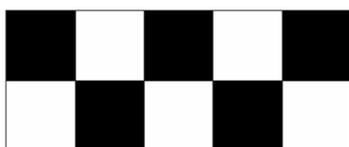
$$\frac{5}{10} \text{ or } 0.5$$
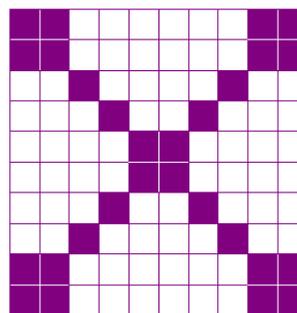
$$\frac{28}{100} \text{ or } 0.28$$

It is important for students to recognize that it doesn't matter where the fractional parts are placed. They can be scattered as they are in the diagrams above or they can be connected, as shown below.
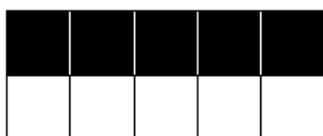
$$\frac{5}{10} \text{ or } 0.5$$
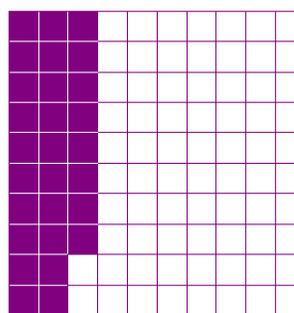
$$\frac{28}{100} \text{ or } 0.28$$

Task Directions
First, students will follow the directions below from the "Decimal Designs" student recording sheet.

- Create tenths and hundredths designs and label them accurately.

Next, students will follow the directions below for the "Decimal Designs, Table" student recording sheet.

1. Look at the example in the table. Read the following questions and discuss how you would answer them with your partner.
   - What do you notice about how "1 out of 10" is written in <u>fraction</u> form?
   - What do you notice about how "1 out of 10" is written in <u>decimal number </u>form?
   - How are they alike? How are they different?
2. Complete the table. Fill in the last three rows of the table from the "Decimals Designs" student recording sheet.

Input	Output	
	Fraction	Decimal
1 out of 10	$\frac{1}{10}$	0.1
2 out of 10		
4 out of 10		
7 out of 10		
10 out of 10		
___ out of 10		
___ out of 10		
___ out of 10		

3. Look at the example in the table. Read the following questions and discuss how you would answer them with your partner.
   - What do you notice about how "29 out of 100" is written in <u>fraction</u> form?
   - What do you notice about how "29 out of 100" is written in <u>decimal number </u>form?
   - How are they alike? How are they different?
4. Complete the table. Fill in the last three rows of the table from the "Decimals Designs" student recording sheet.

Input	Output	
	Fraction	Decimal
29 out of 10	$\frac{29}{100}$	0.29
44 out of 100		
62 out of 100		
75 out of 100		
100 out of 100		
___ out of 100		
___ out of 100		
___ out of 100		

FORMATIVE ASSESSMENT QUESTIONS

- How many squares are shaded out of 10 (or 100)?
- How many squares total are in the figure?
- What <u>fraction </u>represents the shaded part? How do you know?
- What <u>decimal</u> represents the shaded part? How do you know?
- How would you read the fraction (or decimal) you have written?

DIFFERENTIATION

Extension
- Encourage students to conduct a survey of 10 people or 100 people and report the results as a fraction and a decimal.
- Have students write the decimals in words, expanded form, and show decimal locations on a number line.

Intervention

- Some students may need to continue to represent the fractions and decimals using base 10 blocks. See "Ten is the Winner" and "Rolling Around with Decimals" in this unit for more information about using base 10 blocks to represent fractions and decimals.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/k-8-math-lessons (Scroll down to **"Place Value of Decimal Numbers to the Thousandths"**) In this Dreambox lesson, students use a scrolling number line to "zoom in" and "zoom out" to a specific range on the number line, to help students understand the relative magnitude of decimal numbers.
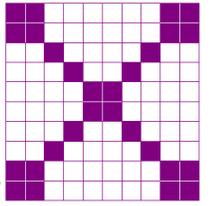
Name_____ Date_____

Decimal Designs

Create tenths and hundredths
designs and label them accurately.

____ shaded boxes out of 10

Fraction _____ Decimal Number _____

____ shaded boxes out of 10

Fraction _____ Decimal Number _____

____ shaded boxes out of 10

Fraction _____ Decimal Number_____

____ shaded boxes out of 100

Fraction _____ Decimal _____

____ shaded boxes out of 100

Fraction _____ Decimal _____

____ shaded boxes out of 100

Fraction _____ Decimal _____

Name _____ Date _____

Decimal Designs
Table

1. Look at the example in the table below. Read the following questions and discuss how you would answer them with your partner.
   - What do you notice about how "1 out of 10" is written in <u>fraction</u> form?
   - What do you notice about how "1 out of 10" is written in <u>decimal number</u> form?
   - How are they alike? How are they different?

2. Complete the table below. Fill in the last three rows of the table from the "Decimals Designs" student recording sheet.

Input	Output	
	Fraction	Decimal
1 out of 10	$\dfrac{1}{10}$	0.1
2 out of 10		
4 out of 10		
7 out of 10		
10 out of 10		
____ out of 10		
____ out of 10		
____ out of 10		

Decimal Designs
Table, Page 2

3. Look at the example in the table below. Read the following questions and discuss how you would answer them with your partner.
   - What do you notice about how "29 out of 100" is written in <u>fraction</u> form?
   - What do you notice about how "29 out of 100" is written in <u>decimal number</u> form?
   - How are they alike? How are they different?

4. Complete the table below. Fill in the last three rows of the table from the "Decimals Designs" student recording sheet.

Input	Output	
	Fraction	Decimal
29 out of 100	$\frac{29}{100}$	0.29
44 out of 100		
62 out of 100		
75 out of 100		
100 out of 100		
___ out of 100		
___ out of 100		
___ out of 100		

__SCAFFOLDING TASK:__ Making "Cents" of Decimals   **Back to Task Table**

Adapted from Santa Rosa District Schools, Florida
Approximately 1 day

__STANDARDS FOR MATHEMATICAL PRACTICE__

1. Make sense of problems and persevere in solving them.
4. Model with mathematics.
6. Attend to precision.

__STANDARDS FOR MATHEMATICAL CONTENT__

MGSE5.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.

MGSE5.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.

__BACKGROUND KNOWLEDGE__

Students should have experience representing addition and subtraction of whole numbers with models. Students should have a concept of money notation (dollar and cents symbols).

Also, students should have an understanding of how to represent addition with decimal numbers.

__COMMON MISCONCEPTIONS__

Students might compute the sum or difference of decimals by lining up the right-hand digits as they would whole number. For example, in computing the sum of 15.34 + 12.9, students will write the problem in this manner:
15.34
+12.9
16.63
To help students add and subtract decimals correctly, have them first estimate the sum or difference. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

ESSENTIAL QUESTIONS

- Can I have more than two groups and still be accurate?
- How is money represented in decimal numbers?

MATERIALS

- 100 pennies per group
- Paper and pencils
- Crayons or colored pencils
- Paper towels or mats for pennies
- Cups in which to shake pennies
- Recording sheet

GROUPING

Partner /Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students learn decimals using groups of 100 pennies. By classifying the pennies in different ways there are an unlimited number of ways to represent decimal numbers in money notation.

Comments
To introduce this task, review money notation (decimals, cents signs, and dollar signs). Review place value of decimal numbers using money notation. Model your thinking with ways to classify the pennies.

Task Directions:
Demonstrate ways to classify 100 pennies. Heads & tails would be a great example with which to begin. Dump out 100 pennies and spread them out under a document camera or overhead projector. Count how many coins are heads and how many are tails. Using correct money notation, record each amount. Have students add the two amounts to see if they total one dollar. Be sure to clarify that 100 cents = one dollar and that each penny represents 1/100 of a dollar.

Divide students into groups and give each group a cup of 100 pennies. Have them dump the pennies and record the number of heads and tails using money notation. Ask each group to find another way to classify the pennies. (Dates, Place minted, etc.) Have them record their answers on the sheet provided.

FORMATIVE ASSESSMENT QUESTIONS

- Why will your answer be different each time you dump the pennies?

- How can you check to see if you counted correctly?
- Are there more ways to classify the pennies?

.

DIFFERENTIATION

Extension
- Have students make bar graphs of the pennies, showing how they were classified.
- Let students work with dimes and explain the difference.

Intervention
- Students may need a model for money notation.
- Students may use calculators.

Intervention Table

Name _____ Date _____

Making Cents of Decimals

Heads	Tails	Total
Example: $0.47	$0.53	$1.00

Other Ways to Classify Pennies

PRACTICE TASK: In the Paper

In this activity, the focus is on writing and modeling numbers that are smaller than one as decimal fractions and decimal numbers, and ordering the decimals from smallest to largest.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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

BACKGROUND KNOWLEDGE

Students should have had prior experiences and/or instruction with writing fractions and decimals. They should have also had experiences using base 10 blocks to represent decimals. In this activity, the smallest base 10 block will represent 0.01, the rod will represent 0.1, and the flat will represent 1 whole.

When ordering the decimals, students should be encouraged to use the models they have drawn. After that, a connection could be made to a more procedural method of ordering decimals by lining up the decimal points and using place value to order them.

COMMON MISCONCEPTIONS

A common misconception that students have when trying to extend their understanding of whole number place value to decimal place value is that as you move to the right of the decimal point, the number increases in value. Reinforcing the concept of powers of ten is essential for addressing this issue.

A second misconception that is directly related to comparing whole numbers is the idea that the longer the number the greater the number. With whole numbers, a 5-digit number is always greater that a 1-, 2-, 3-, or 4-digit number. However, with decimals a number with one decimal

place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. One method for comparing decimals it to make all numbers have the same number of digits to the right of the decimal point by adding zeros to the number, such as 0.500, 0.120, 0.009 and 0.499. A second method is to use a place-value chart to place the numerals for comparison.

ESSENTIAL QUESTIONS

- What is the relationship between decimals and fractions?
- How can we read, write, and represent decimal values?
- How does the placement of a digit affect the value of a decimal number?

MATERIALS

- "In the Paper" students recording sheet
- A page from a newspaper
- Highlighters, crayons, or colored pencils

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this task, students will explore the characteristics of words in a 100-word passage of a newspaper article. They will report their findings in fraction and decimal forms and order decimals from smallest to largest.

Comments
This activity can be used as a Language Arts integration activity. The recording sheet includes some parts of speech and other types of words, but it can be modified to include many other types of words. The possibilities of calculating fractions of various words or word parts are endless.

Task Directions
Students will follow the directions below from the "In the Paper" student recording sheet.

Look through the newspaper and find an article that is interesting to you. Count the first 100 words in the article and put a box around that section with a highlighter or marker. Follow the directions in the table below to determine the fraction of the words that are verbs, nouns, articles, compound words, and number words.

Count the following types of words	Number of occurrences	Relative frequency		Represent the decimal on a hundredths grid	Order the decimal numbers from smallest to largest
		Write the number of occurrences as a fraction $\frac{\text{# of words}}{100}$	Write the number of occurrences as a decimal number		
number of verbs					
number of nouns					
number of articles					
number of compound words					
number of number words					

Here is a sample of student work from the 2012-2013 GA DOE Frameworks version of this task.
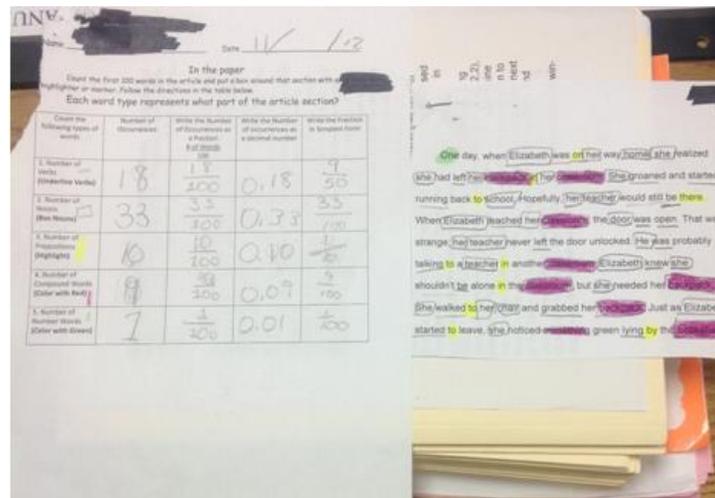
FORMATIVE ASSESSMENT QUESTIONS

- How many of the words did you find? How many total words are there in the part of the article you selected?
- How do you represent that amount as a fraction? How do you represent that amount as a decimal?
- Look at the fractions. Which fraction is the largest? How do you know? So, which decimal is the largest? How do you know?
- Can you think of another way to order the decimals?

DIFFERENTIATION

Extension
- Students using different parts of the article can compare their decimals within the same category.
- Students can decide on additional categories of words to find and report their answers as fractions and decimals.
- Students can write their decimals in words.

Intervention
- Instead of a newspaper, books written at a student's reading level can be used. Ask students to choose a book before beginning this task in class and make a copy of the page(s) so that they can write on the page(s).
- Allow students to use base 10 blocks to model the decimals.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line"**) In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.
  *Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/darts.html

Name _____ Date _____

In the Paper

Look through the newspaper and find an article that is interesting to you. Count the first 100 words in the article and put a box around that section with a highlighter or marker. Follow the directions in the table below to determine the fraction of the words that are verbs, nouns, articles, compound words, and number words.

Count the following types of words	Number of occurrences	Relative frequency		Represent the decimal on a hundredths grid	Order the decimal numbers from smallest to largest
		Write the number of occurrences as a fraction $\frac{\text{# of words}}{100}$	Write the number of occurrences as a decimal number		
number of verbs					
number of nouns					
number of articles					
number of compound words					
number of number words					

PRACTICE TASK: High Roller Revisited

In this task students will play games using place value charts to create the largest possible number by rolling a die and recording digits on the chart one at a time.

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 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.

MGSE5.NBT.3 Read, write, and compare decimals to thousandths.
   c.   Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
   d. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

BACKGROUND KNOWLEDGE

You may want to share the following chart with your students to show the multiple representations for place value, fractions, and decimals.

Thousands	Hundreds	Tens	Ones		Tenths	Hundredths	Thousandths
				•			
1,000	100	10	1	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1,000}$
				•			
1,000 wholes	100 wholes	10 wholes	1 whole	•	1 part of 1 whole that has been divided into 10 parts	1 part of 1 whole that has been divided into 100 parts	1 part of 1 whole that has been divided into 1,000 parts
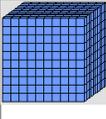
It is important to use the language of fractions in the decimal unit because when students begin learning about decimals in fourth grade, they learn that fractions that have denominators of 10 can be written in a different format as decimals. In 5th grade, this understanding of decimals is extended to additional fractions with denominators that are powers of 10. For example:

- Read 0.003 as 3 thousandths, 0.4 as 4 tenths, which is the same as they would be read using fraction notation
- Read 0.2 + 0.03 = 0.23 as "2 tenths plus 3 hundredths equals 23 hundredths"
- This is the same as 0.20 + 0.03 = 0.23, read as "20 hundredths and 3 hundredths is 23 hundredths"
- Relate 0.2 + 0.03 to $\frac{20}{100} + \frac{3}{100} = \frac{23}{100}$

COMMON MISCONCEPTIONS

A common misconception that students have when trying to extend their understanding of whole number place value to decimal place value is that as you move to the right of the decimal point, the number increases in value. Reinforcing the concept of powers of ten is essential for addressing this issue.

A second misconception that is directly related to comparing whole numbers is the idea that the longer the number, the greater the number. With whole numbers, a 5-digit number is always greater that a 1-, 2-, 3-, or 4-digit number. However, with decimals, a number with one decimal place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. One method for comparing decimals is to make all numbers have the same number of digits to the right of the decimal point by adding zeros to the number, such as 0.500, 0.120, 0.009 and 0.499. A second method is to use a place-value chart to place the numerals for comparison.

ESSENTIAL QUESTIONS

- How does the placement of a digit affect the value of a decimal number?

MATERIALS

- "High Roller Revisited" Recording Sheet for each player; choose Version 1, Version 2, or Version 3 (Smallest Difference)
- One die (6-sided, 8-sided, or 10-sided); or a deck of number cards (4 sets of 0-9)

GROUPING

Partner/Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Comments
These games should be played multiple times for students to begin to develop strategies for number placement. Students should discuss their strategies for playing the game and any problems they encountered. For example, students may roll several smaller (or larger) numbers in a row and must decide where to place them. Or, they may need to decide where to place any given number such as a 3.

Variations:
- Students could also try to make the least number by playing the game "Low Roller."
- Players could keep score of who created the greatest or least number during the game.
- Students could be required to write the word name, read the number aloud, or write the number in expanded notation.

These games can also be played with the whole class. The class can be divided into two teams and a student from each team can take turns rolling the die or drawing a card. Students from each team would complete the numbers on a chart. Alternatively, the students can play individually against each other and the teacher. The teacher can play on the white board and use a think-aloud strategy when placing digits on the board. This provides students with an opportunity to reflect on the placement of digits.

There are three versions of "High Roller Revisited." Version 1 is easiest, and Version 2 is more difficult because it includes more place values. Version 3 is called "Smallest Difference," and it is the most difficult of all three versions. In "Smallest Difference," students use subtraction to compare their decimals instead of simply determining which number is bigger.

Students will follow the directions below for the three versions of the game.

High Roller Revisited – Version 1 (easiest)

Directions:

- The object of each round is to use 4 digits to create the greatest number possible.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 3 more turns so that each player has written 4 digits.
- Once a digit is recorded, it cannot be changed.
- Compare numbers. The player with the greatest number wins the round.
- Play 5 rounds. The player who wins the most rounds wins the game.

Round	Ones	.	Tenths	Hundredths	Thousandths
1.		.			
2.		.			
3.		.			
4.		.			
5.		.			

High Roller Revisited – Version 2 (more difficult than Version 1)

Directions:

- The object of each round is to use 10 digits to create the greatest number possible.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 9 more turns so that each player has written 10 digits.
- Once a digit is recorded, it cannot be changed.
- Compare numbers. The player with the greatest number wins the round.
- Play 5 rounds. The player who wins the most rounds wins the game.

	Millions	,	Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths
1.		,				,				.			
2.		,				,				.			
3.		,				,				.			
4.		,				,				.			
5.		,				,				.			

Smallest Difference Game - High Roller Revisited, Version 3 (most difficult version)
Version 3 of this game can be played with a variety of configurations. Students can use the configuration shown below. Different variations of the game board can be created using more or fewer number of place values.

Directions:
- In each round, players must write a number sentence in which the first number is greater than the second number. Next, players will subtract the smaller number from the greater number. The object of each round is to have the smallest difference between the two numbers.
  Note: If a player ends up with a false statement (i.e. the first number is not greater than the second number), then the player needs to switch the inequality sign so that the number sentence is correct and subtract the two numbers. But that student cannot win that round.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 7 more turns so that each player has written 8 digits.
- Once a digit is recorded, it cannot be changed.
- After each player calculates the difference between his/her numbers, the player with the smallest difference wins the round.
- Play 5 rounds. The player who wins the most rounds wins the game.

Example:

| 9 | 2 | . | 3 | 1 | > | 8 | 4 | . | 7 | 6 |

92.31
- 84.76
7.55

If 7.55 is the smallest difference, then this player wins the round.

Game Board:

1. _____ _____ . _____ _____ > _____ _____ . _____ _____

2. _____ _____ . _____ _____ > _____ _____ . _____ _____

3. _____ _____ . _____ _____ > _____ _____ . _____ _____

4. _____ _____ . _____ _____ > _____ _____ . _____ _____

5. _____ _____ **.** _____ _____ > _____ _____ **.** _____ _____

FORMATIVE ASSESSMENT QUESTIONS

- What strategies are you using when deciding where to place a high number that you rolled? Low numbers?
- What factors are you considering when you decide where to place a 1?
- What factors are you considering when you decide where to place a 3 or 4 (when using a six-sided die)?
- How do you decide where to place a 6 (when using a six-sided die)?

DIFFERENTIATION

Extension
- Have students write about "winning tips" for one of the games. Encourage them to write all they can about what strategies they use when they play.

Intervention
- Prior to playing the game, give students 9 number cards at once and have them make the largest number they can. Let them practice this activity a few times before using the die and making decisions about placement one number at a time.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

   *Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/darts.html

Name _____ Date _____

High Roller Revisited
Version 1

Materials:

- 1 die (can be 6-sided, 8-sided, or 10-sided, numbered 0-9)
- Each player needs a recording sheet.

Number of Players: 2 or more

Directions:

- The object of each round is to use 4 digits to create the greatest number possible.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 3 more turns so that each player has written 4 digits.
- Once a digit is recorded, it cannot be changed.
- Compare numbers. The player with the greatest number wins the round.
- Play 5 rounds. The player who wins the most rounds wins the game.

Game 1:

Round	Ones	.	Tenths	Hundredths	Thousandths
1.		•			
2.		•			
3.		•			
4.		•			
5.		•			

Game 2:

Round	Ones	.	Tenths	Hundredths	Thousandths
1.		•			
2.		•			
3.		•			
4.		•			
5.		•			

Name _____ Date _____

High Roller Revisited
Version 2

Materials:
- 1 die (can be 6-sided, 8-sided, or 10-sided, numbered 0-9)
- Each player needs a recording sheet.

Number of Players: 2 or more

Directions:
- The object of each round is to use 10 digits to create the greatest number possible.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 9 more turns so that each player has written 10 digits.
- Once a digit is recorded, it cannot be changed.
- Compare numbers. The player with the greatest number wins the round.
- Play 5 rounds. The player who wins the most rounds wins the game.

Game 1:

	Millions	,	Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths
1.		,				,				•			
2.		,				,				•			
3.		,				,				•			
4.		,				,				•			
5.		,				,				•			

Game 2:

	Millions	,	Hundred Thousands	Ten Thousands	Thousands	,	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths
1.		,				,				•			
2.		,				,				•			
3.		,				,				•			
4.		,				,				•			
5.		,				,				•			

Name _____ Date _____

Smallest Difference Game
Version 3

Materials:
- 1 die (can be 6-sided, 8-sided, or 10-sided, numbered 0-9)
- Each player needs a recording sheet.

Number of Players: 2 or more

Directions:
- In each round, players must write a number sentence in which the first number is greater than the second number. Next, players will subtract the smaller number from the greater number. The object of each round is to have the smallest difference between the two numbers.
  Note: If a player ends up with a false statement (i.e. the first number is not greater than the second number), then the player needs to switch the inequality sign so that the number sentence is correct and subtract the two numbers. But that student cannot win that round.
- Each player takes a turn rolling the die and deciding where to record the digit on his/her place value chart.
- Players continue taking 7 more turns so that each player has written 8 digits.
- Once a digit is recorded, it cannot be changed.
- After each player calculates the difference between his/her numbers, the player with the smallest difference wins the round.
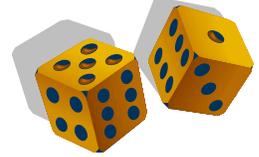- Play 5 rounds. The player who wins the most rounds wins the game.

Example:

> 9 2 . 3 1 > 8 4 . 7 6
>
> 92.31
> - 84.76
> ‾‾‾‾‾‾
> 7.55
>
> If 7.55 is the smallest difference, then this player wins the round.

Game Board:

1. _____ _____ . _____ _____ > _____ _____ . _____ _____

2. _____ _____ . _____ _____ > _____ _____ . _____ _____

3. _____ _____ . _____ _____ > _____ _____ . _____ _____

4. _____ _____ . _____ _____ > _____ _____ . _____ _____

5. _____ _____ . _____ _____ > _____ _____ . _____ _____

<u>PERFORMANCE TASK:</u> Decimal Garden

Adapted from Florida

Approximately 1 day

<u>STANDARDS FOR MATHEMATICAL PRACTICE</u>

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

<u>STANDARDS FOR MATHEMATICAL CONTENT</u>

MGSE5.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.

<u>BACKGROUND KNOWLEDGE</u>

Students may need to activate their prior knowledge of fractions and decimals. To do this, draw a large rectangle on the board. Divide it into ten equal sections. Shade inside two sections and draw stripes inside one section. Ask students how many sections in all. (10) Ask how many sections have stripes. (1/10) Show them how to write this as a fraction (1/10) and decimal (0.1) above the striped section. Next ask the students how many sections are shaded. (2/10). Write the fraction above this section. Ask them how to write it as a decimal. (0.2) Write the decimal above this section beside the fraction. Ask how many sections do not contain stripes or shading. (7/10) Write the answer as a fraction and decimal.

<u>COMMON MISCONCEPTIONS</u>
A common misconception that students have when trying to extend their understanding of whole number place value to decimal place value is that as you move to the right of the decimal point, the number increases in value. Reinforcing the concept of powers of ten is essential for addressing this issue.
A second misconception that is directly related to comparing whole numbers is the idea that the longer the number, the greater the number. With whole numbers, a 5-digit number is always

greater that a 1-, 2-, 3-, or 4-digit number. However, with decimals a number with one decimal place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. One method for comparing decimals it to make all numbers have the same number of digits to the right of the decimal point by adding zeros to the number, such as 0.500, 0.120, 0.009 and 0.499. A second method is to use a place-value chart to place the numerals for comparison.

ESSENTIAL QUESTIONS

- How does the placement of a digit affect the value of a decimal number?

MATERIALS

- "Decimal Garden" task sheet
- Grid paper or graph paper
- Unifix cubes
- crayons, colored pencils, or markers

GROUPING

Individual Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this task, students will create a garden of vegetables in which each vegetable can be expressed in tenths. Students will determine the fraction and decimal number represented by each type of vegetable. Then students will create their own flower garden in which each flower color can be expressed in hundredths. They will identify the fraction and decimal number represented by each flower color.

Comments
This task can be introduced by showing the class a dime and asking how many pennies it takes to equal one dime. (10) What fraction of a dime is a penny? (1/10) Review how to write it as a decimal. (0.1)

Task Directions
Students will follow the directions below from the "Decimal Garden" task sheet.

Decimal Gardens: Flower Garden
1. Use 10 unifix cubes to make a design for a vegetable garden. For example, use red for tomatoes, yellow for corn, and green for green beans
2. Record your unifix cube vegetable garden by coloring the grid below to match the colors of your unifix cubes.

3. Use the table below to record each vegetable in your garden and its color.
4. Determine each vegetable's fractional part of the whole garden. Record that fraction and the corresponding decimal.

Color	Vegetable	Fraction	Decimal Number

Decimal Gardens: Flower Garden

5. Next, design a 10 x 10 flower garden on graph paper using a different color to represent each type of flower in the garden. You may use as many different colors as you like to represent different types of flowers.
6. Make a table like the one above to record each type of flower. Be sure you record each flower color with a fraction and a decimal number.
7. Write a number sentence comparing 2 flower types of flowers. Use >, < or =.
8. Be ready to display and explain your decimal gardens.

FORMATIVE ASSESSMENT QUESITONS

- Which vegetable section of your garden is the largest? Smallest? How do you know?
- How are these numbers (fraction, decimal number) alike? Different?
- How will your fractions change when you change from a 10-frame to a 10 x 10 grid?
- Which is larger, 0.1 or 0.01? How do you know?

DIFFERENTIATION

Extension
- Ask students to write a fraction/decimal number to represent a combination of 2 vegetables.
- Ask students to write a decimal that represents 3 flower colors.

Intervention
- When working on the "Decimal Garden" student recording sheet, allow students to work on the same design with a partner or in a small group.

Intervention Table

Name _____ Date _____

Decimal Gardens: Vegetable Garden

1. Use 10 unifix cubes to make a design for a vegetable garden. For example, use red for tomatoes, yellow for corn, and green for green beans
2. Record your unifix cube vegetable garden by coloring the grid below to match the colors of your unifix cubes.

3. Use the table below to record each vegetable in your garden and its color.
4. Determine each vegetable's fractional part of the whole garden. Record that fraction and the corresponding decimal.

Color	Vegetable	Fraction	Decimal Number

Decimal Gardens: Flower Garden

5. Next, design a 10 x 10 flower garden on graph paper using a different color to represent each type of flower in the garden. You may use as many different colors as you like to represent different types of flowers.
6. Make a table like the one above to record each type of flower. Be sure you record each flower color with a fraction and a decimal number.
7. Write a number sentence comparing 2 flower types of flowers. Use >, < or =.
8. Be ready to display and explain your decimal gardens.

PRACTICE TASK: Decimal Line-up

Back to Task Table

Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.3 Read, write, and compare decimals to thousandths.
- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
- Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons

BACKGROUND KNOWLEDGE

In order to do this activity, students need to be very familiar with number lines and with counting using decimal numbers. One way to give students practice with counting using decimal numbers is to provide students with adding machine tape on which they can list decimals. Give them a starting number and ask them to write the subsequent numbers, counting by hundredths (or tenths). Students can be also given an ending number, or they can continue counting until they fill a strip of adding machine tape. Experiences with counting by tenths and hundredths will help to prepare students for this task.

ESSENTIAL QUESTIONS

- How are decimal numbers placed on a number line?
- How does the placement of a digit affect the value of a decimal number?

MATERIALS

"Decimal Line-up" student recording sheet (2 pages)

GROUPING

Partner/Small Group

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students will place decimal numbers (tenths and hundredths) on a number line and order them.

Comments
To introduce this task, discuss as a large group, the structure of a number line that includes decimals. Students need to recognize that like a ruler, tick marks of different lengths and thicknesses represent different types of numbers.

One way to begin this task is to display the number line shown below:
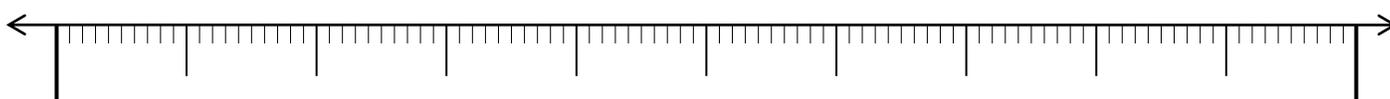
As a class, discuss where the following decimal numbers would be located on the number line: 6.5, 6.25, 6.36, 6.72, 6.9. Start by discussing which benchmark whole numbers would be required for this set of numbers to be placed on the number line. Students should recognize that the smallest number is greater than 6, so the number line would need to start at 6. The largest number is less than 7, so the number line would need to go to 7.

Once the benchmark numbers have been labeled, ask students how to place the following decimal numbers: 6.5 and 6.9. Students should be able to place these decimal numbers on the number line as shown below.

As a class, discuss where the following decimal numbers would be located on the number line:

6   **6.5**   **6.9**   **7**

Once the tenths have been labeled, work as a class to place the decimal numbers 6.25, 6.36, and 6.72. While placing these decimal numbers on the number line, use the "think aloud" strategy to explain how to place it in the correct location on the number line. Alternatively, ask students to explain where to place these decimal numbers on the number line. Once all of the given decimal numbers are placed, the number line should be similar to the one shown below.

6   **6.25**   **6.36**   **6.5**   **6.72**   **6.9**   **7**

Task Directions
Students will follow directions on the "Decimal Line-up" student recording sheet. To complete this task, students will need to correctly label one number line with decimal numbers to the tenths

and a second number line with decimal numbers to the hundredths. Finally, students will be asked to create their own decimal numbers and use their numbers to correctly label a number line.

As students work on this task, they may require help determining what benchmark numbers to place on the number lines of the "Decimal Line-up" student sheet. They may also need guidance about the meaning of the different types of tick marks that are on the number lines. The longest and heaviest tick marks indicate whole numbers, the next heaviest indicate decimal numbers to the tenths, and the shortest and lightest tick marks indicate decimal numbers to the hundredths.

FORMATIVE ASSESSMENT QUESTIONS

- What factors are you considering as you decide where to place whole numbers on your number line?
- How are you using benchmark numbers on your number line?
- What benchmark numbers are you using? How are they helpful?
- Which tick marks are used to represent decimal numbers to the tenths? Hundredths?

DIFFERENTIATION

Extension
- Give students two numbers, for example 3.2 and 3.3. Ask students to list at least 9 numbers that come between these two numbers (3.21, 3.22, 3.23, 3.24...3.29). Ask students if they think there are numbers between 3.21 and 3.22.

Intervention
- Allow students to refer to a meter stick while working on number lines. Each decimeter is one tenth of a meter and each centimeter is one hundredth of a meter.
- Students can use base 10 blocks to model decimal numbers before placing them on the number line and ordering them.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

  Games for Building Decimal Number Sense

- http://www.decimalsquares.com/dsGames/games/darts.html

Name _____ Date _____

Decimal Line-up

1. Ordering tenths.

3.7   **2.3**   **1.6**   **0.9**   **1.2**

a. Place the decimal numbers on the number line below. Add whole numbers as needed to the number line.

0   **4**

b. Next, order the decimals from least to greatest.

_____ _____ _____ _____ _____

c. Explain how you know the decimal numbers are placed and ordered correctly.

_____
_____
_____
_____
_____

2. Ordering hundredths.

2.53   **2.19**   **2.46**   **2.02**   **2.85**

a. Place the decimal numbers on the number line below. Add benchmark numbers as needed to the number line.

2   **3**

b.   Next, order the decimals from least to greatest.

_____   _____   _____   _____   _____
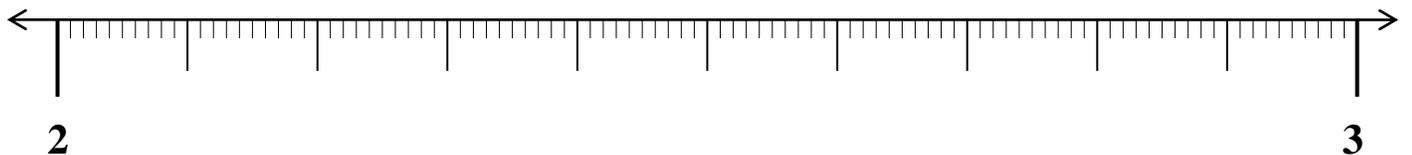
c.   Explain how you know the decimal numbers are placed and ordered correctly.

_____

_____

_____

_____

_____

3.   Ordering decimals.

a.   Write five decimals that you will be able to place on the number line below.
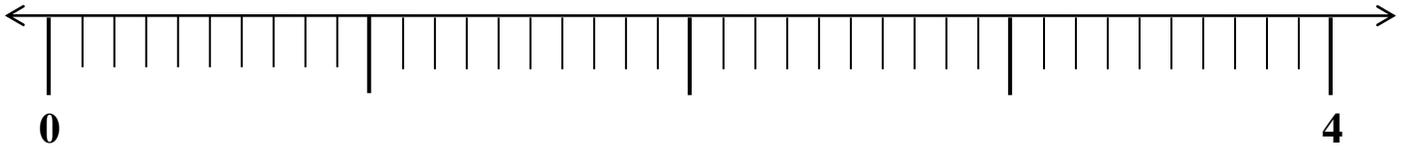
_____   _____   _____   _____   _____

b.   Next, place the decimal numbers on the number line below. Add benchmark numbers as needed to the number line.
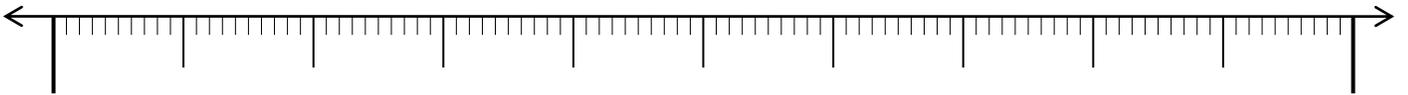
c.   Order the decimals from least to greatest.

_____   _____   _____   _____   _____

d.   Explain how you know the decimal numbers are placed and ordered correctly.

_____

_____

_____

_____

_____

CONSTRUCTING TASK: Reasonable Rounding   **Back to Task Table**

Adapted from the numeracy project www.nzmaths.co.nz
Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place

BACKGROUND KNOWLEDGE

Students should be familiar with showing the placement of decimals on number lines. They should know place value to the thousandths place and be able to determine relative values of decimal numbers.

ESSENTIAL QUESTIONS

- How can rounding decimal numbers be helpful?
- In what situation(s) would you not want to round decimals?

MATERIALS

- Reasonable Rounding sheet
- Pencils

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this task, students will investigate situations where rounding is appropriate, and some situations where rounding would not provide the degree of accuracy needed. Students will also decide when a number has been rounded correctly.

Comments

Many times, students simply round numbers as requested, but it is more important for them to understand the usefulness of rounding in real-life situations. Math should be viewed in context and related to the lives of students.

Task Directions

Students will read the directions on the task sheet and work with partners to determine rounding for appropriate situations.

FORMATIVE ASSESSMENT QUESITONS

- Is this a sensible answer?
- Would it be reasonable to round the number in this situation?
- Why would a more accurate answer be appropriate?
- How do you know your answer is reasonable?

DIFFERENTIATION

Extension

- Students may develop their own rules for rounding and apply them to different situations to see if their rule works consistently.
- Some students may be able to devise more scenarios for using rounding.

Intervention

- Prepare a list of four or five decimal numbers that students might have difficulty putting in order. They should all be between the same two consecutive whole numbers.
- Have students first predict the order of the numbers, from least to most.
- Next, have them place each number on a number line with 100 subdivisions (see below)

Intervention Table
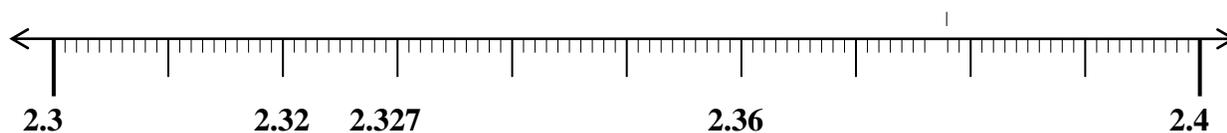
TECHNOLOGY CONNECTIONS

- http://www.decimalsquares.com/dsGames/games/darts.html A game that allows students to practice benchmarking with decimals and exploring decimal density.
- https://www.conceptuamath.com/app/tool/place-value-number-line Virtual tool from Conceptua that allows students to flexibly place decimals on a number line.
- http://www.oswego.org/ocsd-web/games/Estimate/estimate.html (Stages 5-8 allow the user to estimate the location of decimals to tenths/hundredths on an empty number line)

Name _____Date _____

REASONABLE ROUNDING

Sometimes we need to round decimal numbers when a close whole number is all that is needed to give good information. One example of this is in newspaper headlines. Headlines should be short and give summary information so that readers can quickly scan the information to learn the most important points. The U.S. government reported spending $33,883,641.31 in the 2009-2010 financial year. Discuss how to put this number into a newspaper headline. A sensible answer is "Government Spends $34 Million Last Year. Notice the following number line:

33,000,000   34,000,000
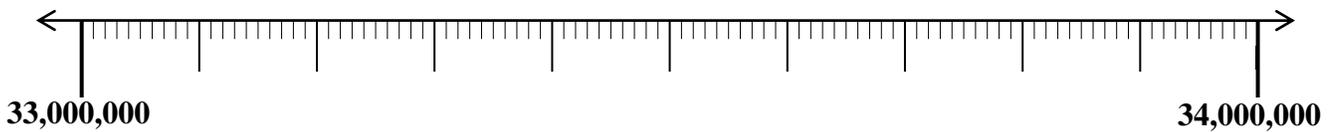
Where would 33,883,641.31 fall on this number line?

1. Round these numbers suitably for use in newspaper headlines.

Quality Stores Make a Profit of $3,493,631.29

_____

The Governor was Paid $251,419.91 Last Year

_____

Scientist Estimates There are 56,409.123 Possums in the United States

_____

Cost of Producing Cheese Drops to 81.8 Cents per Pound Due to Improved Efficiency at the Cheese Factory

_____

A Milk Factory Reports It Brought 27,309,604 Gallons of Milk from Farmers Last Year

_____

2. Mr. Brown rounded 14.486 to the nearest whole number by rounding 14.486 to 14.49 by the "over 5" rule. Then he rounded 14.49 to 14.5 by the same rule. Then he rounded 14.5 to 15 by the rule. Unfortunately, this is wrong. Why is his answer wrong? How can using the "over 5" rule be misleading in some cases? Using a number line, show why his answer is wrong. Explain your thinking.

_____

_____

_____

_____

_____

_____

_____
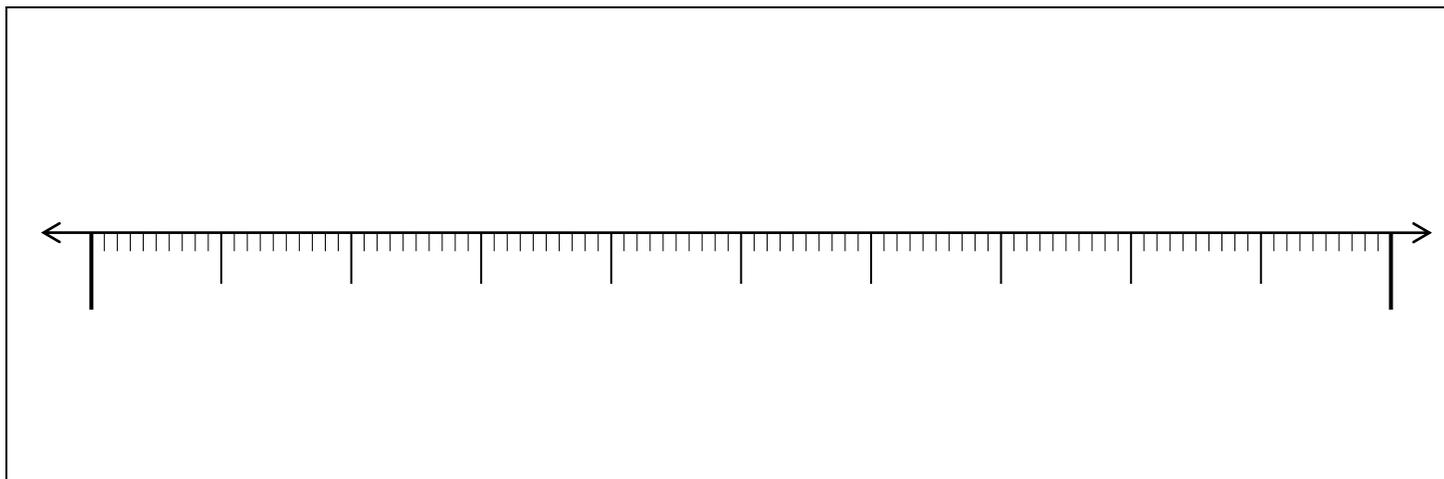
PERFORMANCE TASK: Batter Up!

Adapted from Florida
Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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.

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place

BACKGROUND KNOWLEDGE

   Students should be familiar with constructing bar graphs from raw data. They may need to review the vocabulary associated with graphs.

ESSENTIAL QUESTIONS

- How do we compare decimals?
- How are decimals used in batting averages?

MATERIALS

- "Batter Up!" Recording Sheet
- Centimeter graph paper
- crayons, colored pencils, or markers

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

In this task students will construct a bar graph showing the batting averages of Atlanta Braves baseball players and answer questions about the data. They will order, compare, and round the decimals in the problem.

Comments
This task can be introduced with an explanation of batting averages and how they are computed (# of hits per 1,000 at-bats). They can construct the graph using graph paper with each square representing a portion of the decimal number. Students should be allowed to experiment and decide the appropriate interval.

Task Directions
Students will follow the directions below from "Batter Up!" student recording sheet.

Using the data in the table, construct a bar graph showing the batting averages of these National League batting champions. You will need graph paper and markers, colored pencils, or crayons. Using the data and the graph, answer the questions on the recording sheet. Then students will follow the directions below from the "Batter Up!" student recording sheet.

FORMATIVE ASSESSMENT QUESTIONS

- How will you choose a scale for the graph? Is your scale reasonable?
- How will you show what each bar represents?
- How does rounding to hundredths affect the averages?

DIFFERENTIATION

Extension
- Explain why rounding batting averages would not be a good idea for the players.
- What might happen if a player missed half of the season with an injury? How would it affect his batting average?

Intervention
- Allow students to work with a partner.
- Allow students to use a calculator.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.decimalsquares.com/dsGames/games/darts.html A game that allows students to practice benchmarking with decimals and exploring decimal density.
- https://www.conceptuamath.com/app/tool/place-value-number-line Virtual tool from Conceptua that allows students to flexibly place decimals on a number line.

Player	Batting Average At the end of May
Justin Upton	.313
Brian McCann	.336
Freddie Freeman	.335
Chris Johnson	.319
Jason Heyward	.330

Name _____ Date_____

Batter Up!

1. How much better is the batting average of the player with the highest average than that of the player with the lowest average? How do you know?

2. If rounded to the nearest hundredth, which players will have the same average?

3. Write two generalizations you can make, based on the data.

PRACTICE TASK: Hit the Target

Approximately 1 day   *Adapted from Indiana Math*

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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.

BACKGROUND KNOWLEDGE

Students should be able to estimate sums and differences, using mental math. They should have a clear understanding of the value of decimal numbers, and their relative relationship to one.

ESSENTIAL QUESTIONS

- How can estimation help me get closer to 1?
- How can I keep from going over 1?

MATERIALS

- Decimals master
- Card stock
- Calculators

GROUPING

Groups of 3 or 4

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students will participate in a game using mental strategies to add decimal numbers.

Comments
Students will draw cards with decimal numbers and use mental math to see who can get closest to the whole number 1 without going over. Explain to students that they should draw cards from the stack and add the numbers mentally; stopping when they think the total is close to one. Have them check their work with a calculator to determine which one is closest to one without going over. They may need to subtract to determine the closest answer. Each time a student is closest to the target, he/she earns a point. They may total their points at the end of a session to determine an overall winner, or they may continue the game for several sessions. Each student should write in their math journal about the strategy they used for determining the number closest to one.

Task Directions

Model with the Class, using think-alouds.
1. Tell students they will be using mental strategies to "Hit the Target".
2. Explain to student that they will be trying to hit the target of 1 by mentally adding decimal numbers to get as close to 1 as possible without going over.
3. Demonstrate with the whole class by calling out 2 decimal numbers and having them mentally add the numbers. Use the numbers 0.12 and 0.78.
4. Have them decide whether to ask for another number, or to stop.
5. If they ask for another number give them 0.04, then 0.23.
6. Show students the totals after each addition and ask them to explain how they could determine they were close enough to 1.

Group Task
1. Divide the class into groups of 3 or 4 students.
2. Have one student in each group act as leader. Direct this student to use the calculator to check answers.
3. Have each student in the group draw 2 cards and add them mentally.
4. Let each student decide whether to draw additional cards or stop.
5. When all students have stopped, have the leader use a calculator to determine which student is closest to 1.
6. Each time a student is closest to the target, he or she earns a point.
7. Have students change roles at the end of each round.

FORMATIVE ASSESSMENT QUESITONS

- How did you decide when you were close enough to 1?
- What method did you use to estimate your answer?
- Is it easier to estimate tenths or hundredths? Why?
- Did anyone use a different strategy?
- What operation did you use to help you?

DIFFERENTIATION

Extension
- Change the target number to a whole number other than 1.
- Use a decimal number greater than 1

Intervention
- For students who need additional practice in building better estimation skills, begin the game with only tenths cards. Then add hundredths and thousandths gradually.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

*Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/laserbeam.html
- http://www.decimalsquares.com/dsGames/games/tugowar.html
- http://www.decimalsquares.com/dsGames/games/darts.html

• Decimals Cards
(Copy on Card Stock)

0.006	**0.25**	**0.09**	**0.008**	**0.036**
0.008	**0.075**	**0.005**	**0.085**	**0.12**
0.043	**0.029**	**0.32**	**0.019**	**0.082**
0.006	**0.046**	**0.46**	**0.075**	**0.001**
0.04	**0.063**	**0.053**	**0.07**	**0.073**
0.19	**0.003**	**0.058**	**0.048**	**0.8**

PRACTICE TASK: Ten is the Winner

Adapted from *Investigations in Number, Data, and Space: How Many Tens? How Many Ones? Addition, Subtraction, and the Number System.*
Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.7 Add, subtract, ~~multiply, and divide~~ decimals to hundredths, using concrete mod
els 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. (NOTE: Addition and subtraction are taught in this unit, but the
standard is continued in Unit 3: Multiplication and Division with Decimals.)

BACKGROUND KNOWLEDGE

Before students play this game, they should have developed an understanding of how decimal
numbers can be represented. Using base ten blocks, decimal numbers can be represented by
using the "flat" to represent one whole. One tenth of the whole is the "long." Finally, the "small
square" (or "small cube" depending on the materials being used) can be used to represent a
hundredth because there are one hundred of them in the "flat." The blocks below represent 2.47
or two and forty-seven hundredths

ESSENTIAL QUESTIONS

*   Why is place value important when adding whole numbers and decimal numbers?
*   How does the placement of a digit affect the value of a decimal number?

MATERIALS

*   "Ten is the Winner, Directions" student sheet (one per group)

- "Ten is the Winner, Recording Sheet" student recording sheet (one per pair)
- Dice (one die per group)

GROUPING

Partner/Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students learn a game that allows them to practice adding and comparing decimal numbers. The focus of this game is on adding decimal numbers to the hundredths place.

Comments
To introduce and teach this game, display the game recording sheet. Play the game with the class against the teacher or one side of the room against the other. You can play an abbreviated game if students quickly understand what to do.

While students are playing the game, be sure decimal materials (base ten blocks, money, etc.) are available to students who wish to use them.

One way student understanding can be quickly assessed is by asking students to write a few sentences to explain why place value is important in this game and/or the strategies they used while playing the game. Student recording sheets can also be used to assess student understanding of addition with decimal numbers.

One variation for this game is to have students use estimation for the running total, rounding off to the nearest 1 and then adding to find the running total.
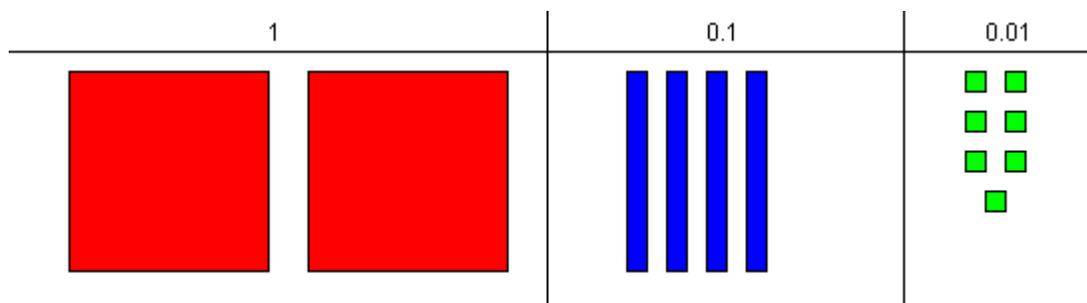
Also, students should have an understanding of how to represent addition with decimal numbers. Below are some sample addition problems from the National Library of Virtual Manipulatives at the following web address.
http://nlvm.usu.edu/en/nav/frames_asid_264_g_2_t_1.html?from=category_g_2_t_1.html

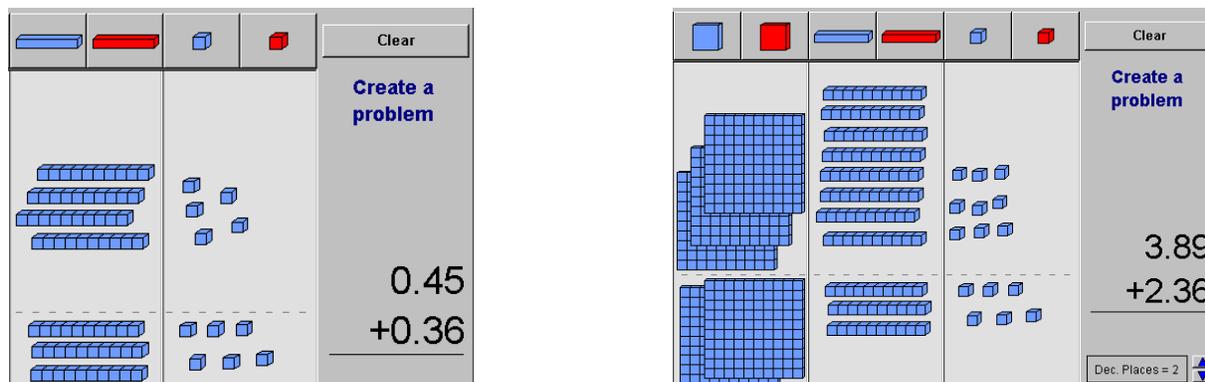Students should be able to represent addition of decimal numbers, including regrouping. The problems above would require regrouping ten hundredths to create one tenth and regrouping ten tenths to create one whole. It is important for students to recognize that they need to line up decimal place values in order to add correctly. If some students recognize that the decimal points are always lined up as well, that is fine, but what is important is that students recognize each place value needs to be lined up.

Another strategy that is often helpful for students to use to find the sum of two numbers is an open number line. The problem $3.89 + 2.36 =$ can be solved using an open number line as shown below.

Start by placing 3.89 on the number line. Count on 2.36 from 3.89 to determine the sum of the two decimal numbers. The sum is the ending number on the number line, in this case $3.89 + 2.36 = 6.25$.
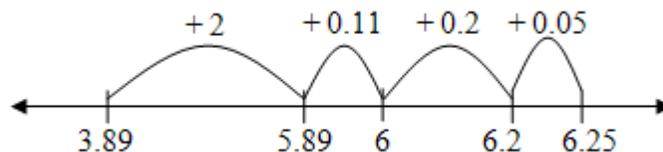
Task Directions
Students will follow the directions below from the "Ten is the Winner, Game Directions" student sheet.

Players: 2-3
Materials:
- One die
- "Ten is the Winner, Directions" student sheet (one per group)
- "Ten is the Winner" student recording sheet (one per player)
- Pencil

Directions:
The object of the game is to be the closest to 10 without going over after fifteen turns. Players will need to keep a running total on their paper as they play the game.

1. Decide which player will go first.
2. Player 1 says "tenths place" or "ones place" and then rolls the die.
3. The number that is rolled is written in the place named before rolling the die. A zero is written in the remaining place.
4. Player 2 says "tenths place" or "ones place" and then rolls the die. Player 2 then records the number rolled in the place called.
5. Players continue to take turns, recording the digits rolled, until both players have taken fifteen turns.
6. Each player adds up their numbers to find their total. The player closest to ten without going over is the winner.

FORMATIVE ASSESSMENT QUESITONS

- How do you decide whether to roll a digit for the hundredths place, tenths place, or the ones place?
- How does a digit in the hundredths place (or tenths place, or ones place) affect the value of the number?
- Why is place value important when adding decimal numbers?
- What strategy (strategies) are you using to win the game? How are your strategies working?
- What strategy (strategies) are you using to add the decimal numbers?

DIFFERENTIATION

Extension

- Change the target number, adding whole number places. Ask students to determine how many rounds should be played.
- Use a deca-die (0-9) instead of regular six-sided die. Have children predict before playing whether or not the change in die or number of places will make their goal easier or more difficult to achieve.

Intervention

- Give students "Ten is the Winner, Game Directions, Version 2" student sheet and "Ten is the Winner, Recording Sheet, Version 2." This version uses decimals to the tenths place. Once students have an understanding of addition to the tenths place, introduce the first version of the game which requires addition to the hundredths place.
- Allow students to play the game with money. Students can represent the value they chose for each roll in money. They can then find their running total by counting the amount of money they have collected.

[Intervention Table](#)

Name _____ Date _____

Ten is the Winner
Game Directions

Players: 2-3

Materials:
- One die
- "Ten is the Winner, Directions" student sheet (one per group)
- "Ten is the Winner" student recording sheet (one per player)
- Pencil

Directions:

The object of the game is to be the closest to 10 without going over after fifteen turns. Players will need to keep a running total on their paper as they play the game.

1. Decide which player will go first.
2. Player 1 says hundredths place, tenths place, or ones place, and then rolls the die.
3. The number that is rolled is written in the place named before rolling the die. A zero is written in the remaining place.
4. Player 2 says hundredths place, tenths place, or ones place, and then rolls the die. Player 2 then records the number rolled in the place called.
5. Players continue to take turns, recording the digits rolled, until both players have taken fifteen turns.
6. Each player adds up their numbers to find their total. The player closest to ten without going over is the winner.

Ten is the Winner
Recording Sheet

Player #_____ _____   Computation Space

Ten is the Winner				
Ones Place	•	Tenths Place	Hundredths Place	Running Total
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			

Name _____ Date _____

Ten is the Winner
Game Directions, Version 2

Players: 2-3

Materials:
- One die
- "Ten is the Winner, Directions" student sheet (one per group)
- "Ten is the Winner" student recording sheet (one per player)
- Pencil

Directions:

The object of the game is to be the closest to 10 without going over after ten turns. Players will need to keep a running total on their paper as they play the game.

1. Decide which player will go first.
2. Player 1 says hundredths place, tenths place, or ones place, and then rolls the die.
3. The number that is rolled is written in the place named before rolling the die. A zero is written in the remaining place.
4. Player 2 says hundredths place, tenths place, or ones place, and then rolls the die. Player 2 then records the number rolled in the place called.
5. Players continue to take turns, recording the digits rolled, until both players have taken ten turns.
6. Each player adds up their numbers to find their total. The player closest to ten without going over is the winner.

Ten is the Winner
Recording Sheet, Version 2

Player #____ _____   Computation Space

| Ten is the Winner | | | |
Ones Place	•	Tenths Place	Running Total
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		
	•		

CONSTRUCTING TASK: It All Adds Up

Back to Task Table

Adapted from: Good Questions for Math Teaching
Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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.

BACKGROUND KNOWLEDGE

Students should have had prior experiences identifying and representing decimal numbers. Students should be able to read decimal numbers and understand the value of the whole number compared to tenths and hundredths. Students should have some concept of divisibility and know that even numbers can be divided by two. Also, students should have an understanding of how to represent addition with decimal numbers.

COMMON MISCONCEPTIONS

Students might compute the sum of decimals by lining up the right-hand digits as they would whole number. For example, in computing the sum of 15.34 + 12.9, students will write the problem in this manner:
15.34
+12.9
16.63
To help students add decimals correctly, have them first estimate the sum. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

ESSENTIAL QUESTIONS

- How do we determine which decimal number to add?
- How can I test my pattern to see if it works?
- Could there be more than one correct answer? Why?

GROUPING

Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The focus of this activity is addition of decimals and incorporating the Standards for Mathematical Practice throughout the task

Students complete a task that requires them to think about patterns of numbers in addition of decimals. There is more than one correct answer which may lead them to the realization of multiple combinations of numbers can result in the same sum.

Comments
To introduce this task, read the scenario on the recording sheet and clarify vocabulary. Don't spend too much time in introducing the task but allow students to struggle and seek their own strategies for accomplishing the task. They may work with a partner and look for strategies together. Ask questions that will prompt deeper thinking and move them in the right direction.
As students finish, have them present their findings to the class. As they notice that they may have different answers which are all correct, ask them these questions?
- How can all of these answers be correct?
- Can you find any more correct answers?
- Do you notice a pattern?

Materials:
- "It All Adds Up" task sheet
- Pencil
- Base Ten models
- Number Line

Task Directions:
Students will read the directions for the activity and decide on the best way to figure out the answer.

It All Adds Up: See if you can solve the mathematician's problem. Use pictures, words, and numbers to represent your thinking.

A mathematician wrote down a sequence of numbers, adding the same number to each to get the next number. The first number was 2.57 and the last number was 3.61. What could the numbers in between be? *NOTE FOR TEACHERS: Correct answers may be found by adding 0.52, 0.26, 0.13, 0.02, 0.04, or 0.08 to the number each time.*

FORMATIVE ASSESSMENT QUESTIONS

Possible questions include:
- What is the difference between the two numbers?
- What do you notice about the difference?
- How would finding the difference help you solve this problem?
- How would changing 2.57 to 2.61 make this an easier problem?
- How would thinking about this problem as if it were money help you to find a solution?

.

As students finish, have them present their findings to the class. As they notice that they may have different answers which are all correct, ask them these questions?
- How can all of these answers be correct?
- Can you find any more correct answers?
- Do you notice a pattern?

DIFFERENTIATION

Extension
Ask students to write another problem using different starting and ending numbers. Ask them what they need to do to be sure they can find multiple correct answers?

Interventions
- Scaffold with an easier problem like going from 2.5 to 3.5 or from 2 to 3.
- Change amounts to money
- Use base ten blocks as counters
- Provide a partially filled in number line
- Students may use calculators.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

*Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/laserbeam.html
- http://www.decimalsquares.com/dsGames/games/tugowar.html
- http://www.decimalsquares.com/dsGames/games/darts.html

Name:_____Date_____

It All Adds Up

Directions: See if you can solve the mathematician's problem. Use pictures, words, and numbers to represent your thinking.

A mathematician wrote down a sequence of numbers, adding the same number to each to get the next number. The first number was 2.57 and the last number was 3.61. What could the numbers in between be? Explain how you got your answers.

PRACTICE TASK: Rolling Around with Decimals

Back to Task Table

Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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 subtr action; relate the strategy to a written method and explain the reasoning used.

BACKGROUND KNOWLEDGE

Students should have had prior experiences identifying and representing decimal numbers. Students should be able to read decimal numbers and understand the value of the whole number compared to tenths and hundredths.

Also, students should have an understanding of how to represent subtraction with decimal numbers. Below are some sample subtraction problems from the National Library of Virtual Manipulatives at the following web address. http://nlvm.usu.edu/en/nav/frames_asid_264_g_2_t_1.html?from=category_g_2_t_1.html

Common Misconceptions
Students might compute the sum or difference of decimals by lining up the right-hand digits as they would whole number. For example, in computing the difference of 13.96- 2.9, students will write the problem in this manner:

13.96
-2.9
13.67

Students may have also developed an overgeneralization of the commutative and associative properties which will lead them to incorrectly subtract decimals without regrouping. For example, in computing the difference of 13.76-1.97, students will subtract in this manner:

13.76
-1.97
12.21

To help students add and subtract decimals correctly, have them first estimate the sum or difference. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

ESSENTIAL QUESTIONS

- Why is place value important when subtracting whole numbers and decimal numbers?
- How do we subtract decimal numbers?
- How does the placement of a digit affect the value of a decimal number?

MATERIALS

- "Rolling Around with Decimals, Game Directions" student sheet (one per group)
- "Rolling Around with Decimals, Recording Sheet" student recording sheet (one per pair)
- Dice (three dice per group, two different colors)

GROUPING

Partner/Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The focus of this game is on subtracting decimal numbers to the hundredths place, but will also provide students the opportunity to compare decimal numbers.

Students play a game that allows them to practice subtracting and comparing decimal numbers.

Comments
To introduce and teach this game, display the game recording sheet. Play the game with the class against the teacher or one side of the room against the other. You can play an abbreviated game if students quickly understand what to do.

While students are playing the game, be sure decimal materials (base ten blocks, money, etc.) are available to students who wish to use them.

One-way student understanding can be quickly assessed is by asking students to write a few sentences to explain why place value is important in this game and/or the strategies they used while playing the game. Student recording sheets can also be used to assess student understanding of addition with decimal numbers.

An alternative way to play this game is to limit it to 10 rounds. The winner can be the player with the smallest difference or the largest difference – this should be determined before the game begins. Also, "Rolling Around with Decimals" can be modified to include addition as follows:
- For addition, players keep a running total of rolls. The winner is the player with the highest sum after 10 rounds.

http://nlvm.usu.edu/en/nav/frames_asid_264_g_2_t_1.html?from=category_g_2_t_1.html
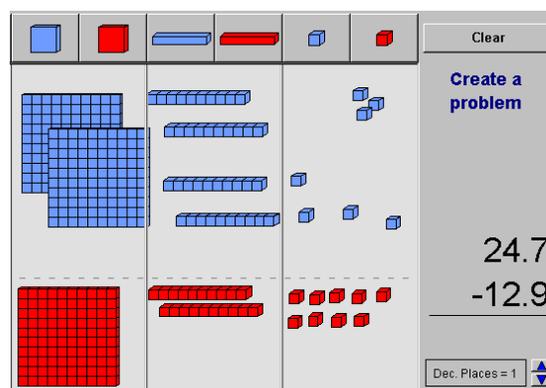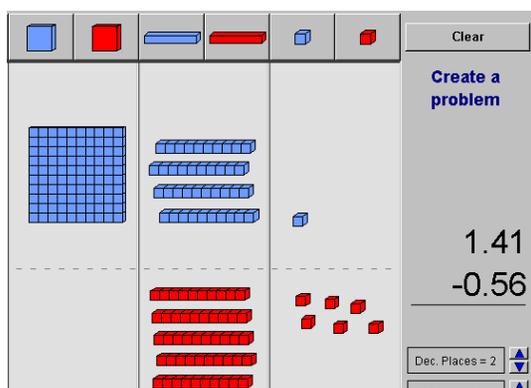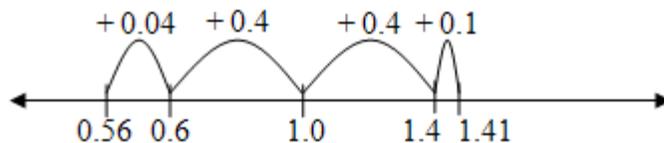
Students should be able to represent subtraction of decimal numbers, including regrouping. Also, it is important for students to recognize that they need to line up decimal place values in order to subtract correctly. If some students recognize that the decimal points are always lined up as well, that is fine, but more importantly students must recognize that each place value needs to be lined up.

Another strategy that is often helpful for students to use to find the difference between two numbers is an open number line. Students have had many experiences counting up on a number line to subtract whole numbers. This knowledge should help them easily transition to decimal subtraction on an open number line. The problem $1.41 - 0.56 =$ __ can be solved using an open number line as shown below.

Start by placing 0.56 on the number line. Count up from 0.56 to 1.41 to determine the difference between the two decimal numbers. The difference can be found by adding $0.04 + 0.4 + 0.4 + 0.1 = 0.85$.

Task Directions
Students will follow the directions below for "Playing with Decimals, Rolling Around with Decimals, Game Directions" student sheet.

Number of Players: 2-3
Materials:
- 3 dice (1 one color, 2 another color);
- Recording Sheet (one for each pair of players)
- Pencil

Directions:
1. The one die will represent the whole number portion of the number. The other two dice will represent the decimal portion of the number.
2. Take turns with a partner rolling the number cubes.
3. With the number cubes you have rolled, create the largest decimal you can using the single color for the whole number and the additional two dice for the decimal.
4. Record your roll on the recording sheet.

5. After all players have completed their first roll, each player subtracts the decimal created from 50.
6. After each additional roll, each player will subtract the new decimal amount from the previous decimal difference.
7. The first player with zero remaining or whose roll is larger than the remaining difference is the winner.

FORMATIVE ASSESSMENT QUESTIONS

- Why is place value important when subtracting decimal numbers?
- How do you know you created the largest possible decimal?
- How would this game be different if you used all three dice to make the largest possible decimal number?
- What strategy/strategies are you using to win the game? How are your strategies working?
- What strategy (strategies) are you using to subtract the decimal numbers? How are your strategies working?

DIFFERENTIATION

Extension
- Ask students to write a story for a subtraction problem with decimals. If necessary, help students brainstorm contexts for which decimal numbers would be applicable. Allow students to trade stories with a peer to solve.

Intervention
- Allow students to play the game with money. Students can start with $50.00, make trades and subtract or count back change to determine the running totals.
- Base Ten Blocks

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.
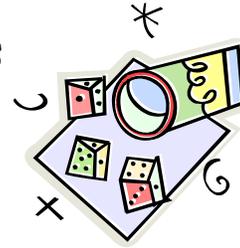
Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/laserbeam.html
- http://www.decimalsquares.com/dsGames/games/tugowar.html
- http://www.decimalsquares.com/dsGames/games/darts.html

Name _____ Date _____

Rolling Around With Decimals
Game Directions

Number of Players: 2-3

Materials:
- 3 dice (1 one color, 2 another color);
- Recording Sheet (one for each pair of players)
- Pencil

Directions:
1. The one die will represent the whole number portion of the number. The other two dice will represent the decimal portion of the number.
2. Take turns with a partner rolling the number cubes.
3. With the number cubes you have rolled, create the largest decimal you can using the single color for the whole number and the additional two dice for the decimal.
4. Record your roll on the recording sheet.
5. After all players have completed their first roll, each player subtracts the decimal created from 50.
6. After each additional roll, each player will subtract the new decimal amount from the previous decimal difference.
7. The first player with zero remaining or whose roll is larger than the remaining difference is the winner.

Example:
Player 1 has the following rolls:
   1st turn: Ones place   2
                Decimal places   1, 5
The largest possible number would be 2.51

   2nd turn: Ones place   3
                Decimal places   2, 1
The largest possible number would be 3.21

Player 1's score sheet would look as shown.

| Player 1's Record Sheet | larger

Rolling Around With Decimals

Ones Place	•	Tenths Place	Hundredths Place	50.00
2	•	5	1	47.49
3	•	2	1	44.28
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			
	•			

Rolling Around with Decimals
Recording Sheet

Player #_____   _____   Computation Space

Rolling Around With Decimals			
Ones Place	• Tenths Place	Hundredths Place	50.00
	•			
	•			
	•			
	•			
	•			
	•			
	•			
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Performance Task: The Right Cut (Jenise Sexton)

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place.

MGSE.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.

BACKGROUND KNOWLEDGE

Many times, students simply round numbers as requested, but it is more important for them to understand the usefulness of rounding in real-life situations. Math should be viewed in context and related to the lives of students.

In 4th grade, students used rulers to measure the length of various objects and figures. It may be necessary to briefly review how to properly measure a centimeter ruler.

COMMON MISCONCEPTIONS

Students might compute the sum or difference of decimals by lining up the right-hand digits as they would whole number. For example, in computing the sum of 15.34 + 12.9, students will write the problem in this manner:

```
1 5. 3 4
+    2.9
  16.63
```

To help students add and subtract decimals correctly, have them first estimate the sum or difference. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

ESSENTIAL QUESTIONS

- What strategies can I use to add and subtract decimals?
- How do you round decimals?

MATERIALS

- "The Right Cut" recording sheet
- Centimeter ruler

GROUPING

Individual or partner task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will add and subtract decimals to determine two lengths of a surgical incision. Students will also round decimals in context. Using a cm ruler, students will measure and record the measurement of each incision to the nearest centimeter.

Students must first determine the smallest incision the surgeon should make based on the average size of an infant's liver. Students will use the give or take 0.84 cm information to subtract 0.84 cm from 7.62cm to figure the smallest size of the liver. In order to determine the largest incision 0.84 cm must be added to 7.62cm.

In making sense of the task, it should be noted by the students that the rounding rule does not apply. Students should realize the incision must be larger than the liver, so each measure should be rounded up to the nearest centimeter. If students apply the rule, the smallest incision will be smaller than the liver. This is an idea you should allow your students to discover and make sense, rather than tell them.

TASK

When babies are born with scar tissue on their liver, it must be surgically removed to prevent further damage. In order to remove scar tissue on an infant's liver, a pediatric surgeon must make a large enough incision to pull the liver up and out of the abdomen without causing too much damage to the flesh. If the average infant liver length is 7.62 cm give or take 0.84 cm, what is the smallest incision the surgeon should make? What is the largest incision the surgeon should make? Explain. *(Possible solutions: smallest incision 6.8 cm or 7 cm and largest incision 8.5 cm or 9 cm. Subtracting 0.84 cm will produce an answer of 6.78 cm which would represent the smallest average size infant liver. Therefore, the smallest incision that should be made to cause the least amount of damage would be 6.8 cm or 7 cm. This incision is larger than the liver size. Adding 0.84 cm will produce an 8.46 cm so the largest incision should be 8.5 cm or 9 cm. This incision is larger than the liver.)*

Use a ruler to create the two incision sizes in centimeters on the abdomens below. Be sure to label each incision smallest and largest.

FORMATIVE ASSESSMENT QUESTIONS

- How are you going to figure out the smallest incision? Largest incision?
- What does it mean to give or take 0.84 cm?
- What strategy can you use to add and subtract decimals?
- How does the decimal rounding rule apply to this situation? How do you know?

DIFFERENTIATION

Extension
- Determine the length of the average infant liver in millimeters. In meters.
- If the length of an infant's liver is about 6.5 times smaller than the width of its abdomen, what is the width of the average infant's abdomen?

Intervention
- Instruct students to use an open number line to add and subtract the decimal amounts. Then use a closed number line to round the decimals to the correct whole number.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

Games for Building Decimal Number Sense

- http://www.decimalsquares.com/dsGames/games/laserbeam.html
- http://www.decimalsquares.com/dsGames/games/tugowar.html
- http://www.decimalsquares.com/dsGames/games/darts.html
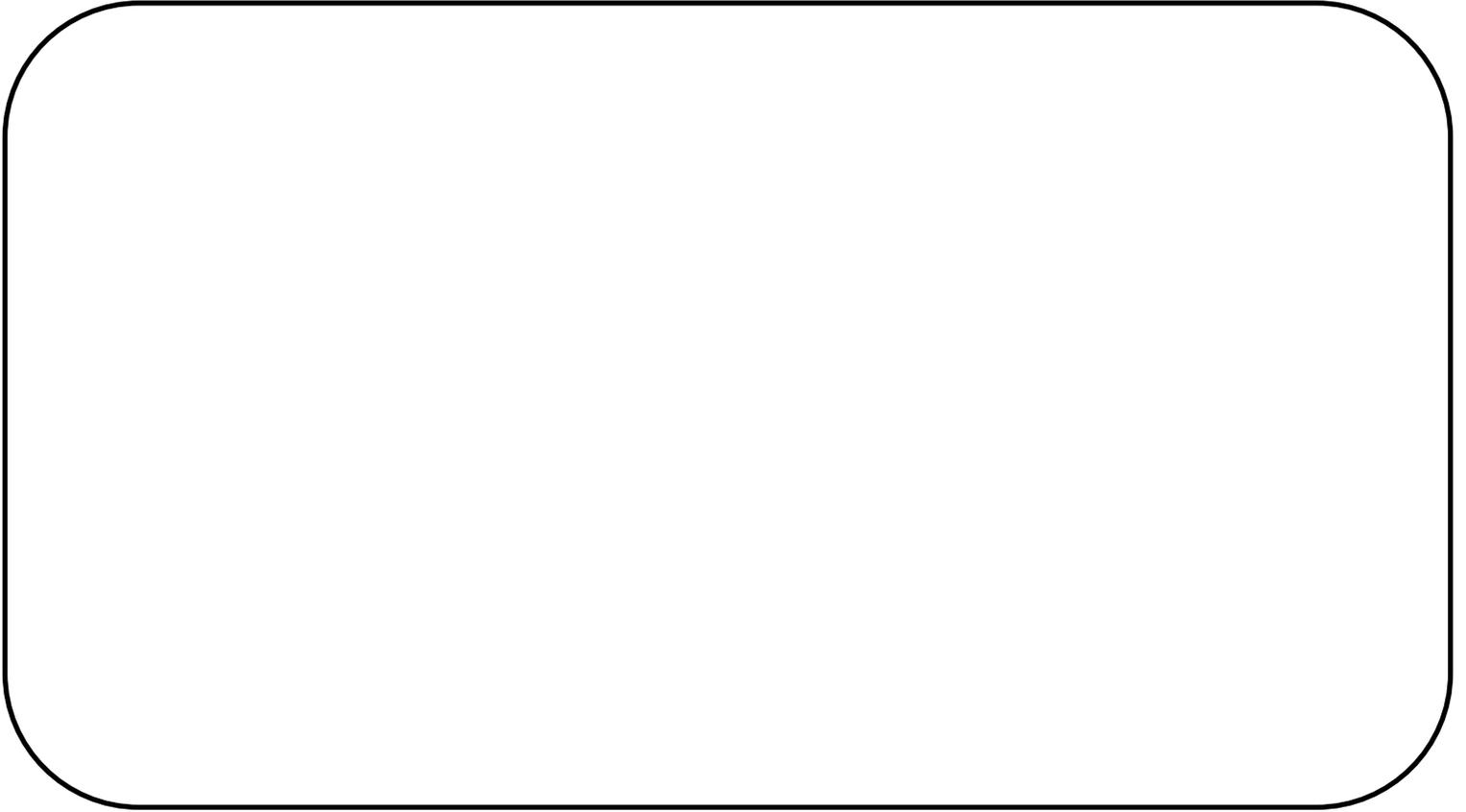
Name:_____   Date:_____

The Right Cut

When babies are born with scar tissue on their liver it must be surgically removed to prevent further damage. In order to remove scar tissue on an infant's liver, a pediatric surgeon must make a large enough incision to pull the liver up and out of the abdomen without causing too much damage to the flesh. If the average infant liver length is 7.62 cm give or take 0.84 cm, what is the smallest incision the surgeon should make? What is the largest incision the surgeon should make? Explain.

Use a ruler to create the two incision sizes in centimeters on the abdomens below. Be sure to label each incision smallest and largest.
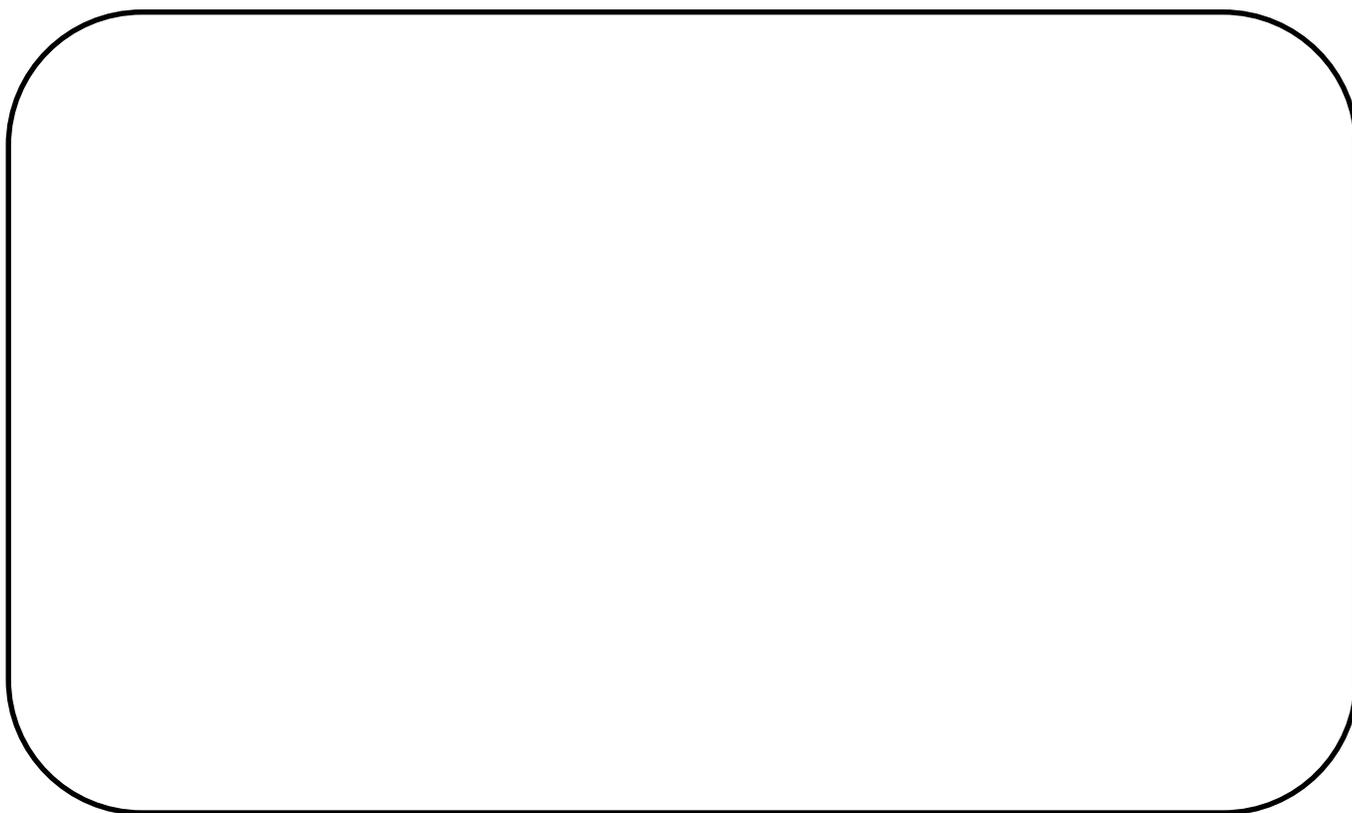
3-ACT TASK: Competitive Eating Records

Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them. After viewing the Act 1 video "Sport Science: Joey Chestnut and Hot Dog Eating", students will make sense of the relationships presented on the "Competitive Eating Records" graph. Students will generate questions that they are interested in investigating and analyze the information before attempting to find solutions. Students contemplate what types of solutions are reasonable and what plan would be best when trying to achieve the solutions.

2. Reason abstractly and quantitatively. Students will create estimates that are too low and too high to be viable possibilities. This promotes student thinking about the meaning of the quantities before trying to compute the actual solution. (www.corestandards.org/Math/Practice/)

3. Construct viable arguments and critique the reasoning of others. Students will defend how the solutions they achieved are valid possibilities using their high and low estimates recorded during Act 1.

4. Model with mathematics. Equations are constructed to find answers to the questions generated by looking at the graph about food that has been consumed by competitors of various eating competitions. Students can also investigate the difference between various types of food consumed by competitors during various eating competitions.

6. Attend to precision. As students solve the problems, they will give estimates that are too high and too low during Act 1. Then, as students proceed to Act 2, they will precisely extract data to the nearest hundredth from a graph to calculate the total amount of food eaten by various competitors and the differences between the amount of food consumed by various competitors.

7. Look for and make use of structure. To extract the needed information from the graph and solve the problem being posed, students will use the structure and patterns within the "Competitive Eating Results" double bar graph. They will use labels and keys to interpret the information being presented in the graph. Students will also use their knowledge of the structure used to solve whole number addition and subtraction and use that structure to add and subtract decimal numbers.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place.

MGSE5.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.

ESSENTIAL QUESTIONS

During Act 1, students are encouraged to suggest questions that come to mind after viewing the picture. In Act 2, students will solve a problem that focuses on the following learning through inquiry:

- How are decimals used to represent quantities in real world situations?
- What strategies can I use to add and subtract decimals?

The essential questions above can be shared at the beginning of Act 2 to define the emphasis of the problem-solving opportunity being presented.

MATERIALS

Act 1 video "Sport Science: Joey Chestnut and Hot Dog Eating" http://safeshare.tv/w/PjdASyXWsS
Act 1 graph "Competitive Eating Records" (attached - make copies for student use during Act 2.)
Student Recording Sheet (attached)

GROUPING

Individual, Partners or Small Groups

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will view a video about the science behind training the body for competitive eating competitions. The video shows Joey Chestnut who is a record holder in various eating competitions and is well known for his abilities in this arena. After seeing the video, students will be shown the Act 1 graph "Competitive Eating Records." Next, they will be asked to discuss what they wonder about or are curious about. These questions will be recorded on a class chart or on the board and on the student recording sheet. Students will then use mathematics to answer one of the questions generated on the chart. Students will be given information to solve the problem based on need. When they realize they do not have the information they need, and ask for it, it will be given to them.

Background Knowledge:

This task follows the 3-Act Math Task format originally developed by Dan Meyer. More information on this type of task may be found at http://blog.mrmeyer.com/category/3acts/. A Three-Act Task is a whole-group mathematics task consisting of 3 distinct parts: an engaging and perplexing Act One, an information and solution seeking Act Two, and a solution discussion and solution revealing Act Three. More information along with guidelines for 3-Act Tasks may be found in the *Guide to Three-Act Tasks* on georgiastandards.org.

In Unit 2, students are using their background knowledge of whole number place value and comparing/contrasting that knowledge with ideas being learned about decimal place value. It is imperative that students make sense of sums and differences that involve decimal numbers by estimating prior to finding the actual solution. The estimate gives students an idea of what to expect and should help them catch errors that

they often make when performing a set of steps in an algorithm, rather than making meaning of the problem being solved.

Students are experiencing addition and subtraction of decimal numbers for the first time in fifth grade. Therefore, it is necessary to make sure that students have a chance to work at the concrete level of learning with tools such as base ten blocks. Students can then be shown how to represent decimal numbers using pictures which will allow them to transition to the abstract stage of working with decimal numbers. Students in fifth grade need to have experiences at all three levels – concrete, representational and abstract – to ensure that a firm foundation has been prepared for continued learning in middle school about decimal numbers.

In Act 2, students will compare competitors represented on the graph. Students must extract the needed information from the graph with precision. The bars on the graph do not fall nicely on a tick mark. Students must infer the quantities of food being eaten in kilograms by looking at the y-axis and use the information available to make generalizations about the competitors in various eating competitions.

Common Misconceptions:

When learning about decimal place value, addition and subtraction, students think that a decimal number with many digits has a large value and in comparison, a decimal number with a smaller number of digits has a smaller value. Students are overgeneralizing this idea using their background knowledge of whole number place value, addition, and subtraction. When working with whole numbers, a number with six digits is larger than a whole number with two digits. However, that generalization doesn't hold true for decimal numbers. A decimal with one digit can be worth more than a decimal with four digits. For this reason, it is imperative that students make sense of problems given by estimating a sum or difference prior to showing any precise calculations.

Task Directions:

Act 1 – Whole Group - Pose the conflict and introduce students to the scenario by showing Act I video or picture. (**Dan Meyer** http://blog.mrmeyer.com/2011/the-three-acts-of-a-mathematical-story/)
"Introduce the central conflict of your story/task clearly, visually, viscerally, using as few words as possible."

- Show the Act 1 video "Sport Science: Joey Chestnut and Hot Dog Eating" to students. http://safeshare.tv/w/PjdASyXWsS
- Next, show the Act 1 graph "Competitive Eating Records" to students.
- Ask students what they notice, what they wonder about, and what questions they have about what they saw in the graph based on what they observed in the video.
- Give each student a copy of the Student Recording Sheet. Have students record their questions and curiosities in the Act 1 section that asks, "What questions come to your mind?" Consider doing a think-pair-share so that students have an opportunity to talk with each other before sharing questions with the whole group. Students need to have access to the picture at all times as they develop their questions.
- Share and record students' questions. The teacher may need to guide students so that the questions generated are math related.
- Explain to students that they will choose a question from the list that they would like to investigate. Students will record the main question they choose on their recording sheet.

- Ask students to estimate answers to their question (think-pair-share). Students will write their best estimate, then write two more estimates – one that is too low and one that is too high so that they establish a range in which the solution should occur. Students should plot their three estimates on a number line. Space is available on the recording sheet for students to record an open number line with all three estimates.

Anticipated questions students may ask and wish to answer:

- What is the difference between the total weight of rice cakes ingested compared to the total weight of butter ingested?
- How do I tell what number the bar is showing?
- To the nearest hundredth, how many total kilograms of food were eaten by all the competitors on the graph?
- What is the total weight ingested for all the meats shown on the graph?
- Why was the total weight ingested greater for rice cakes than the other foods on the list?
- What is the relationship between the orange bar (the total weight ingested) and the blue bar (the kilograms ingested per minute) on the graph?
- Why do some foods have blue bars greater than the orange bars, some bars are close to being equivalent and some orange bars are greater than the blue bars?

Any of the questions from the list above or questions on the student generated chart from Act 1 can be a main question(s) to be investigated.

Act 2 – **Student Exploration** - Provide additional information as students work toward solutions to their questions. **(Dan Meyer** http://blog.mrmeyer.com/2011/the-three-acts-of-a-mathematical-story/**)**
"The protagonist/student overcomes obstacles, looks for resources, and develops new tools."

- During Act 2, students review the main question selected from Act 1 and decide on the facts, tools, and other information needed to answer the question. When students decide what they need to solve the problem, they should ask for those things. It is pivotal to the problem-solving process that students decide what is needed without being given the information up front. Information that might be requested to solve this problem is a copy of the Act 1 Competitive Eating Records graph and rulers.
- Students can record information that they need to solve the problem, given information, estimates and work on the student recording sheet under Act 2.
- The teacher provides guidance as needed during this phase. Some groups might need scaffolds to guide them. The teacher should question groups who seem to be moving in the wrong direction or might not know where to begin. Questioning is an effective strategy that can be used, with questions such as:
  - What is the problem you are trying to solve?
  - What do you think affects the situation?
  - Can you explain what you've done so far?
  - What strategies are you using?
  - What assumptions are you making?
  - What tools or models may help you?

- Why is that true?
- Does that make sense?

Additional Information for Act 2

Competitive Eating Records (attached - 1 copy per student or small group)

Important note: Student generated questions are a vital part of this lesson. Additional questions may be answered after they've found a solution to the main question selected during Act 1, or as homework or extra projects.

Act 3 – Whole Group – Share solutions and strategies.

- Students present the question they investigated, the solution they found and strategies they used to determine to solution. and compare them.
- Ask students if any other groups investigated the same problem. If there is a group that investigated the same problem, allow the group to compare their solution and strategies to the previous group.
- As different solutions to the various questions investigated by students are collected, have students defend a solution by explaining the decimal numbers they extracted from the graph as they worked. As the discussion progresses, students should realize that differences in the solutions shared are explained in the various decimals used as they interpreted the graph. If students don't pick up on this idea through the course of the discussion, it is appropriate for the teacher to ask students to think about why various solutions were given.
- Have students record their result in the Act 3 section of the student recording sheet. Students can also plot their solution on the open number line on the student recording sheet.
- Lead discussion to compare these, asking questions such as:
  o How reasonable was your estimate?
  o Which strategy was most efficient?
  o Can you think of another method that might have worked?
  o What might you do differently next time?
- Ask students, "What generalizations can you make about the competitive eating records on the graph using the information you've discovered through your investigation?" Allow students to share the meaning of the answers to their questions with the whole group.

Act 4, The Sequel - "The goals of the sequel task are to a) challenge students who finished quickly so b) I can help students who need my help. It can't feel like punishment for good work. It can't seem like drudgery. It has to entice and activate the imagination." Dan Meyer http://blog.mrmeyer.com/2013/teaching-with-three-act-tasks-act-three-sequel/
Challenge students to revisit the other student generated questions recorded in Act 1. (Refer students to the list created on their recording sheet or the class chart created during Act 1.) Allow students to choose one of the questions from Act 1 and investigate it independently. Allow students to record thinking about the problem in the same manner as the student recording sheet used during this lesson.

FORMATIVE ASSESSMENT QUESTIONS

- What models did you create?
- What organizational strategies did you use?
- How is adding and subtracting decimals similar to adding and subtracting whole numbers? How are they different?
- How does estimation help when finding sums and differences between decimal numbers?

DIFFERENTIATION

Extension
Have students look at the food groups on http://www.choosemyplate.gov/food-groups/.
Students can classify each food on the graph according to the food group it belongs to. Then, students investigate the relationship between the food group each food belongs in and the amount of food ingested. Possible ideas include:
- Which food group was ingested most often during the competitions on the graph?
- What is the difference between the total kilograms of meat ingested and total kilograms of vegetables ingested?
- Students can order the food groups from least to greatest once the total number of kilograms are calculated.
- Students can also create a new graph based on the total number of kilograms ingested of each food group.

Intervention
As they work to find a solution to the main question they selected to investigate, have students work with decimal numbers that are rounded to the nearest tenth. After completing the task, conference with students about how to find solutions by modeling how to think through using the y axis and its increments to infer the decimal number to the nearest hundredth.

Intervention Table

TECHNOLOGY CONNECTIONS

- Hungry Puppies http://www.mathplayground.com/ASB_Hungry_Puppies_Decimals.html
  During this game, students are one of several puppies that are trying to capture two bones that are equivalent to the decimal in the middle of the game board. The game is very fast paced and shows a variety of ways to create sums using decimal addends.

Three Act Task Student Recording Sheet   Name _____

ACT 1

What questions come to your mind?

Main Question: _____

What is your first estimate and why?
Record an estimate that is too low and an estimate that is too high.
On an empty number line, record all three estimates made above.

ACT 2

What information would you like to know or need to solve the MAIN question?

Record the given information (measurements, materials, etc.…)

If possible, give a better estimation with this information: _____

Act 2 (cont.)

Use this area for your work, tables, calculations, sketches, and final solution.

ACT 3

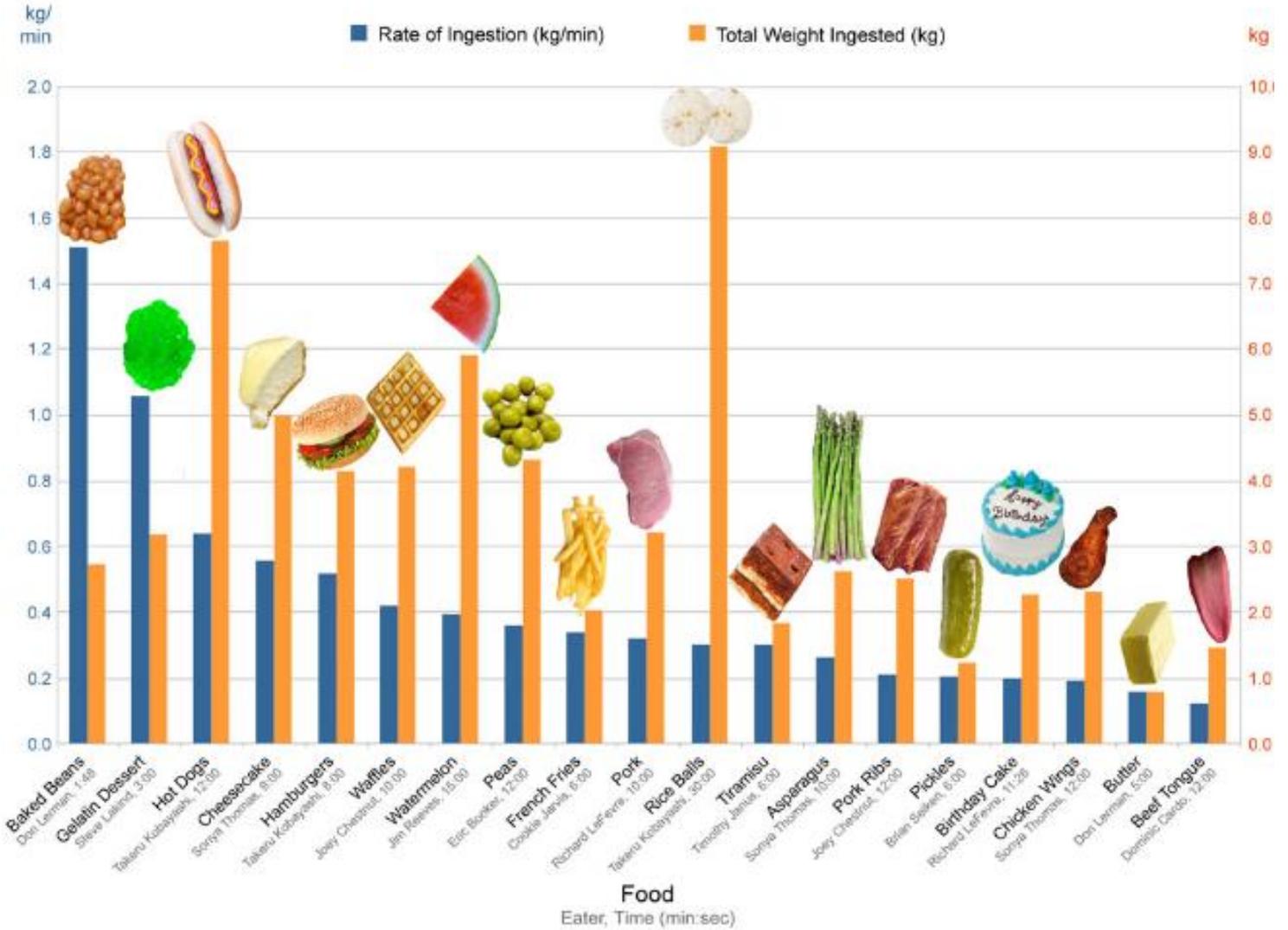| What was the result? |
| --- |
| |

Act One - Competitive Eating Records Graph

Competitive Eating Records

CULMINATING TASK: Check This

Back to Task Table

Adapted from New York City Schools Tasks
Approximately 1 day

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
6. Attend to precision.

STANDARDS FOR MATHEMATICAL CONTENT

MGSE5.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.

MGSE5.NBT.4 Use place value understanding to round decimals up to the hundredths place.

MGSE5.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.

BACKGROUND KNOWLEDGE

Students should have had many opportunities to identify, read, and illustrate decimal numbers. They should also have had opportunities to add and subtract amounts of money. Students' work will require accuracy in computation as well as reasoning to determine amounts to be added or subtracted. Teachers should model using a checkbook register and associated vocabulary before introducing the task.

ESSENTIAL QUESTIONS

• How can I accurately find out how much money you have in your checking account?
• How can I decide when to add and when to subtract?

MATERIALS

• Blank checkbook registers
• Task pages

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

The purpose of the task is to introduce real life problem while reinforcing the concepts of decimals taught throughout the unit.

This culminating task represents the level of depth, rigor, and complexity expected of all fifth-grade students to demonstrate evidence of learning. Although this is a culminating task, teachers should expect to provide the necessary support with regards to the checkbook register as using a checkbook register is not the focus of this task.

Comments
Students should be given opportunities to revise their work based on teacher feedback, peer feedback, and metacognition, which includes self-assessment and reflection.

Suggestions for Classroom Use
While this task may serve as a summative assessment, it also may be used for assessment and/or as a project. It is important that all elements of the task be addressed throughout the learning process so that students understand what is expected of them.

Task Directions
This task may be introduced by showing the model of a checkbook register and demonstrating its use. Students should also be familiar with the connections between adding and subtracting with models and with the standard algorithm. Prior to implementing the task, students should review the process of adding and subtracting money (decimals). Students should be consistently using straight columns for addition and subtraction.

It will be necessary for teachers to introduce vocabulary related to banking situations: deposit, credit, payment, withdrawal, debit, balance, etc. Students will also need to be able to recognize real life situations that either suggest addition or subtraction. Comparing and contrasting how these operations are used in a banking money situations will be helpful.

Since the main purpose of this task is not to learn how to use a checkbook register, teachers should expect to provide assistance as it relates to the use of the register.

FORMATIVE ASSESSMENT QUESTIONS

- Why did you choose that operation?
- What would cause you to add money in your checkbook register?

- What would cause you to subtract money in your checkbook register?
- How will you know if you have enough money to buy an Xbox after week one?
- Should you buy the Xbox after week one? Why or why not?
- What affect would buying the Xbox after week one have on your life during week two?

DIFFERENTIATION

Extension
- Create and describe transactions for your register that will allow you to buy Xbox One and Xbox One games after week two.
- Which expenses could your family do without, in order to buy an Xbox One and the games to go with it? What options could you have if you needed to help your family raise the money to pay for your internet service for your Xbox One.

Intervention
- Some students may need to be given strips of paper with transactions and amounts of money to manipulate, cut, and paste instead of writing in the checkbook register. A partially filled in register may be another alternative.
- Some students may need to write all of the computations on scratch paper before entering them in the checkbook register.
- Some students may benefit from working from a partially filled in checkbook register.
- Some students may benefit from working with a partner, or support from the teacher to help organize their information.
- Some students may benefit from using play money with this task.

Intervention Table

TECHNOLOGY CONNECTIONS

- http://www.dreambox.com/teachertools (Scroll down to **"Decimal Sums on the Number Line")** In this Dreambox tool, students use a number line to add and subtract decimals and solve for a variable in a "change unknown" situation.

Games for Building Decimal Number Sense
- http://www.decimalsquares.com/dsGames/games/laserbeam.html
- http://www.decimalsquares.com/dsGames/games/tugowar.html
- http://www.decimalsquares.com/dsGames/games/darts.html

Name:_____ Date:_____

CULMINATING TASK: CHECK THIS

You are hoping that you will be able to purchase an Xbox One for $499.50, so you are taking over managing your family's checkbook for two weeks. During this time period you will make deposits, make withdrawals, and write checks in order to pay various bills. Your family account will begin with a balance of $600.00.

- Record the transactions in your checkbook register choosing the correct operation for each transaction.
- Find the balance of the account at the end of each week. Make sure your balance at the beginning of Week 2 is a reflection of the balance at the end of Week 1.
- Answer the reflection questions.

Week 1:

7/14	You are mowing lawns in your neighborhood to earn money to buy an Xbox One for the family. The rate for mowing lawns is $10.00 per lawn. You mowed 3 lawns, your sister mowed 2 lawns, and your brother mowed half a lawn before he broke the lawn mower. You all deposited your money into the account toward the purchase of an Xbox One.
7/15	You wrote Check #100 to Pet Palace to buy your new dog, Bongo, for $99.00 and his accessories which cost $18.96.
7/16	You found a $20.00 bill under the seat in the car and you used it to buy ice cream for $4.37. You deposited the rest of the money.
7/17	Your dad had a flat tire. He withdrew $95.88 for a new tire.
7/19	Baseball tickets cost $11.95 each. You took out money to buy one for you and your friend.
7/20	Aunt Emily sent an early birthday present in the amount of $75.00. You deposit it toward the purchase of an Xbox One.

Week 2:

7/22	You wrote Check #103 in the amount of $158.36 to pay the electric bill.
7/23	Your family has decided to go to the movies. Adult tickets cost $10.95 and child tickets cost $6.15. You write Check #104 to pay for your mom and dad (both adult tickets) and you, your brother, and sister (all child tickets).
7/25	While walking Bongo, the leash breaks. You write Check # 105 in the amount of $8.13 to Pet Palace to replace Bongo's broken leash.
7/27	You spend the afternoon babysitting for your little cousin at the rate of $4.75 per hour. You worked from 2 PM until 5 PM. You deposit it all into the account.
7/29	You count up all the change in your piggy bank. You had seventy-six dollars and forty-one cents which you deposit into the account.

Name _____ Date _____

Week 1:

Date	Check #	Payment Issued to or Description of Deposit	Amount of Payment		Amount of Deposit		Balance		
								$600	00
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
							ENDING BALANCE		

Name _____ Date _____

Week 2:

Date	Check #	Payment Issued To or Description of Deposit	Amount of Payment		Amount of Deposit		Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
		To:					Payment/Deposit		
		For:					Balance		
							ENDING BALANCE		

Name _____ Date _____

1. Using your balance at the end of the week, represent your total in all three number forms:

Base Ten Numeral	Expanded Form	Number Name

2. Rounding to the nearest tenth/dime, what is the difference in your bank account from when you started this week to when you finished this week?

3. Explain how you solved question #2, including how you round decimals.

   _____

   _____

   _____

4. Within the last two weeks, how much money have you spent on Bongo and all of his supplies? Show your work:

5. Using the total amount you spent on Bongo over the past two weeks, represent your total in all three number forms

Base Ten Numeral	Expanded Form	Number Name

6. Your family has been saving up their money for some time to get an Xbox One. If the Xbox costs $499.50, do you have enough money to purchase it? How do you know? Explain using comparison and place value terms: _____

   _____

   _____

   _____