# Standard #: MAFS.5.NBT.2.7

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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.

## General Information

**Subject Area:** Mathematics

**Domain-Subdomain:** Number and Operations in Base Ten

**Cluster:** Perform operations with multi-digit whole numbers and with decimals to hundredths. (Major Cluster) - Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.

**Content Complexity Rating:** Level 2: Basic Application of Skills & Concepts - More Information

**Status:** State Board Approved

**Grade:** 5

**Cluster:** Level 2: Basic Application of Skills & Concepts

**Date Adopted or Revised:** 02/14

**Date of Last Rating:** 02/14

**Assessed:** Yes

## Test Item Specifications

N/A

**Assessment Limits :**
Items may only use factors that result in decimal solutions to the thousandths place (e.g., multiplying tenths by hundredths). Items may not include multiple different operations within the same expression (e.g., 21 + 0.34 x 8.55). Expressions may have up to two procedural steps of the same operation.

**Calculator :**
No

**Context :**
Allowable

## Sample Test Items (3)

**Test Item #:** Sample Item 1
**Question:**
What is the value of the expression?

$5.2 \times 10.38$

**Difficulty:** N/A
**Type:** EE: Equation Editor

**Test Item #:** Sample Item 2
**Question:**
An expression is shown.

$12.25 + 3.05 + 0.6$

What is the value of the expression?

**Difficulty:** N/A
**Type:** EE: Equation Editor

**Test Item #:** Sample Item 3
**Question:**
Allen ran 5.4 miles on Monday and 3.28 miles on Tuesday.

How many miles did Allen run altogether?

**Difficulty:** N/A

**Type:** EE: Equation Editor

## Related Courses

| Course Number | Course Title |
|---|---|
| 5012070: | Mathematics - Grade Five (Specifically in versions: 2014 - 2015, 2015 and beyond (current)) |
| 7712060: | Access Mathematics Grade 5 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current)) |
| 5012065: | Accelerated Mathematics Plan Grade 4 (Specifically in versions: 2019 and beyond (current)) |

## Related Access Points

| Access Points Number | Access Points Title |
|---|---|
| MAFS.5.NBT.2.AP.7a: | Solve one-step problems using decimals. |

## Related Resources

### Assessments

| Name | Description |
|---|---|
| Sample 4 - Fifth Grade Math State Interim Assessment: | This is a State Interim Assessment for fifth grade. |
| Sample 3 - Fifth Grade Math State Interim Assessment: | This is a State Interim Assessment for fifth grade. |
| Sample 2 - Fifth Grade Math State Interim Assessment: | This is a State Interim Assessment for fifth grade. |
| Sample 1 - Fifth Grade Math State Interim Assessment: | This is a State Interim Assessment for fifth grade. |

### Educational Games

| Name | Description |
|---|---|
| Ice Ice Maybe: An Operations Estimation Game: | This fun and interactive game helps practice estimation skills, using various operations of choice, including addition, subtraction, multiplication, division, using decimals, fractions, and percents. Various levels of difficulty make this game appropriate for multiple age and ability levels. Addition/Subtraction: The addition and subtraction of whole numbers, the addition and subtraction of decimals. Multiplication/Division: The multiplication and addition of fractions and decimals. Percentages: Identify the percentage of a whole number. Fractions: Multiply and divde a whole number by a fraction, as well as apply properties of operations. |
| Circle 3 (Addition of Decimals): | This addition game uses mixed decimals to the tenths place. This game encourages some logical analysis as well as addition skills. There may be several ways to make the first couple of circles sum to 3, but there is only one way to combine all the given numbers so that every circle sums to 3. |
| Change Maker: | This interactive applet gives students practice in making change in U.S. dollars and in four other currencies. Students are presented with a purchase amount and the amount paid, and they must enter the quantity of each denomination that make up the correct change. Students are rewarded for correct answers and are shown the correct change if they err. There are four levels of difficulty, ranging from amounts less than a dollar to amounts over $100. |

### Formative Assessments

| Name | Description |
|---|---|
| Running A Race: | Students are asked to solve a word problem that involves adding two decimals by using a strategy based on place value. |
| Tony's Lunchbox: | Students are asked to solve a word problem that involves subtracting two decimals by using a strategy based on place value. |
| Buying Candy Bars: | Students are asked to solve a word problem involving multiplication of a decimal by a whole number using a model or drawing or a strategy based on place value, the relationship between multiplication and division, or properties of operations. |
| Running: | Students are asked to solve a word problem involving division of a whole number by a decimal using a model or drawing, a strategy based on place value, the relationship between multiplication and division, or properties of operations. |

### Lesson Plans

| Name | Description |
|---|---|
| Electric Energy & Temperature: | This lesson introduces how electrical devices transform electrical energy to thermal energy to alter the temperature of a substance resulting in the freezing, melting, or boiling of the substance. Each electrical device produces thermal energy as a byproduct that is conducted from a source like an electrical socket or battery; this lesson discusses how that energy is transferred while also comparing and contrasting the states of matter of different substances.

This is lesson 1 in a Unit on Detecting Thermal & Electrical Energy. |
| Florida Food Round Up!: | Most families must buy food and household items that they will need every few weeks. Instead of randomly throwing things into a shopping cart and paying whatever the total is, many families must stick carefully to a predetermined budget to buy all of the items they need. A helpful way to make sure that you are able to buy everything needed is to use a list that is written before going shopping. Families must also determine, if they will purchase "name brand" or "store brand" products. Today, students will practice using a grocery list with a predetermined budget as they add and subtract decimals. |
| Hoverama: | In this lesson students will create a model hovercraft. The challenge is to lift the most mass. Students will use their knowledge of forces and how increased mass interacts with motion. They will need to follow a budget in order to purchase building material for their hovercraft. While budgeting, students will apply real world mathematical (money) problem solving. Students will use iPads to record and document the process of the engineering and building of their model hovercrafts. |
| Weathering Weather: | This is a design challenge lesson allowing students to utilize their understanding of climate zones to design a tropical roof that would withstand the wind and water generated by a hurricane. This lesson also allows you to assess students understanding of operations with decimals to create their design under a given budget. |
| Marbelous Pool Noodle Ramps: | In this lesson, students will build a ramp out of a pool noodle and use it to launch a marble across the room. Students will investigate by adjusting the height and slope of the ramp and record their findings on a data sheet. Students will practice collecting and analyzing data and will investigate the importance of performing repeated experimental trials. Students will practice converting metric units of distance as well as the addition and division of decimals to find the mean of a small data set. |
| Icky, Icky, No More Slicky: | In this lesson, 5th grade students will build an engineering device to separate oil from water in a simulated oil spill. Students will have an opportunity to learn about the impact that humans can have on the environment, both positively and negatively.

This is an Engineering Design Challenge that is best used after a unit or lesson that is aligned to the science standard SC.5.P.8.2. This challenge provides students a means to use their knowledge of the way materials will or will not dissolve in water to create and design an oil spill removal tool while learning the Engineering Design Process and being exposed to the field of engineering. This lesson is not intended as an initial introduction to the standard and would be best utilized as a culmination lesson for a unit aligned to SC.5.P.8.2. |
| The Coasta with the Mosta: | Students will create an exciting and thrilling roller coaster model. Students will use their knowledge of forces to build a model of a roller coaster using foam insulation and a marble. |
| When the Wind Blows: | This is an engineering design process lesson that covers forces and motion. It is designed to engage students using hands-on problem solving strategies. |
| Bottling Rockets: | In this lesson, students will explore the concepts of force and motion as they use the engineering design process to create and test rockets. Students will demonstrate their understanding of familiar forces by creating and presenting a poster. Take students up, up, and away with this engaging lesson! |
| From Trash to Treasure - An Engineering Design Challenge: | This lesson gives students hands-on experience with sorting mixtures based on their properties. The students will relate these science standards to a real-world problem of eliminating trash in land fills. They will have to purchase the tools they use to create their assembly line to sort the garbage within the budget provided. |
| Bridge Over Troubled Waters: | In this engineering lesson, students will design and construct a bridge that will be free-standing and support a toy car. |
| Medic Mass Landing: Engineering Design Challenge: | In this lesson, 5th grade students work in small groups on a STEM challenge that involves science and math standards related to force, motion, and measurement, as well as learning the engineering design process. |
| How Much Did I Earn? Division with Decimals: | This lesson will introduce division of decimals using place value decomposition. Students will use base 10 blocks, division strategies and place value knowledge to divide decimals by whole numbers. |
| Shopping for My Trip to the Beach: | This lesson will teach students how to add decimals, in money form, modeling with base-ten blocks and then using the standard algorithm, through the hundredths place. This is not an introductory lesson. Students should already have conceptual knowledge and practice adding four digit numbers using manipulatives or other methods. |
| Multiplying Decimals: Finding Part of a Whole: | In this lesson, students will use area models to show that multiplying a whole number by a decimal creates a product that is only part of the original whole. |
| Shopping for Groceries: | In this lesson, students will use grocery ads to take the role of a shopper and a cashier and will purchase several items. Students will be able to add and subtract decimals to hundredths, using strategies based on models, illustrations, and place value. |
| Deft Drawings for Decimal Division: | In this lesson, students divide decimals to hundredths in real-world word problems by drawing illustrations based on place value and explaining the reasoning used. |
| Bakery Boxes in the Mail: | Students need to make decisions about the correct bakery box to send cookies through the mail to fill orders. Students need to consider the capacity, dimensions, and volume of the boxes in terms of how many cookies each box will hold. |
| Blessings in a Bag!!: | In this MEA, the students will select 5 items from a list to be placed in a bag donated by an organization. |

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| Workouts That Work: | Students will create a rating system for workout DVD's according to weight loss, muscle toning, and increased physical condition. |
| Keeping Your Cool With Your Lunch Bag: | On this MEA activity, students will create a procedure to rank five lunch bags as to which one is the best in keeping food and drinks at a safe temperature and appealing to the taste, while keeping design and price on target. |
| To Oregon by Wagon: | Students work in teams to plan the contents of a covered wagon for a family relocating from Missouri to Oregon. Students must calculate the weight and cost of the wagon by adding, subtracting, and multiplying decimals. |
| Textbook Predicament: | This 5th grade MEA is designed to have students do math computations and compare information to provide best answer to the problem based on calculations and information given. |
| Women Warriors: | This is a MEA that looks at the contribution of some women that helped out during the American Revolution. |
| Out to Lunch: Decimal Operations with a Menu: | In this lesson students work toward fluency with decimal operations by using a snack bar menu and going "Out to Lunch" with a friend. |
| Currency Craze!: | If I travel to Italy, can I buy a raspberry gelato with a $5.00 bill? Students will understand that other countries use currencies different than that of the United States, and that when visiting those countries, exchange rates are used to determine the value of the United States dollar (USD) as well as other nations' currencies as well. This lesson integrates Mathematics with Social Studies as the students apply their knowledge of decimals and basic operations with their passports for a real-world application. |
| Field Day Fun: | In this MEA, students will choose their top choices of field day activities given the cost, number of adult supervisors needed, the area required for event, safety concerns, clean up required, number of students that can play at a time, and peer comments about the activity. Students will need to make trade-offs in cost when the "twist" provides budget restrictions. Students will calculate area and multiply whole numbers and decimal numbers. |
| Are You Ready for a Hurricane?: | This activity allows students to determine the types of items that should be in a hurricane survival kit, use a budget and calculations to determine the items to include in the kit and gain an understanding of hurricanes and the need to prepare for them. |
| Blow Me Away: | This MEA asks the students to decide which hand dryer model would be the "best and the worst" for Blow Me Away Incorporated to sell.<br><br>The students will consider company's cost; selling price; whether hand dryer turns on when hands are placed near it; whether hand dryer stays on when hands are near it; whether hand dryer turns of when hands are moved away; appearance and energy efficiency.<br><br>Students will provide "top choice" to Blow Me Away Incorporated and explain how they arrived at the solution.<br><br>LEGO Education WeDo Robotics extension activity can follow should a school have the WeDo program. |
| How Many Gigabytes Does Lathan Really Need?: | Students will be comparing quantitative and qualitative aspects of technology devices in order to rank them for a particular student's needs. |
| Fast Food Decision: | Students will rank fast food restaurants from best to worst based on their nutrition, price, and distance to sport field. Students will need to be able to add, subtract, and multiply decimal numbers. Given the first data set, students will come up with a procedure for ranking restaurants based on the prices and nutrition information given. Students will need to consider what is more important, price or nutrition. They will also need to determine what nutritional elements are more important to consider (fat, calories, sodium). Because some ties can occur, students will have to make tradeoffs for nutrition or price. Given the second data set, students have to reconsider their procedure when given price and coupon information along with distance to the restaurant and budget. |
| Come Sail Away!: | In teams, students will determine which sailboat the Leeward Family should purchase. They will use their knowledge of multiplying decimals to assist in their problem solving. The criteria will be based on air conditioning, swim out, auto helm, recent bottom job, condition of sails, condition of upholstery, and other twists! |
| Black Out in an Ice Cream Shop!: | This Model Eliciting Activity (MEA) asks students to develop a procedure for choosing a back-up energy source (generator) for an ice cream shop. Students will need to consider Cost of unit, wattage output, size of fuel container, length of time this machine will run, auto turn on, and the number of outlets it can receive. In the second portion of the problem statement, the students will need to prepare and compare the cost of use for 24 hour period. They will need to determine if they have still made the correct choices while adding three more generators for consideration, and make a cost analysis for 24 hours of use. In the culminating activity, the students will write a proposal for the client for the generator of their choice and include the 24 hours cost analysis. |
| Pick A Pet: | This Model Eliciting Activity (MEA) asks students to develop a procedure for choosing a reptile or amphibian to place in a school reception area. Students will need to consider safety, price of animal, cost by week to feed animal, size and cost of the enclosure, and the life span of the animals they are considering. In the second portion of the problem statement, the students will need to prepare a budget and cost analysis for the year to consider if they have still made the correct choices while adding three more animals for consideration. The culminating activity for this MEA will have the student write a proposal for the Principal to state their choice of animal, give a year's budget for cost and care for the animal. |
| Oak Tree Engineers: | This Model Eliciting Activity (MEA) is written at a 5th grade level. In this open-ended problem, students are presented with a variety of steps. Based on the data table given for student review, students must decide which simple machines they want to assemble and rank the stores in order starting with the one they would like to order from. Moreover, students are given special characteristics that they need to consider before describing their reasoning and procedures implemented in reaching their answers. |
| Wondrous Water Parks: | This activity requires students to apply their knowledge of force, motion, speed, and division to solve the problem of which water park their class should choose to go on for their 5th grade class trip. |

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| Estimating Decimal Products: | In this lesson, students will learn to estimate decimal products using different strategies to arrive at compatible numbers. They will learn that estimates will vary depending on the strategy chosen and that the closer the compatible numbers are to the actual factors, the closer the estimate will be to the exact answer. Students will also learn that estimation is used to solve problems that don't require exact answers and to check exact answers for reasonableness. |
| New Frozen Yogurt Store: | This MEA asks students to decide which factors are important in developing a successful frozen yogurt (froyo) store in order to compete with and become the best store in the area. Students will provide feedback to an entrepreneur who is looking to open a frozen yogurt store. They will rank order their choices of the most successful to least successful store. Students will provide a detailed written explanation for how they decided to rank factors and their solution rating existing stores from best to worst. |
| New Snack Shack Snack: | This MEA asks the students to decide which snack food would be the best for introduction in the school Snack Shack. Students are asked to compare nutritional value per ounce of food based on calories, fat, sodium, cholesterol, protein, and sugar. |
| Scuba Diving Mask Search: | This MEA asks the students to decide which company would be the "best and the worst" to use to purchase scuba diving masks for Tino's Scuba Diving School to provide to their diving certification students. Furthermore, the students are asked to suggest which type of scuba diving masks should be purchased in term of multiple panes – single pane mask, double pane mask, full face mask, skirt color, fit, durability, and price. Students must provide a "top choice" scuba diving mask to the company owner and explain how they arrived at their solution. |
| Shopping on a Budget: | This lesson reinforces multiplication of decimals by a whole number. Students will be presented with real-world items such as cans of soup, etc to investigate the concept of multiplying decimals. The culminating activity of the lesson is for students to create a school supply order for their classroom utilizing school supply catalogs. |
| Dividing Decimals Investigations: | In this introductory lesson, students test how the basic operations performed on the dividend and divisor affect the quotient of a pair of numbers. Students then conclude whether the results of their trials can be applied to solve problems with a decimal divisor. |
| "Dinner with Friends": | The students will determine what can be ordered at a dinner that they are taking their friends to with the given budget they have. The students will be trying to maximize their budgets and order as much food as they possibly can with their given amount of money. |
| Race to Fill the Whole!: | In this engaging lesson, students will play a game using base ten blocks to add decimals to the hundredths. |
| Sunshine Beach Hotel MEA: | This Model Eliciting Activity (MEA) asks students to develop a procedure to select a hurricane shutter company. |
| The 20 Second Game: | This is a game students will love to play to improve their understanding of estimating decimal products and increase speed when finding these estimations. The game can be modified to practice estimating products of whole numbers, quotients of whole numbers, and quotients of decimals. |
| Those Pesky Remainders: | This is a lesson to help students understand how to interpret the remainder in a division problem. Real world problems are presented in a PowerPoint so students may visualize situations and discover the four treatments of a remainder. Fourth grade does not have to translate remainders to decimals or fractions. |
| Vending Machine Snacks: | In this MEA, students are challenged to choose the snacks that will be in a vending machine in a school. Students will need to multiply and divide whole numbers and decimal numbers as well as compare fractions and decimal numbers. Students will work in groups to solve the problem and write a letter to the client explaining their thinking. |

## Original Student Tutorials

| Name | Description |
|---|---|
| Designing Dog Playgrounds: Multiplying Decimals: | Help your town build a dog park by multiplying whole numbers by decimals to the tenths place in this interactive tutorial. |
| Topsy-Turvy Playground: Subtracting Decimals: | Learn to subtract decimals to the hundredths place using place-value models and written expressions as you fix the topsy-turvy playground in this interactive tutorial. |
| Sweet Treats Factory Invasion: Adding Decimals: | Help these aliens clean up the Sweet Treats Factory by learning to add decimals in this interactive mathematics tutorial. |

## Problem-Solving Task

| Name | Description |
|---|---|
| What is 23 ÷ 5?: | When a division problem involving whole numbers does not result in a whole number quotient, it is important for students to be able to decide whether the context requires the result to be reported as a whole number with remainder (as with Part (b)) or a mixed number/decimal (as with Part (c)). Part (a) presents two variations on a context that require these two different responses to highlight the distinction between them. |

## Tutorial

| Name | Description |
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| Adding and Subtracting with Decimals: | This tutorial for student audiences will assist learners with a further understanding of the rules for adding and subtracting with decimals. Students will be able to navigate the teaching portion of the tutorial at their own pace and test their understanding after each step of the lesson with a "Try This" section. The "Try This" section will monitor students answers and self-check by a right answer turning orange and a wrong answer dissolving. |

## Virtual Manipulatives

| Name | Description |
|---|---|
| | With this virtual manipulative, students can explore the meaning of place value and grouping as they add and |

| | subtract decimals. Base blocks consist of individual units, longs, flats, and blocks (ten of each set for base 10). These blocks can represent negative as well as positive numbers with one to four decimal places and in five different bases. Students exchange and group the blocks as needed to solve the problem. Problems can be presented to or created by the students. All material is available in Spanish and French as well as English, including instructions for using the manipulative, information about bases and place value, and suggested questions for classroom use. |
|---|---|
| Base Blocks Decimals: | |
| Diffy Virtual Manipulative: | Diffy is a virtual manipulative that allows students to practice their subtraction facts with whole numbers, integers, fractions, decimals, or money. It is a puzzle of sorts with four black numbers placed at the corners of a black square. The first goal is to fill in the four blanks in the blue circles in the middle of each side of the black square. |

## Student Resources

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| Circle 3 (Addition of Decimals): | This addition game uses mixed decimals to the tenths place. This game encourages some logical analysis as well as addition skills. There may be several ways to make the first couple of circles sum to 3, but there is only one way to combine all the given numbers so that every circle sums to 3. |
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## Parent Resources

### Educational Game

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