



FIFTH GRADE

Unit 3

Multiplication of Whole Numbers and Decimals

20 days

enVision 2.0 Topic 3

Overarching Understandings:

Using an understanding of place value, properties of operations, and operations with whole numbers and decimals can be solved using addition, subtraction, and multiplication. Problems are solved using multiple representations: concrete models, drawings, equations, and a written explanation of the reasoning used.

Essential Questions:

- What is an effective way to estimate solutions to problems?
- When would I use estimation strategies in the real world?
- How can I use the operations to solve real world problems?
- What strategies can we use to efficiently solve problems?
- What strategies can I use to help me make sense of the standard algorithms?
- How can I write an expression that demonstrates a situation or context?

Common Core State Standards:

5.NBT.5 Fluently multiply multi-digit whole numbers by using the standard algorithm.

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.

Key Vocabulary:

whole number
decimal tenths / hundredths
distributive property
array
estimate

Sentence Frames:

My estimate is _____.
I used _____ to solve the problem by _____.
This model/drawing shows _____.

Suggested Materials:

dice
colored markers/pens
grid paper
place value charts
colored tiles

Number Talks: *Number Talks are used to build number sense, develop fluency, and make sense of problems.*

Problem Solving

Number Lines (Whole Numbers & Decimals)



San Diego Unified
SCHOOL DISTRICT

FIFTH GRADE

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20 days

19 Lessons

1 Assessment Day

Suggested Order of Lessons

Objective 1: Students will solve problems involving multiplication of whole numbers by using strategies based on place value, properties of operations, and relationships between the operations. (5.NBT.5 and 5.NBT.6)

Day	Source	Lesson Title	Page Number	Notes
1	enVision 2.0	3-1 Multiply Greater Numbers by Powers of 10	ENV TE p.113	
2	enVision 2.0	3-2 Estimate Products	ENV TE p.119	
3	enVision 2.0	3-3 Multiply 3-Digit by 2-Digit Numbers	ENV TE p.125	
4	enVision 2.0	3-4 Multiply Whole Numbers with Zeroes	ENV TE p.131	
5	enVision 2.0	3-5 Multiply Multi-Digit Numbers	ENV TE p.137	
6	Georgia	Three in a Row	Unit p. 9	
7	enVision 2.0	3-7 Critique Reasoning	ENV TE p.149	

Objective 2: Students will solve problems involving multiplication of decimals by using strategies based on place value, properties of operations, and relationships between the operations. (5.NBT.7)

Day	Source	Lesson Title	Page Number	Notes
8	enVision 2.0	4-1 Multiply Decimals by Powers of 10	ENV TE p.165	
9	enVision 2.0	4-2 Estimate the Product of a Decimal and a Whole Number	ENV TE p.171	
10	EngageNY	Multiply Decimal Fractions by Whole Numbers	Unit p. 13	
11	enVision 2.0	4-4 Multiply a Decimal by a Whole Number	ENV TE p.183	

12	enVision 2.0	4-5 Use Models to Multiply a Decimal and a Decimal	ENV TE p.189	
13	enVision 2.0	4-6 Multiply Decimals Using Partial Products	ENV TE p. 195	
14	enVision 2.0	4-7 Use Properties to Multiply Decimals	ENV TE p. 201	
15	enVision 2.0	4-8 Use Number Sense to Multiply Decimals	ENV TE p. 207	
16	Georgia	Bargain Shopping	Unit p. 18	
17	Georgia	Field Trip	Unit p. 23	
18	Georgia	Field Trip	Unit p. 23	
19	enVision 2.0	4-10 Model with Math	ENV TE p. 219	
20	Assessment			

Notes:

- *enVision 2.0 Lessons 3-6, 4-3, and 4-9 were not included in the suggested order of lessons. They were replaced with lessons that are more conceptual and have more opportunities for problem solving.*

SDUSD Math Lesson Map

Number Talks 15 minutes

Number Talks are a chance for students to come together to practice fluency and share their mathematical thinking by engaging in conversations and discussions around problem solving and number sense activities.

The structure of math lessons should follow the Launch, Explore, Summarize format. This structure allows students to explore mathematical concepts with rigor (fluency, concept development, and application) to develop understanding in ways that make sense. Some rich tasks may take multiple days for students to explore. In these cases, each day should still follow the Launch, Explore, Summarize format.

LAUNCH (5–10 minutes)

The teacher sets the stage for learning by ensuring the purpose and the rationale of the lesson are clear by connecting the purpose to prior learning, posing the problem(s), and introducing the Explore task for students. During this time the teacher is identifying the tools and materials available, reviewing academic vocabulary, and setting the expectations for the lesson.

The students are actively engaged in a short task or discussion to activate prior knowledge in preparation of the Explore task. Students may be using tools and/or manipulatives to make sense of the mathematical concept.

WHOLE GROUP

EXPLORE (15–20 minutes)

The teacher provides opportunities and support for students to develop conceptual understanding by providing meaningful explorations and tasks that promote active student engagement.

The teacher monitors the development of student understanding by conferring with students and asking students questions in order to understand and stimulate their thinking. The teacher uses this information to plan for the Summarize and, if needed, to call the students together for a mid-Explore scaffold to focus or propel student thinking.

The students are actively engaged in constructing meaning of the mathematical concept being taught. Students engage in private reasoning time before working with partners or groups. Students use multiple representations to solve rich tasks and communicate their mathematical understanding.

INDIVIDUAL, PAIRS, OR SMALL GROUP

SUMMARIZE (15–20 minutes)

The teacher provides opportunities to make public the learning that was accomplished by the students by sharing evidence of what was learned, and providing opportunities for students to analyze, compare, discuss, extend, connect, consolidate, and record thinking strategies. A summary of the learning is articulated and connected to the purpose of the lesson.

The students are actively engaged as a community of learners, discussing, justifying, and challenging various solutions to the **Explore** task. The students are able to articulate the learning/understanding of the mathematical concept being taught either orally or in writing. Students can engage in this discussion whether or not they have completed the task.

WHOLE GROUP

PRACTICE, REFLECT, and APPLY (10–15 minutes)

This time is saved for after the Summarize so students can use what they have learned to access additional tasks. The opportunities that teachers provide are responsive to student needs.

The students may have the opportunity to: revise their work, reflect on their learning, show what they know with an exit slip, extend their learning with a similar or extension problem, or practice with centers or games.

The teacher confers with individual students or small groups.

INDIVIDUAL, PAIRS, OR SMALL GROUP

FORMATIVE ASSESSMENT

The teacher determines what students are learning and are struggling with by conferring with students and by examining student work throughout the lesson. This formative assessment informs ongoing adjustments in the lesson and next steps for the class and each student.

The students are actively engaged in showing their learning accomplishments related to the mathematical concept of the lesson.

SDUSD Mathematics Units

We understand that for deep and sustainable change in mathematics to take place, teachers, students, and leaders must grapple with what the rich mathematics asked for by Common Core State Standards-Mathematics looks like in the classroom, in pedagogical practice, in student work, in curriculum, and in assessments. It is our goal that teachers and site leaders work collaboratively toward a shared vision of math instruction that develops mathematically proficient students as defined by the CCSS-Mathematics. It is our hope that these units provide a common instructional foundation for this collaboration.

The SDUSD Mathematics Units are designed to support teachers and students as we shift from a more directive style of teaching mathematics toward a more inquiry-based style. In problem-based learning, students develop the habits of mind and interaction of mathematicians through engaging in mathematical discourse, connecting representations, asking genuine questions, and justifying and generalizing ideas. These mathematical habits reflect the shifts in pedagogy required to support the Common Core Standards for Mathematical Practice.

The SDUSD math units are compiled with multiple sources to ensure students have a variety of mathematical experiences aligned to the CCSS. All lessons should follow the structure of Launch, Explore, and Summarize. The following document will guide teachers in planning for daily lessons, by helping them understand the structures of each of the sources.

Structure for enVision 2.0 Lessons

Use Step 1 Develop: Problem-Based Learning is the Launch, Explore, and Summarize for every enVision 2.0 Lesson.

Launch: (Before)

Start with the Solve-and-Share problem. Pose the problem to the students making sure the problem is understood. This does not mean you explain *how* to do the problem, rather you ensure that students understand what the problem is about. Establish clear expectations as to whether students will work individually, in pairs, or in small groups. This includes making sure students know which representations and tools they might be using or if they will have a choice of materials.

Explore: (During)

Students engage in solving the problem using a variety of strategies and tools. Use the suggested guiding questions to check in briefly with students as needed, in order to understand and push student thinking. You may want to use the “Extension for Early Finishers” as needed.

Summarize: (After)

Select student work for the class to analyze and discuss. If needed, use the Sample Student Work provided for each lesson in enVision 2.0.

Practice, Reflect, Apply: (Select Problems from Workbook Pages, Reteach, Games, Intervention Activity)

During this time, students may revise their work from the Explore time or you may use pieces of Step 2 Develop: Visual Learning and Step 3 Assess and Differentiate. Note: The Quick-Check component is now a few select problems that are highlighted with a pink checkmark in the Teacher’s Edition. This time provides an excellent opportunity to pull small groups of students that may need additional support.

Structure for Engage NY Lessons

Launch/Explore: (Concept Development)

The Concept Development constitutes the major portion of instructional time when new learning is introduced. During this time, the lessons move through a deliberate progression on material, from concrete to pictorial to abstract. Your word choice may be slightly different from that in the vignettes, and you should use what works from the suggested talking points to meet your students' needs.

Summarize: (Student Debrief)

The student debrief piece helps develop students' metacognition by helping them make connections between parts of the lesson, concepts, strategies, and tools on their own. The goal is for students to see and hear multiple perspectives from their classmates and mentally construct a multifaceted image of the concepts being learned. Through questions that help make these connections explicit, and dialogue that directly engages students in the Standards for Mathematical Practice, they articulate those observations so the lesson's objective becomes eminently clear to them.

Practice, Reflect, Apply: (Problem Set/Exit Ticket)

The Problem Set often includes fluency pertaining to the Concept Development, as well as conceptual and application word problems. The primary goal of the Problem Set is for students to apply the conceptual understandings learned during the lesson.

Exit Tickets are quick assessments that contain specific questions to provide a quick glimpse of the day's major learning. The purpose of the Exit Ticket is twofold: to teach students to grow accustomed to being individually accountable for the work they have done, and to provide you with valuable evidence of the efficacy of that day's work which is indispensable for planning purposes. This time provides an excellent opportunity to pull small groups of students that may need additional support.

Structure for Georgia Standards Lessons

The Georgia Standards tasks have been included in the units to provide students opportunities for rich, engaging, real-world mathematical experiences. These tasks allow students to develop conceptual understanding over time and may take more than one math lesson to complete. The extra time for these lessons has been allotted for in the units. When planning for a Georgia Task, it is suggested that you start by doing the mathematics the students will be engaging in before presenting it to the students.

Launch:

You may need to activate prior knowledge for some of the tasks that will be presented by showing images, letting students engage in partner talk about real-life situations, or using the suggested activity from the background knowledge component. Pose the task to the students making sure the task is understood. This does not mean that you explain *how* to do the problem, rather you ensure that students understand what the problem is about. You establish clear expectations as to whether students will work individually, in pairs, or in small groups. This includes making sure students know which representations and tools they might be using or if they will have a choice of materials.

Explore:

Students will engage in working on the task using a variety of strategies and tools. You may use the Essential Questions or Formative Assessment questions provided in the lesson as needed in order to understand and prompt student thinking.

Summarize:

Select student work for the class to analyze and discuss. Use partnerships and whole-class collaborative conversations to help students make sense of each others' work. The Formative Assessment questions may also be used during this time to facilitate the conversation.

Practice, Reflect, Apply:

At this time, provide students time to reflect and revise their work from the Explore after they have engaged in the conversation in the Summarize portion of the lesson. This time provides an excellent opportunity to pull small groups of students that may need additional support.

Common Core Approach to Assessment

Assessments provide ongoing opportunities for students to show their learning accomplishments in addition to offering students a pathway to monitor their progress, celebrate successes, examine mistakes, uncover misconceptions, and engage in self-reflection and analysis. A central goal of assessments is to make students aware of their strengths and weaknesses and to give them opportunities to try again, do better and, in doing so, enjoy the experience of seeing their hard work pay off as their skill and understanding increases. Furthermore, the data collected as a result of assessments represent invaluable tools in the hands of teachers and provides specific data about student understanding that can inform instructional decisions.

For each Topic in enVision 2.0 the following assessments are available:

In the Student Workbook:

- Topic Assessment
- Performance Assessment

Online Teacher's Edition:

- Additional topic assessment Black-line Master
- Additional performance assessment Black-line Master

Online Student Assessment

- Teacher can modify the number of items on an assessment
- Teacher can rearrange order of problems

All of the assessment items for enVision 2.0 are aligned to the types of problems students may encounter on state testing. We have found enVision 2.0 has an excessive amount of items suggested for each topic. To avoid over-assessing, we recommend that school sites work collaboratively in grade-level teams to determine how to best use all the assessment resources available to evaluate student understanding and reduce the amount of items assessed. The SDUSD math units have grouped related topics together within a unit. Sites may choose to only give an assessment at the end of each unit, consisting of items from multiple topics, rather than using multiple days to assess each topic individually.

Multiplication Three in a Row

In this task, students practice multiplying 2-digit by 2 or 3-digit numbers in a game format.

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

STANDARDS FOR MATHEMATICAL PRACTICE

- SMP 6. Attend to precision.
- SMP 7. Look for and make use of structure.
- SMP 8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

This game can be made available for students to play independently. However, it is important for students to share some of the strategies they develop as they play more. Strategies may include:

- estimating by rounding the numbers in Box A
- multiplying tens first, then ones; for example, $47 \times 7 = (40 \times 7) + (7 \times 7) = 280 + 49 = 329$

Be sure students know and understand the appropriate vocabulary used in this task. Provide index cards or sentence strips with key vocabulary words (i.e. factor, product). Have students place the cards next to the playing area to encourage the usage of correct vocabulary while playing the game.

COMMON MISCONCEPTIONS

Students may overlook the place value of digits, or forget to use zeros as place holders, resulting in an incorrect partial product and ultimately the wrong answer.

ESSENTIAL QUESTIONS

- How can estimating help us when solving multiplication problems?
- What strategies can we use to efficiently solve multiplication problems?

MATERIALS

- Color Counters
- “Three in a Row” game board (printed on card stock and/or laminated for durability)
- Calculators

GROUPING:

Small Group or Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Comments: Being able to estimate and mentally multiply a 2-digit number by a 2 or 3-digit number is an important pre-requisite skill for dividing a whole number by a 2-digit number. Helping students develop their mental computation or estimation abilities in general is also an important focus of Grade 4 GPS. As students play this game, encourage students to try mental computation and explain strategies. It is important to remind them that they can use the calculator **only after** they announce their products. Remember that we want students to use estimation skills and mental math strategies to multiply a 2-digit number by a 2 or 3-digit number

KEY TO THREE IN A ROW GAME

79x25 or 25x79 1,975	91x76 or 76x91 6,916	232x802 or 802x232 186,064	472x32 or 32x472 15,104	91x802 or 802x91 72,982	18x512 or 512x18 9,216
18x802 or 802x18 14,436	232x32 or 32x232 7,424	472x76 or 76x472 35,872	35x512 or 512x35 17,920	232x25 or 25x232 5,800	18x97 or 97x18 1,746
91x97 or 97x91 8,827	79x512 or 512x79 40,448	18x25 or 25x18 450	232x76 or 76x232 17,632	79x32 or 32x79 2,528	35x802 or 802x35 28,070
79x76 or 76x79 6,004	472x25 or 25x472 11,800	472x97 or 97x472 45,784	35x97 or 97x35 3,395	232x512 or 512x232 118,784	91x32 or 32x91 2,912
18x32 or 32x18 576	79x97 or 97x79 7,663	472x512 or 512x472 241,664	79x802 or 802x79 63,358	18x76 or 76x18 1,368	35x25 or 25x35 875
91x512 or 512x91 46,592	472x802 or 802x472 378,544	35x32 or 32x35 1,120	91x25 or 25x91 2,275	232x97 or 97x232 22,504	35x76 or 76x35 2660

Task Directions

Students will follow the directions below from the “Three in a Row” game board.

This is a game for two or three players. You will need color counters (a different color for each player), game board, pencil, paper, and a calculator.

Step 1: Prior to your turn, choose one number from Box A and one number from Box B. Multiply these numbers on your scratch paper. Be prepared with your answer when your turn comes.

Step 2: On your turn, announce your numbers and the product of your numbers. Explain your strategy for finding the answer.

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Step 3: Another player will check your answer with a calculator after you have announced your product. If your answer is correct, place your counter on the appropriate space on the board. If the answer is incorrect, you may not place your counter on the board and your turn ends.

Step 4: Your goal is to be the first one to make “three-in-a-row,” horizontally, vertically, or diagonally.

FORMATIVE ASSESSMENT QUESTIONS

- Who is winning the game? How do you know?
- (To the winner) What was your strategy?
- Is there any way to predict which factors would be best to use without having to multiply them all? Explain.
- How are you using estimation to help determine which factors to use?
- How many moves do you think the shortest game of this type would be if no other player blocked your move? Why?

DIFFERENTIATION

Extension

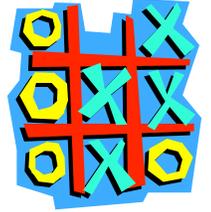
- A variation of the game above is to require each player to place a paper clip on the numbers they use to multiply. The next player may move only one paper clip either the one in Box A or the one in Box B. This limits the products that can be found and adds a layer of strategy to the game.
- Another variation is for students to play “Six in a Row” where students need to make six products in a row horizontally, vertically, or diagonally in order to win.
- Eventually, you will want to challenge your students with game boards that contain simple 3-digit numbers (e.g. numbers ending with a 0 or numbers like 301) in Box A or multiples of 10 (i.e., 10, 20, ... 90) in Box B. As their competency develops, you can expect them to be able to do any 3-digit by 2-digit multiplication problem you choose.

Intervention

- Allow students time to view the game boards and work out two or three of the problems ahead of time to check their readiness for this activity.
- Use benchmark numbers in Box A, such as 25, 50, 100, etc.

Name _____ Date _____

Three in a Row Game Board



This is a game for two or three players. You will need color counters (a different color for each player), game board, pencil, paper, and a calculator.

Step 1: Prior to your turn, choose one number from Box A and one number from Box B. Multiply these numbers on your scratch paper. Be prepared with your answer when your turn comes.

Step 2: On your turn, announce your numbers and the product of your numbers. Explain your strategy for finding the answer.

Step 3: Another player will check your answer with a calculator after you have announced your product. If your answer is correct, place your counter on the appropriate space on the board. If the answer is incorrect, you may not place your counter on the board and your turn ends.

Step 4: Your goal is to be the first one to make "three-in-a-row," horizontally, vertically, or diagonally.

Box A						Box B					
18	232	35	472	79	91	25	32	512	76	802	97

1,975	6,916	186,064	15,104	72,982	9,216
14,436	7,424	35,872	17,920	5,800	1,746
8,827	4,0448	450	17,632	2,528	28,070
6,004	11,800	45,784	3,395	118,784	2,912
576	7,663	24,1664	63,358	1,368	875
46,592	37,8544	1,120	2,275	22,504	2,660

Objective: Multiply decimal fractions with tenths by multi-digit whole numbers using place value understanding to record partial products.

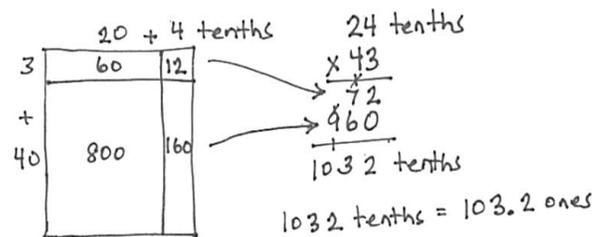
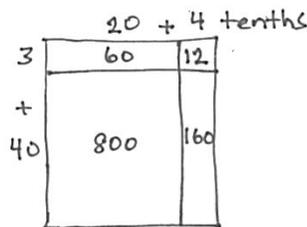
Concept Development (32 minutes)

Materials: (S) Personal white boards

Problems 1–3

43×2.4

- T: (Write 43×2.4 on the board.) Round the factors to estimate the product.
- S: (Show.) $40 \times 2 = 80$.
- T: Predict whether our estimate is greater than or less than the actual product.
- S: Less than, because both factors were rounded to numbers less than the actual factors. → Our actual answer might be about 90.
- T: We have 43 units of 2.4. I'd like to rename 2.4 using only tenths. How many tenths would that be?
- S: 24 tenths.
- T: Decompose those 24 tenths into expanded form along the length of our rectangle. Let's write tenths out to the right to remind us of the unit. (Demonstrate.)



- S: (Draw.)
- T: Our rectangle's width is 43 whole units. Decompose 43 into expanded form along the width.
- S: (Draw.)
- T: What partial products do the rows represent?
- S: 3×24 tenths and 40×24 tenths.
- T: Find the partial products and the final product.
- S: (Multiply the cells and add the rows.)
- T: We found that we have 1,032 of what unit?
- S: Tenths.
- T: Write 1,032 tenths in standard form.
- S: 103.2.
- T: Compare this to our estimate. Is our product reasonable?
- S: Our estimate was 80, and our exact product is 103.2. Our product is reasonable.
- T: Let's solve this same problem using the algorithm. (Write $24 \text{ tenths} \times 43$ on the board as shown.) When we find the product, we have to remember that we copied tenths. Solve this problem, and then share with your partner.

S: (Work and share.)

T: Look back at your area model. Find these partial products in your algorithm. Turn and talk.

S: 72 is the first row in the area model and the first row in the algorithm. → I see 72 tenths in both of them. → I see 960 tenths in the second row of both.

T: We've found 1,032 tenths using a second strategy. Let's write it in standard form.

S: 103.2.

It's important to have students recognize that the area model that's been drawn using whole number values would be 10 times as wide as the model we would draw using tenths.

T: We don't have to do this process in such a long way. Here is a simplifying short cut for multiplying by 1. We can first multiply one of the factors by 10 and then divide the product by 10.

The student demonstrates this with the algorithm by multiplying by 10 and then dividing by 10. "It's like multiplying by 1! 2 times 3 times 10 divided by 10 is 6. See, it's the same idea just with bigger numbers."

$$\begin{array}{r}
 2.4 \\
 \times 43 \\
 \hline
 72 \\
 + 960 \\
 \hline
 1032
 \end{array}$$

$2.4 \xrightarrow{\times 10} 24$
 $24 \times 43 = 1032$
 $1032 \div 10 = 103.2$

$43 \times 2.4 \xrightarrow{\times 10} 1032 \xrightarrow{\div 10} 103.2$

$1032 \div 10 = 103.2$

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set.

Student Debrief (10 minutes)

Lesson Objective: Multiply decimal fractions with tenths by multi-digit whole numbers using place value understanding to record partial products.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

You may choose to use any combination of the questions below to lead the discussion.

- Discuss Michelle's error in Problem 3 by allowing students to share their representations and explanations. Some students may explain her error by saying that she should have said 1,768 *tenths*. Others may offer that she should have written her answer in standard form as 176.8. Either explanation's premise is that Michelle did not consider the unit of her final product.
- How does being fluent in whole number multi-digit multiplication help you multiply decimals? (Focus student attention on the notion that the algorithm is exactly the same, but different units must be considered when multiplying decimals.)

- Extend student reasoning about decimal multiplication by offering a case such as 0.3×42 . Ask students how they would draw an area model and/or record this case vertically. Point out that the convention is to write the numeral with the most digits as the “top” number in the algorithm, but that this is not expressly necessary. Ask students to discuss how putting the single-digit numeral (3 tenths) as the top number affects the recording of partial products? (It doesn’t. The process is the same. The order is different.)

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students

Name _____ Date _____

1. Estimate the product. Solve using an area model and the standard algorithm. Remember to express your products in standard form.

a. $22 \times 2.4 \approx \underline{\quad} \times \underline{\quad} = \underline{\quad}$

$$\begin{array}{r} 24 \text{ (tenths)} \\ \times 22 \\ \hline \end{array}$$

2. Estimate, and then use the standard algorithm to solve. Express your products in standard form.

a. $3.2 \times 47 \approx \underline{\quad} \times \underline{\quad} = \underline{\quad}$

$$\begin{array}{r} 32 \text{ (tenths)} \\ \times 47 \\ \hline \end{array}$$

3. Michelle multiplied 3.4×52 . She incorrectly wrote 1,768 as her product. Use words, numbers, and pictures to explain Michelle's mistake.

Name _____ Date _____

1. Find the products using the area model and the standard algorithm.

a. 33.2×21

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Performance Task: Bargain Shopping

This culminating task represents the level of depth, rigor and complexity expected of all fifth grade students to demonstrate evidence of learning. In this task, students will determine the best store to buy certain items on their list of needed school supplies. Students will determine how much money they will have left after making appropriate purchases. With the remaining money from their original purchases, students are asked whether or not they can purchase school supplies for their siblings.

STANDARDS FOR MATHEMATICAL CONTENT

Understand the place value system.

MCC5.NBT.2 *Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.*

Perform operations with multi-digit whole numbers and with decimals to the hundredths.

MCC5.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.*

STANDARDS FOR MATHEMATICAL PRACTICE

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

BACKGROUND KNOWLEDGE

You may want to have some class discussions about what constitutes a good value before beginning this task. Students may have different answers for Question 3 based on prior experiences of what “better” means to them. Have students justify their answers.

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ESSENTIAL QUESTIONS

- *How do the rules of multiplying whole numbers relate to multiplying decimals? How can we multiply and divide decimals fluently?*
- *How do we solve problems with decimals?*

MATERIALS

- *“Bargain Shopping” Recording Sheet*
- *Sale Papers for Canton Supplies and Cherokee Discounts*

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Comments:

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the learning process so that students understand what is expected of them. Students may want to practice their estimation skills before participating in this activity.

You may want to have students bring in copies of local advertisements from the newspaper to use for a similar introductory activity. Also, you may want to collect advertisements during the first week of school and save them until you are ready to use them. This way, students could purchase supplies from the store they think offers a better buy.

TASK:

Students will follow the directions below from the “Bargain Shopping” Recording Sheet.

It is time to go shopping for school supplies for next school year. You have ads from two local stores indicating their prices (which include sales tax) for different school supplies. Your mother has given you \$45.50 to spend, and wants you to find the best prices on things you will need.

School Supplies Needed

Eight folders

One calculator

Two packs of regular lined notebook paper (pack of 500 sheets)

Three rulers

Three bottles of glue

Thirty-three pencils

Ten pens

Five spiral notebooks

Two backpacks

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1. *Determine the cheapest price for each item on your list of school supplies needed. From which store would you buy each school supply? How much money will you have to spend? How much of the \$45.50 will you have left over?*
2. *With the remaining money, you decide to buy each of your three siblings the same school supply item. What item would you purchase?*
3. *Is one store better than the other? Why or why not?*
4. *If you could choose only one store, which would it be? Explain your reasoning by writing an overall summary of your findings.*

See sale papers from two different stores shown below.

FORMATIVE ASSESSMENT QUESTIONS

- *What is your strategy for completing this task?*
- *What factors influence your decision about which store has better values?*
- *How would you determine the store in which you would make your purchases if you had to choose only one store?*

Name _____

Bargain Shopping Recording Sheet



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School Supplies Needed

Eight folders One
calculator

Two packs of regular lined notebook paper (pack of 500 sheets) Three
rulers

Three bottles of glue
Thirty-three pencils Ten
pens

Five spiral notebooks Two
backpacks

1. Determine the cheapest price for each item on your list of school supplies needed. From which store would you buy each school supply? How much money will you have to spend? How much of the \$45.50 will you have left over?
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3. Is one store a better overall value than the other? Why or why not?
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CHEROKEE DISCOUNTS		
<p>Calculator \$6.99</p> 	<p>Lined Paper 500 sheets 93¢</p> 	<p>Folder 15¢ each</p> 
<p>Erasers - large 52¢ each</p> 	<p>Clipboard \$2.15</p> 	<p>Book Covers 4 for \$2.00</p> 
<p>Glue 2 oz. bottle 95¢</p> 	<p>Backpack \$8.97</p> 	<p>Pencils 11¢ each 10 pack --</p> 
<p>Scissors \$1.75</p> 	<p>Pens 29¢ each \$3.56 - 15 pack</p> 	<p>Ruler \$1.45</p> 
	<p>Spiral Notebooks 99¢ each</p> 	
CANTON SUPPLIES		
<p>Calculator \$12.98 - regular</p> 	<p>Lined Paper 500 sheets Regular Price - 47¢</p> 	<p>Folder 15¢ each</p> 
<p>Erasers - large 60¢ each</p> 	<p>Clipboard \$1.99</p> 	<p>Book Covers \$1.50</p> 
<p>Glue 2 oz. bottle 39¢</p> 	<p>Backpack \$8.37</p> 	<p>Pencils 69¢ each 10 pack -- \$2.02</p> 
<p>Scissors \$2.13</p> 	<p>Pens 35¢ each \$4.08 - 15 pack</p> 	<p>Ruler \$1.14 each</p> 
	<p>Spiral Notebooks 75¢ each</p> 	

CULMINATING TASK: Field Trip

Adapted from Bowland Maths

This culminating task represents the level of depth, rigor, and complexity expected of all fifth grade students to demonstrate evidence of learning. Students will plan a field trip and analyze how to determine the most cost effective trip based on the given data. In order to do this, students will need to use reasoning to: determine which trip should be taken, calculate costs for one trip, and use repeated reasoning to explain how to compare costs on other trips.

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.NBT.4 Use place value understanding to round decimals to any place. Perform operations with multi-digit whole numbers and with decimals to hundredths.

MCC5.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. Students' work will represent some uniqueness based on how they approach the problem. Students will need to reflect on their own understanding of place value and decimal operations.

ESSENTIAL QUESTIONS

- *What factors should be taken into consideration when deciding where to go on a field trip?*
- *How can decimal computation help people make decisions?*

MATERIALS

- *"Field Trip" task sheet.*

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

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 formative 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

Students will follow the directions below from the “Field Trip” students recording sheet.

Mr. Richards, a teacher at Crosstown Elementary School, plans to take 30 students on a school trip. The class voted on which place to visit.

The following questions can be asked to make sure the students understand the situation:

- *Which place has the cheapest entrance fee?*
- *Which place is nearest?*
- *What are Lucy’s first and second choices?*
- *How much do teachers have to pay?*
- *How much will the school pay towards the total cost of the trip?*

FORMATIVE ASSESSMENT QUESTIONS

- *How would you find the total cost for going on the _____ field trip?*
- *How does multiplication of decimals help you find the total cost of the field trip?*
- *How could you do this task without using multiplication?*
- *What stays the same no matter which field trip the class goes on?*
- *How is going on the _____ field trip different from the _____ field trip?*
- *How could you find out if one of the trips would be cheaper?*
- *Taking the total cost into account, which trip will be the cheapest/most expensive?*
- *How could an expression help you find the total cost of the different trips?*

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Name _____ Date _____

Field Trip

Mr. Richards, a teacher at Crosstown Elementary School, plans to take 30 students on a school trip. Here are the places they could visit.

Big City Zoo	Prison Museum	Space Science Show
		
36 miles from Crosstown Elementary School Entrance Fee: \$2.50 per person	30 miles from Crosstown Elementary School Entrance Fee: \$6.75 per person	10 miles from Crosstown Elementary School Entrance Fee: \$11.25 per person

The class voted on which place to visit. Here are the results.

	ZOO	PRISON MUSEUM	SPACE SCIENCE SHOW
First Choice	12 Students	8 Students	10 Students
Second Choice	5 Students	14 Students	11 Students

1. Taking first and second choices into account, where do you think Mr. Richards should take his class? Explain how you decided.

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Here are some more facts about the trip.

- The bus company charges \$6.29 per mile.
- The school will pay the first \$200 of the trip.
- Teachers go free.
- Each student pays the same amount.

2. How much will each student need to pay to go on the trip you have chosen? Explain your thinking.

3. Explain to Mr. Richards how he could figure out which trip would be the cheapest.