5 Math Unit 05: Multiply Multi-Digit Whole Numbers

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 2**
Length: **12 Days**
Status: **Published**

Unit Overview

Multiply Multi-Digit Whole Numbers

In this unit, students are guided gradually from their previous understanding of place-value relationships to a concrete understanding of multi-digit multiplication. They begin by writing powers of 10 in exponential form and then work to identify patterns when multiplying powers of 10.

Students then begin to estimate products, using compatible numbers and rounding. Estimation gives students a way to think about computation with larger numbers. For example, the magnitude of the product 5,136 X 13 may not be as easy for students to comprehend as 5,000 X 10. That may be because students may lose sense of the magnitude of the product when they work through the steps of finding 5, 136 X 13. After they estimate products, students begin finding exact products by using area models and partial products.

Students then relate their understanding of partial products to an algorithm. Multiplying multi-digit numbers using an algorithm can be an abstract process. Even when students multiply the digits in the correct order and regroup accurately, they may not be fully aware of the actual quantities with which they are working.

What Students Are Learning

- Students use whole-number exponents to denote powers of 10.
- Students explain patterns when multiplying a number by powers of 10.
- Students use patterns to multiply a number by powers of 10.
- Students use area models to determine partial products and relate the partial products to the standard algorithm.
- Students multiply multi-digit whole numbers using an algorithm.

Number Routines

- About How Much?
- Find the Pattern, Make a Pattern
- Greater Than or Less Than
- What's Another Way to Write It?
- Which Doesn't Belong?
- Notice & Wonder

Standards

MATH.5.NBT.A.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.

MATH.5.NBT.B.5	With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm.

Materials

Core Materials:

Reveal Math

5.1 Understand Powers and Exponents

5.2 Patterns When Multiplying a Whole Number by Powers of 10

5.3 Estimate Products of Multi-Digit Factors

5.4 Use Area Models to Multiply Multi-Digit Factors

5.5 Use Partial Products to Multiply Multi-Digit Factors

5.6 Relate Partial Products to an Algorithm

5.7 Multiply Multi-Digit Factors Fluently

Supplemental Materials:

- ST Math
- Happy Numbers
- 3 Act Lessons
- Building Fact Fluency Kit
- Brainingcamp Manipulatives
- Nearpod Lessons
- Brainpop Resources
- Online Resources

Technology

CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.3	Organize and present collected data visually to communicate insights gained from different views of the data.
CS.3-5.8.1.5.DA.4	Organize and present climate change data visually to highlight relationships or support a claim.
CS.3-5.8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
CS.3-5.8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.
CS.3-5.DA	Data & Analysis

Individuals can select, organize, and transform data into different visual representations and communicate insights gained from the data.

Data can be organized, displayed, and presented to highlight relationships.

Assessment

Formative Assessment

- Unit Readiness Diagnostics
- Lesson Checks
- Exit Tickets
- Teacher Observation

Summative Assessment

- Unit Assessment Performance Task
- Benchmark Tests
- Alternative Assessments: Performance Tasks & Projects

Accommodations & Modifications

Special Education

Differentiated Instruction			
Accommodate Based on Students Individual Needs: Strategies			
Time/General • Extra time for assigned tasks • Adjust length of assignment • Timeline with due dates for reports and projects • Communication system between home and school • Provide lecture notes/outline	**Processing** • Extra response time • Have students verbalize steps • Repeat, clarify, or reword directions • Mini-breaks between tasks • Provide a warning for transitions • Reading partners	**Comprehension** • Precise step-by-step directions • Short manageable tasks • Brief and concrete directions • Provide immediate feedback • Small group instruction • Emphasize	**Recall** • Teacher-made checklist • Use visual graphic organizers • Reference resources to promote independence • Visual and verbal reminders • Graphic

		multi-sensory learning	organizers
Assistive Technology • Computer/whiteboard • Tape recorder • Spell-checker • Audio-taped books	**Tests/Quizzes/Grading** • Extended time • Study guides • Focused/chunked tests • Read directions aloud	**Behavior/Attention** • Consistent daily structured routine • Simple and clear classroom rules • Frequent feedback	**Organization** • Individual daily planner • Display a written agenda • Note-taking assistance • Color code materials

504

- In class/pull out support with special ed teacher Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks Graphic organizers
- Vocabulary support Mnemonic devices
- Songs/videos to reinforce concepts Limit number of questions
- Scribe Manipulatives Calculators Reteach pages Leveled homework
- Lesson intervention activities
- Math Diagnosis & Intervention System Another look homework video
- Practice buddy

ELL

- Translation device/dictionary
- In class/pull out support with ESL teacher
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Manipulatives
- Math Diagnosis & Intervention System

At-risk of Failure

- Additional time during intervention time
- Questions read aloud

- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Manipulatives
- Calculators
- Reteach pages
- Leveled homework
- Lesson intervention activities
- Math Diagnosis & Intervention System
- Another look homework video
- Practice buddy

Gifted & Talented

- Independent projects
- Enrichment pages
- Online games
- Leveled Homework
- Extension Activities
- Today's Challenge

Interdisciplinary Connections

SCI.3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
ELA.RI.MF.5.6	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears.
ELA.SL.PE.5.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

Career Readiness, Life Literacies & Key Skills

Critical Thinking and Problem Solving

• 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).

• 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

Technology Literacy

• 9.4.2.TL.3: Enter information into a spreadsheet and sort the information.

• 9.4.2.TL.4: Navigate a virtual space to build context and describe the visual content.

9.4.2.TL.7: Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts

	People can choose to save money in many places such as home in a piggy bank, bank, or credit union.
PFL.9.1.5.FI.1	Identify various types of financial institutions and the services they offer including banks, credit unions, and credit card companies.
PFL.9.1.5.PB.1	Develop a personal budget and explain how it reflects spending, saving, and charitable contributions.
WRK.9.2.5.CAP.3	Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
WRK.9.2.5.CAP.4	Explain the reasons why some jobs and careers require specific training, skills, and certification (e.g., life guards, child care, medicine, education) and examples of these requirements.
TECH.9.4.5.CT	Critical Thinking and Problem-solving
TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).
	The ability to solve problems effectively begins with gathering data, seeking resources, and applying critical thinking skills.

Career Ready Practices

STEM CAREER: Entomologist Student discusses his aspirations to be an entomologist. Student and entomologist count ladybugs. They use multidigit multiplication to do their work, including estimating a population.

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP12. Work productively in teams while using cultural global competence.