

Multiplying and Dividing by Multiples of 10

Introduction

Review place value. Write a six-digit number on the board, with the same numeral for each digit, such as *333,333*. Ask students to give the value of each digit. Then, have students discuss patterns they notice with a partner.

Creating the Notebook Page

Guide students through the following steps to complete the right-hand page in their notebooks.

- 1. Add a Table of Contents entry for the Multiplying and Dividing by Multiples of 10 pages.
- 2. Cut out the title and glue it to the top of the page.
- 3. Cut out the multiplication rectangle. Fold the right side in on the dashed line. Apply glue to the back of the large section and attach it to the page.
- 4. With the flap folded in, complete each multiplication sentence by writing an equal sign and the answer on the flap. Look at the patterns in the products. Open the flap and write the patterns on the underside of the flap.
- 5. Repeat steps 3 and 4 for the division rectangle.
- 6. Cut out the three multiplication and division problem pieces. Fold each piece on the dashed line. Apply glue to the gray glue sections and attach each piece to the bottom of the page.
- 7. Solve each problem and write the answer under the flap.

Reflect on Learning

To complete the left-hand page, have students develop a rule for multiplying by multiples of 10 and for dividing by multiples of 10. Students should support their rule by providing several examples.

Answer Key 52,000; 0.31; 1,040,000





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Exponents

Introduction

Write several long repeated addition sentences on the board, such as 4 + 4 + 4 + 4 + 4. Have students approach the board and rewrite each problem in a simpler way. Discuss how multiplication is repeated addition. Then, write a long repeated multiplication sentence on the board, such as $2 \times 2 \times 2 \times 2 \times 2 \times 2$. Explain that exponents are a simpler way to show repeated multiplication.

Creating the Notebook Page

Guide students through the following steps to complete the right-hand page in their notebooks.

- 1. Add a Table of Contents entry for the Exponents pages.
- 2. Cut out the title and glue it to the top of the page.
- 3. Cut out the definition piece and glue it to the top left side of the page.
- 4. Complete the definition. (Exponents are a way to show **repeated multiplication** of a single **number**.)
- 5. Cut out the 3⁵ piece. Glue it to the right of the definition.
- 6. Cut out the *base* and *exponent* arrows. Discuss the two parts of exponential notation. Glue the arrows to the 3⁵ piece to label the parts.
- 7. Return to the definition piece and complete the definitions of *base* (the number **multiplied**) and *exponent* (how many times the **base** is **multiplied** by **itself**).
- 8. Cut out the four L-shaped pieces. Place each piece with the text face down and fold in the blank side. Then, fold down the top flap with the text. Apply glue to the gray glue sections and attach them to the bottom of the page.
- 9 To complete each piece, flip up the top flap and write the related exponent or repeated multiplication sentence on the blank flap. Then, flip out that flap and write the answer on the bottom rectangle.

Reflect on Learning

To complete the left-hand page, have students solve exponents for several powers of 10, such as 10^2 , 10^3 , 10^4 , etc. Students should then describe patterns they see in powers of 10.

Answer Key 4³, 64; 84, 4,096; 2 × 2 × 2 × 2 × 2 × 2 × 2, 64; 5 × 5 × 5, 125





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Multiplying Multi-Digit Numbers

Introduction

Review multiplication by writing a 3-digit by 1-digit problem and a 2-digit by 2-digit problem on the board. Have students solve each problem. Discuss strategies used to solve each problem, emphasizing the traditional algorithm.

Creating the Notebook Page

Guide students through the following steps to complete the right-hand page in their notebooks.

- 1. Add a Table of Contents entry for the Multiplying Multi-Digit Numbers pages.
- 2. Cut out the title and glue it to the top of the page.
- 3. Cut out the large rectangle with the four steps and example problem. Cut on the solid lines to create four flaps. Apply glue to the back of the right-hand flap of the large rectangle and attach it to the top of the page.



- 4. Under each flap, write a description of the step. (1. Multiply the top number by the ones place of the bottom number from right to left. 2. Multiply the top number by the tens place from right to left. Add a zero in the ones place of the answer. 3. Continue multiplying the top number by each place value, from right to left. 4. Add the numbers to get the final product.)
- 5. Color each flap a different color. Then, solve the example problem. Color code each step of the process to match the flaps.
- 6. Cut out the *Multiply* piece. Cut along the solid lines to create six flaps. Apply glue to the back of the rectangular section to attach it to the bottom of the page.
- 7. Solve each multiplication problem. Write the product under the flap.

Reflect on Learning

To complete the left-hand page, have students create a 3- or 4-digit number from their birth date. For example, March 3 would be 303, and November 19 would be 1,119. Then, have students record 3 or 4 other students' numbers. From these numbers, student should create several different multiplication problems and solve them.





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Dividing Multi-Digit Numbers

This lesson is designed to introduce one or more strategies at a time and can be taught during a period of days or weeks. If desired, each strategy may be placed on a separate page.

Introduction

Review simple division facts. Have students solve several problems with a partner. Then, have students solve one of the same problems, but with the dividend replaced by a multiple of 10. For example, if students previously solved $76 \div 4$, have them solve $760 \div 4$. Then, briefly discuss strategies they used to find the new quotient.

Creating the Notebook Page

Guide students through the following steps to complete the right-hand page in their notebooks.

- 1. Add a Table of Contents entry for the Dividing Multi-Digit Numbers pages.
- 2. Cut out the title and glue it to the top of the page.
- 3. Cut out each rectangle. Apply glue to the back of the title sections to attach each rectangle to the page.
- 4. Work through each example step-by-step to complete the front of each flap. You may choose to use different colors to show the separate steps of each method. As you work through each method, write notes and helpful tips under the flap. For example, you may want to add a note about how to handle a zero in a dividend in the standard equation, or a hint about starting with multiples of 10 in the Partial Quotient Method.

Reflect on Learning

To complete the left-hand page, have students divide the school's zip code by the school's street address (or vice versa if the street address is larger than the zip code). Then, have students divide the school's seven-digit phone number by the school's area code. They may use any method or methods of their choosing.



Dividing Multi-Digit Numbers



Reading and Writing Decimals

Introduction

Write a six- or seven-digit number on the board. Ask students to write the number in word form and expanded form. Then, repeat with a number written in word form, and a number written in expanded form, having students rewrite it in the other two forms.

Creating the Notebook Page

Guide students through the following steps to complete the right-hand page in their notebooks.

- 1. Add a Table of Contents entry for the Reading and Writing Decimals pages.
- 2. Cut out the title and glue it to the top of the page.
- 3. Next, cut out the *Standard Form, Word Form,* and *Expanded Form* rectangles. Fold each piece on the dashed line near the title. Apply glue under the title section of each rectangle and attach it to the page below the title.



- 4. To complete the *Expanded Form* piece, place the dashed line after the 2 right before the 8 in 0.008. Press down to flatten. Repeat with the dashed lines after the 1 and the 4, flattening as you go. When complete, it should show the number 4.128 when folded, and 4 + 0.1 + 0.02 + 0.008 when unfolded.
- 5. Write a short explanation of or helpful hint for each form under the flap made by each rectangle.
- 6. Finally, cut out the triangle piece with the three flaps. Fold on the dashed lines. Apply glue to the back of the triangle to attach it to the page. Write any decimal on the triangle. You may choose to have all students write the same number, or allow them to choose their own number. Then, write the different forms for that decimal under each corresponding flap.

Reflect on Learning

To complete the left-hand page, have students write the three forms for the number 57.063 as you say it aloud. Have students write in their own words how they chose to handle the "missing" number in the tenths place.

Reading and Writing Decimals

