

Powers of Ten

STRAND: Number and Number Sense

STRAND CONCEPT: Exponents, Squares, Square Roots

SOL: 6.4

Remediation Plan Summary

Students explore patterns involving the powers of ten and exponents, using a scientific calculator.

Common Errors and Misconceptions

Students sometimes try to multiply all of the tens by hand, and end up with the incorrect standard form, rather than thinking about the pattern with the powers of ten.

Materials

- Scientific calculators
- “Calculating Tens Recording Sheet” handouts

Introductory Activity

Present the following patterns to the students:

5	50	500	5,000	?
13	130	1,300	13,000	?

Ask students to identify the next number in each pattern. (50,000 and 130,000) Ask how these patterns are alike. (Possible answers: “Each number has one more 0 than the number before it. Each number has one more place-value position than the number before it. You multiply a number by 10 to find the number that comes next.”)

Plan for Instruction

- Distribute calculators and copies of the “Calculating Tens Recording Sheet” handout.
- Explain the directions for using the calculator to complete the recording sheet, as follows: First, enter the number 10 on the calculator; the result appears in the display window. Note on the recording sheet that to “compute” the product for 10, we simply enter 10 on the calculator. The final column is a way to write 10 in exponential form. Explain that a number written in exponent form has a base number and an exponent. The base number is the factor that is being multiplied. The exponent tells how many times the base number is used as a factor. In this case, the base number is used once; therefore, the exponent is 1.
- For the second row of the table, have students find the result for the computation 10×10 by pressing the “X” key, entering the number 10, and then pressing the “=” key. Have them write the product (from the display window) in the table. (100) Ask students to identify the base number (10) and the exponent (2) and write them in the last column. Ask the students what the 2 represents.

Name: _____

Calculating Tens Recording Sheet

Compute	Enter on the Calculator	Product	Exponent Form
10×1	10×1	10	10^1
10×10	$\times 10 =$		10^2
$10 \times 10 \times 10$	$=$		10^3
	$=$		
	$=$		
	$=$		
	$=$		

What patterns do you notice?