

WORKSHEET

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MATH SKILLS

What Is Scientific Notation?

Sometimes scientific calculations result in very large numbers, like 918,700,000,000,000, or in very small numbers, such as 0.0000000578. **Scientific notation** is a short way of representing such numbers without writing the place-holding zeros. In scientific notation, we write the number as a product of two factors: the first is a number between 1 and 10, and the second is a power of ten, written as 10^{exponent} .

PROCEDURE: To write a number in scientific notation, first identify which digits are not place-holding zeros. Then place the decimal point after the leftmost digit. To find the exponent for the factor of 10, count the number of places that you moved the decimal point. If you moved the decimal point to the left, the exponent will be positive. If you moved the decimal point to the right, the exponent will be negative.

SAMPLE PROBLEM: Write 653,000,000 in scientific notation.

<p>Step 1: Identify the number without the place-holding zeros.</p> <p style="text-align: center;">653</p>	<p>Step 2: Place the decimal point after the leftmost digit.</p> <p style="text-align: center;">6.53</p>
<p>Step 3: Find the exponent by counting the number of places that you moved the decimal point.</p> <p style="text-align: center;">$6.53,000,000 \rightarrow 6.53$</p> <p>The decimal point was moved 8 places to the left. Therefore, the exponent of 10 is positive 8. <i>Remember</i>, if the decimal point had moved to the right, the exponent would be negative.</p>	<p>Step 4: Write the number in scientific notation.</p> <p style="text-align: center;">6.53×10^8</p>

Practice Your Skills!

Original number	Number without place-holding zeros	Power of 10	Number in scientific notation
1. 530,000			
2. 904,580,000			
3. 0.000000617			

4. Express the following data in scientific notation:

- a. 53,657 kg _____ b. 0.000043 L _____
- c. 0.00083 m _____ d. 1011.9 cm _____