

Take out your WS and write the number of problems you completed at the top (28)

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LESSON  
**10.2** Scientific Notation  
with Positive Powers  
of 10

LESSON  
**10.3** Scientific Notation  
with Negative  
Powers of 10

<https://ieer.org/resource/classroom/scientific-notation/>

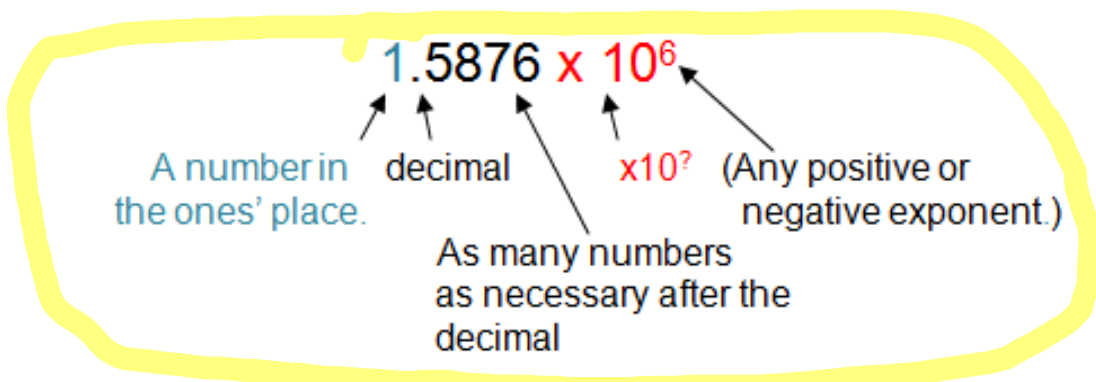


Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or small quantities.

Row  
Integers  $\{ \dots, -1, 0, 1, 2, \dots \}$   
whole  $\{ 0, 1, 2, 3, 4, 5, \dots \}$   
Counting  $\{ 1, 2, 3, 4, \dots \}$

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Scientific notation must always be written with the same components as the following model:



S.N.	=	standard form
2.13 x 10 <sup>3</sup>	=	2130
7.5 x 10 <sup>-4</sup>	=	0.00075
9.8 x 10 <sup>6</sup>	=	9800000
5.67 x 10 <sup>-8</sup>	=	0.0000000567

7<sup>2</sup> = 49

7<sup>-2</sup> = 1/7<sup>2</sup> = 1/49

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## Writing a Number in Scientific Notation

To translate between standard notation and scientific notation, you can count the number of places the decimal point moves.

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### Writing Large Quantities in Scientific Notation

When the number is greater than or equal to 10, use a positive exponent.

84,000 = 8.4 x 10<sup>4</sup>

The decimal point moves 4 places to the left.

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**Write each number in scientific notation.** (Explore Activity and Example 1) pg.306

1. 58,927

Hint: Move the decimal left 4 places.

5.8927 × 10<sup>+4</sup>

58,927  
↑

2. 1,304,000,000

Hint: Move the decimal left 9 places.

1.304 × 10<sup>9</sup>

5. An ordinary quarter contains about 97,700,000,000,000,000,000 atoms.

9.77 × 10<sup>22</sup>

6. The distance from Earth to the Moon is about 384,000 kilometers.

3.84 × 10<sup>5</sup>

**Write each number in standard notation.** (Example 2)

7.  $4 \times 10^5$

Hint: Move the decimal right 5 places.

400,000

8.  $1.8499 \times 10^9$

Hint: Move the decimal right 9 places.

1,849,900,000  
1,849,900,000

9.  $6.41 \times 10^3$

6,410 = 6,410

10.  $8.456 \times 10^7$

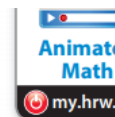
84,560,000  
84,560,000

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**Negative Powers of 10**

pg.309

You can use what you know about writing very large numbers in scientific notation to write very small numbers in scientific notation.



**A typical human hair has a diameter of 0.000025 meter. Write this number in scientific notation.**

**A** Notice how the decimal point moves in the list below. Complete the list.

$2.345 \times 10^0 = 2.345$	<i>It moves one place to the right with each increasing power of 10.</i>	$2.345 \times 10^0 = 2.345$	<i>It moves one place to the left with each decreasing power of 10.</i>
$2.345 \times 10^1 = 23.45$		$2.345 \times 10^{-1} = 0.2345$	
$2.345 \times 10^2 = 234.5$		$2.345 \times 10^{-2} = 0.02345$	

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## Writing a Number in Scientific Notation

To write a number less than 1 in scientific notation, move the decimal point right and use a negative exponent. pg. 310

Writing Small Quantities in Scientific Notation

When the number is between 0 and 1, use a negative exponent.	$0.0783 = 7.83 \times 10^{-2}$	<i>The decimal point moves 2 places to the right.</i>
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pg. 312

Write each number in scientific notation. (Explore Activity and Example 1)

1. 0.000487  
Hint: Move the decimal right 4 places.  
 $4.87 \times 10^{-4}$

2. 0.000028  
Hint: Move the decimal right 5 places.  
 $2.8 \times 10^{-5}$

5. Picoplankton can be as small as 0.00002 centimeter.  
 $2 \times 10^{-5}$   
 $2.0 \times 10^{-5}$

6. The average mass of a grain of sand on a beach is about 0.000015 gram.  
 $1.5 \times 10^{-5}$

Write each number in standard notation. (Example 2)

7.  $2 \times 10^{-5}$   
Hint: Move the decimal left 5 places.  
 $0.00002$

8.  $3.582 \times 10^{-6}$   
Hint: Move the decimal left 6 places.  
 $0.000003582$

11.  $9.06 \times 10^{-5}$   
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12.  $4 \times 10^{-5}$   
 \_\_\_\_\_

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## Homework

-Textbook page 307 (16-21, 26)

-Textbook pages 313-314 (16-21, 28-33)

18 Problems

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