

Name: Key

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

## Scientific Notation

- Scientific notation is a shortened way of writing very big or very small numbers.
- A number written in scientific notation has the form  $a \times 10^n$  where  $1 \leq a < 10$ .

## Converting to Scientific Notation

**Step 1:** Move to decimal so the new number is between 1 and a number up to 10.

**Step 2:** Write using a power of ten. The exponent matches the number of times the decimal was moved.

- If the decimal was moved left, the exponent is positive.
- If the decimal was moved right, the exponent is negative.

**Directions:** Write each number in scientific notation.

	Standard Form	Scientific Notation
1.	540	$5.4 \times 10^2$
2.	937,000	$9.37 \times 10^5$
3.	1,852,000	$1.852 \times 10^6$
4.	76,820	$7.682 \times 10^4$
5.	4,671	$4.671 \times 10^3$
6.	0.00982	$9.82 \times 10^{-3}$
7.	0.05273	$5.273 \times 10^{-2}$
8.	0.0000014	$1.4 \times 10^{-6}$
9.	0.258	$2.58 \times 10^{-1}$
10.	0.00000000725	$7.25 \times 10^{-9}$

**Directions:** Determine if the number is correctly written in scientific notation. If not, correct it.

11.  $2.98 \times 10^7$   
Correct

12.  $11.4 \times 10^3$   
No,  $1.14 \times 10^4$

13.  $85.1 \times 10^{-5}$   
No,  $8.51 \times 10^{-4}$

14.  $6.7 \times 10^{-2}$   
Correct

# Converting to Standard Form

Converting to standard form is even easier. The exponent tells you the directions AND the number of places to move the decimal.

Directions: Write each number in standard form.

	Standard Form	Scientific Notation
15.	6,380	$6.38 \times 10^3$ <del>6.380</del>
16.	209,500	$2.085 \times 10^5$ <del>2.08500</del>
17.	98.2	$9.82 \times 10^1$ 9.82
18.	5,388,000	$5.388 \times 10^6$ <del>5.388000</del>
19.	821	$8.21 \times 10^2$ 8.21
20.	0.0000525	$5.25 \times 10^{-5}$ <del>0.0000525</del>
21.	0.7392	$7.932 \times 10^{-1}$
22.	0.000000162	$1.62 \times 10^{-7}$ <del>0.000000162</del> 62
23.	0.0000000024	$2.4 \times 10^{-9}$
24.	0.06018	$6.018 \times 10^{-2}$

# Comparing Numbers

Directions: Place  $<$  or  $>$  in the circle to complete each statement.

25.  $7.42 \times 10^3$   $<$   $3.128 \times 10^5$

26.  $9.98 \times 10^7$   $>$   $4.5733 \times 10^4$

27.  $6.4 \times 10^{-2}$   $>$   $2.275 \times 10^{-3}$

28.  $8.7 \times 10^{-6}$   $<$   $5.23 \times 10^{-1}$

# Applications

29. The length of one cycle of a visible light wave is 0.0000000000000002 seconds. Write this number in scientific notation.

$2 \times 10^{-15}$

30. The distance from the Earth to the sun is  $9.3 \times 10^7$  miles. The distance from Mars to the sun is  $2.28 \times 10^8$  miles. Which planet is closer and by how many miles? Give your answer in scientific notation.

Earth

~~2.28000000~~

~~9.3000000~~

$2.28,000,000$   
 $93,000,000$

$1.35,000,000$

$1.35 \times 10^8$

$$\begin{array}{r} 22.8 \times 10^7 \\ - 9.3 \times 10^7 \\ \hline 13.5 \times 10^7 \\ 1.35 \times 10^8 \\ \hline 1.35 \end{array}$$