

Name: _____

Period: _____

Topic 4: Scientific Notation

Scientific Notation: _____

Standard Form: _____

Scientific Notation: _____

Example

Circle the numbers that are expressed in scientific notation. For the numbers not circled, explain why each is *not* expressed in scientific notation.

20×10^3

5×2^{10}

4×10^{-3}

2.7×10^{120}

4.22

7.5×10^0

10×10^6

0.5×10^2

To put numbers in scientific notation:

1. Find the appropriate place for the decimal. (Move it to a position, either left or right, where there will be one number in the units place.)
2. Use “×” for times.
3. Write 10 to a power. (The power is the number of places you move the decimal to its new position. If you move the decimal point to the right, give the power a negative sign. If you move the decimal to the left, give the power a positive sign.)

Example: Write 372,000,000 in scientific notation.

Step 1: Choose the correct place for the decimal.

3.72 The number must be between 1 and 10.

Step 2: 3.72×10

The exponent will be the number of places you moved from the original position. Since the decimal moved to the left, the exponent is positive.

Step 3: 3.72×10^8

To convert numbers from scientific notation to decimal notation.

To move from scientific notation into standard decimal notation, you need to move the decimal point either right or left. If the power is positive, you would move the decimal point to the right. If the power is negative, you would move the decimal point to the left.

Example: Convert 2.31×10^5 to decimal form.

Move the decimal to the right 5 places because the exponent is a **positive 5**.

231000

1. The X-15 aircraft holds the world speed record at 23,865,600 ft/hr. Express the world record speed in scientific notation.

1. The diameter of an average snowflake is about 10 micrometers. That is approximately 0.0003937 in. Express the diameter of a snowflake in scientific notation.

2. The population on Earth increased by about 7.62×10^8 people during the first decade of the 21st century. Express the population growth in standard form.

 people

2. The diameters of atoms can vary. One particular atom has a diameter of 5.0×10^{-8} cm. Express the diameter of the atom in standard form.

5. **Error Analysis** A friend says the average distance to the moon is 382,500 km. Is the number he wrote accurate? Explain.

$$3.825 \times 10^6$$

5. **Error Analysis** An earthworm travels 0.0000425 miles per second. A friend writes the rate as 4.25×10^5 mps. Explain her error. Write the correct rate in scientific notation.

Example

The table shows numbers of bacteria in four colonies in a microbiology lab. To complete the table, estimate each number in scientific notation using a single digit for the first factor. Then determine whether each statement is *true* or *false*.



Bacteria Colonies

- a. Colony A has about 40 times as many bacteria as Colony B. T / F
- b. Colony C has about 30 times as many bacteria as Colony B. T / F
- c. Colony B has about 5 times as many bacteria as Colony D. T / F

Colony	Number of Bacteria	Scientific Notation
A	79,854,000	
B	2,124,000	
C	6,180,000	
D	397,000	

Got It?

A microbiologist observes two colonies of bacteria at the same time. The number of bacteria in each colony is shown. The number of bacteria in Colony A is how many times the number of bacteria in Colony B?

Colony A
 4×10^6

Colony B
 2×10^5

The length of cell A is 3×10^{-4} m and the length of cell B is 3×10^{-5} m. How many times as long is cell A than cell B?

- 3.** The measurement 8.16 micrometers equals 8.16×10^{-6} meter. The measurement 2.04 centimeters equals 2.04×10^{-2} meter. How many times greater is the centimeter measurement than the micrometer measurement?

- 3.** One giant ant colony is reported to have about 3.06×10^8 worker ants and 1.02×10^6 queen ants. The number of worker ants is how many times the number of queen ants?

