

**Practice
4-3*****Using Scientific Notation to Describe Very Small Quantities***

1. Express the number 0.0073 in scientific notation.
2. Express 0.5 in scientific notation by counting decimal places.
3. Write 3.91×10^{-2} in standard form.
4. The length of a bacterial cell is 6.2×10^{-6} m. Express the length of the cell in standard form.
5. Which number is greater, 7×10^{-9} or 6×10^{-4} ?
6. A plant cell has length 5.8×10^{-6} m and width 2.9×10^{-6} m. What is the ratio of the plant cell's length to its width?
7. **a) Writing** Express 0.000000298 in scientific notation.
b) Explain how negative powers of 10 make small numbers easier to write and compare.
8. **Reasoning** A nanometer is one-billionth of a meter. A centimeter is one-hundredth of a meter, and a kilometer is 1,000 meters. An X-ray can have a wavelength of 0.000000036 meter.
a) Express this wavelength in scientific notation.
b) Which unit is most appropriate for measuring the wavelength of an X-ray?

<input type="radio"/> A. meter	<input type="radio"/> C. kilometer
<input type="radio"/> B. nanometer	<input type="radio"/> D. centimeter
9. **Error Analysis** Your teacher asks you to write 3.92×10^{-6} in standard form. Your classmate gives an incorrect answer of 0.000000392.
a) Write 3.92×10^{-6} in standard form.
b) What was your classmate's likely error?

<input type="radio"/> A. Your classmate moved the decimal point 1 extra place to the left.
<input type="radio"/> B. Your classmate moved the decimal point 1 extra place to the right.
<input type="radio"/> C. Your classmate moved the decimal point 2 extra places to the left.
<input type="radio"/> D. Your classmate moved the decimal point 2 extra places to the right.
10. **Hair Growth** Human hair grows at a rate of 2.33×10^{-6} m per minute or 1.398×10^{-4} m per hour.
a) Express each rate in standard form.
b) Explain how you would find the rate at which hair grows per day.

11. Multiple Representations The numbers below represent 0.002 as a product of two factors. Which product is written in scientific notation?

- ☐ A. 2×10^{-3} ☐ C. 0.2×10^{-2}
☐ B. 20×10^{-4} ☐ D. 200×10^{-5}

12. Mental Math Express this number in scientific notation.

0.0000000004

13. Write 0.00000734 in scientific notation by counting decimal places.

14. Think About the Process

a) What should you do first to write 5.871×10^{-7} in standard form?

- ☐ A. Move the decimal point 7 places to the right.
☐ B. Move the decimal point 6 places to the right.
☐ C. Move the decimal point 6 places to the left.
☐ D. Move the decimal point 7 places to the left.

b) Write 5.871×10^{-7} in standard form.

15. Think About the Process The length of cell A is 8×10^{-5} m. The length of cell B is 0.000004 m.

a) What is the ratio of cell A's length to cell B's length?

b) Is it easier to find the ratio when the numbers are expressed in scientific notation or in standard form? Explain your reasoning.

1. 7.3×10^{-3}
2. 5×10^{-1}
3. 0.0391
4. 0.0000062 m
5. 6×10^{-4}
6. 2
7. a) 2.98×10^{-7}
b) Answers will vary
8. a) 3.6×10^{-8} m
b) B
9. a) 0.00000392
b) A
10. a) Hair grows at a rate of 0.00000233 m per minute.
Hair grows at a rate of 0.0001398 m per hour.
b) Answers will vary
11. A
12. 4×10^{-10}
13. 7.34×10^{-6}
14. a) D
b) 0.0000005871
15. a) 20
b) Answers will vary