LESSON MAKER PRO

Powers in Perspective

Work with quantities from tiny cells to digital files.

GRADE 8 · 8.NOS.B.5

8.NOS.B.5 "Apply scientific notation to represent and compare very large and very small quantities in context, and use technology to compute with numbers in scientific notation..."

NAME _____ DATE _____

THE BIG IDEA

Scientific notation writes a number as a value at least 1 but less than 10, multiplied by a power of 10. To multiply, multiply the front numbers and add the exponents; to divide, divide the front numbers and subtract the exponents. To add or compare, first rewrite the numbers with matching powers of 10.

WORKED EXAMPLE

Find $(2.4 \times 10^5)(3 \times 10^2)$.

1. Multiply the front numbers: $2.4 \times 3 = 7.2$.
2. Add the exponents: $5 + 2 = 7$.
3. Combine the results: 7.2×10^7.

Answer: 7.2×10^7

PRACTICE 6 problems

1 Write 0.00000056 in scientific notation.

ANSWER _____

2 Write 7.3×10^8 as a whole number.

ANSWER _____

3 Which is larger, 6×10^{-5} or 9×10^{-6}?

ANSWER _____

4 Find $(5 \times 10^4)(2 \times 10^3)$. Write the answer in scientific notation.

ANSWER _____

5 Find $(8.4 \times 10^9) / (2.1 \times 10^3)$. Write the answer in scientific notation.

ANSWER _____

6 Find $3.7 \times 10^6 + 2.5 \times 10^6$. Write the answer in scientific notation.

ANSWER _____

APPLY IT Show your work

1 A gamer saves 4×10^2 gameplay clips. Each clip takes 2.5×10^7 bytes of storage. If 1 GB = 1×10^9 bytes, how many GB do the clips take altogether? Write your answer in scientific notation.

WORK SPACE

ANSWER _____

2 A science club measures a hair that is 7×10^{-5} meters wide and a bacterium that is 2×10^{-6} meters wide. How many times as wide is the hair? Write the quotient in scientific notation and explain what it means.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A music app sends 3×10^6 song previews in a day. Each preview uses 4×10^5 bytes. The app's daily data limit is 1×10^{12} bytes. Does the app stay within its limit? Find how far under or over the limit it is in scientific notation, and explain your answer.

WORK SPACE AND ANSWER

ANSWER KEY # Powers in Perspective

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 0.00000056 in scientific notation.	**5.6×10^{-7}**
2	Write 7.3×10^{8} as a whole number.	**730,000,000**
3	Which is larger, 6×10^{-5} or 9×10^{-6}?	**6×10^{-5}**
4	Find $(5 \times 10^{4})(2 \times 10^{3})$. Write the answer in scientific notation.	**1×10^{8}**
5	Find $(8.4 \times 10^{9}) / (2.1 \times 10^{3})$. Write the answer in scientific notation.	**4×10^{6}**
6	Find $3.7 \times 10^{6} + 2.5 \times 10^{6}$. Write the answer in scientific notation.	**6.2×10^{6}**

PART 2 · APPLY IT

1. **1×10^{1} GB** Multiply to get 1×10^{10} bytes. Divide by 1×10^{9} bytes per GB to get 1×10^{1} GB.
2. **3.5×10^{1}; the hair is 35 times as wide as the bacterium.** Divide 7 by 2 and subtract the exponents: -5 - (-6) = 1. The quotient is 3.5×10^{1}, or 35.

CHALLENGE

No. The previews use 1.2×10^{12} bytes, which is 2×10^{11} bytes over the limit.

Require scientific notation where the prompt requests it. In the context problems, answers must include the appropriate unit or comparison.