LESSON MAKER PRO

Tiny to Tremendous

Choose useful units and write measurements with powers of 10.

GRADE 7 · 7A.AF.B.16.b

7A.AF.B.16.b "Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities."

NAME _____ DATE _____

THE BIG IDEA

In scientific notation, write a positive number as a number at least 1 but less than 10, multiplied by a power of 10. Large measurements use positive powers of 10, and very small measurements can use negative powers. Convert to a useful unit before writing the measurement in scientific notation.

WORKED EXAMPLE

A bike path is 48,000,000 mm long. Write its length in scientific notation using kilometers.

1. 1 km = 1,000,000 mm.
2. 48,000,000 ÷ 1,000,000 = 48 km.
3. 48 km = 4.8×10^1 km.

Answer: 4.8×10^1 km

PRACTICE 6 problems

1 Write 6,300,000 m in scientific notation using kilometers. Use 1 km = 1,000 m.

ANSWER _____

2 Write 0.0000042 m in scientific notation. Keep the unit as meters.

ANSWER _____

3 Write 0.0036 m in scientific notation using millimeters. Use 1 m = 1,000 mm.

ANSWER _____

4 Write 9.1×10^6 mm in scientific notation using kilometers. Use 1 km = 1,000,000 mm.

ANSWER _____

5 Write 0.00000075 m in scientific notation using nanometers. Use 1 nanometer (nm) = 0.000000001 m.

ANSWER _____

6 A tiny part is 0.00081 m long. Which unit, meters or millimeters, gives a measurement between 0.1 and 10? Write the measurement in scientific notation using that unit. Use 1 m = 1,000 mm.

ANSWER _____

APPLY IT Show your work

1 A game update is 2,700,000,000 bytes. Write its size in scientific notation using gigabytes. Use 1 gigabyte (GB) = 1,000,000,000 bytes.

WORK SPACE

ANSWER _____

2 A student uses a phone microscope to measure a strand of hair that is 0.000082 m wide. Write its width in scientific notation using micrometers. Use 1 micrometer (μm) = 0.000001 m.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A microscope measures two strands of hair. Strand A is 0.000075 m wide, and strand B is 6.5×10^4 nm wide. Which strand is wider, and by how many micrometers? Write the difference in scientific notation. Use 1 μm = 0.000001 m and 1 μm = 1,000 nm.

WORK SPACE AND ANSWER

ANSWER KEY

Tiny to Tremendous

GRADE 7 · 7A.AF.B.16.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 6,300,000 m in scientific notation using kilometers. Use 1 km = 1,000 m.	**6.3×10^{3} km**
2	Write 0.0000042 m in scientific notation. Keep the unit as meters.	**4.2×10^{-6} m**
3	Write 0.0036 m in scientific notation using millimeters. Use 1 m = 1,000 mm.	**3.6×10^{0} mm**
4	Write 9.1×10^{6} mm in scientific notation using kilometers. Use 1 km = 1,000,000 mm.	**9.1×10^{0} km**
5	Write 0.00000075 m in scientific notation using nanometers. Use 1 nanometer (nm) = 0.000000001 m.	**7.5×10^{2} nm**
6	A tiny part is 0.00081 m long. Which unit, meters or millimeters, gives a measurement between 0.1 and 10? Write the measurement in scientific notation using that unit. Use 1 m = 1,000 mm.	**Millimeters; 8.1×10^{-1} mm**

PART 2 · APPLY IT

1. **2.7×10^{0} GB** Divide 2,700,000,000 by 1,000,000,000 to get 2.7 GB. Write 2.7 as 2.7×10^{0}.
2. **8.2×10^{1} µm** Divide 0.000082 by 0.000001 to get 82 µm. Write 82 as 8.2×10^{1}.

CHALLENGE

Strand A is wider by 1×10^{1} µm.

For problem 6, the chosen unit must be millimeters. In the challenge, strand A is 75 µm and strand B is 65 µm, so their difference is 10 µm.