LESSON MAKER PRO

Power of Ten Moves

Use exponents and place value to scale numbers.

GRADE 5 · NY-5.NBT.2

NY-5.NBT.2 "Use whole-number exponents to denote powers of 10. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10…"

NAME _____ DATE _____

POWERS MOVE DIGITS

A power of 10 shows how many factors of 10 are multiplied. When you multiply by 10^n, move the decimal point n places right. When you divide by 10^n, move it n places left. For a whole number, multiplying by 10^n adds n zeros to the end of the product, in addition to any zeros already there.

WORKED EXAMPLE

Find 1.23×10^6.

1. $10^6 = 1{,}000{,}000$.
2. Multiply by 10^6, so move the decimal point 6 places right.
3. $1.23 \rightarrow 12.3 \rightarrow 123 \rightarrow 1{,}230{,}000$.
4. The zeros are placeholders after the digits move.

Answer: 1,230,000

PRACTICE 6 problems

1 Write 100,000 as a power of 10.

ANSWER _____

2 Find 37×10^3.

ANSWER _____

3 Find 6.09×10^2.

ANSWER _____

4 Find $84.5 \div 10^1$.

ANSWER _____

5 Find 0.072×10^3.

ANSWER _____

6 A student says that $9.3 \div 10^2 = 930$. Is the student correct? Explain.

ANSWER _____

APPLY IT Show your work

1 A game designer uses 3.2 megabytes of sound for one game level. A test version has 10^3 identical levels. How many megabytes of sound does the test version use?

WORK SPACE

ANSWER _____

2 At a robotics challenge, a robot travels 750 meters in 10^2 seconds at a constant speed. How many meters does it travel each second?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Start with 0.506. Multiply it by 10^4, then divide the result by 10^2. What is the final result? Explain how the decimal point moves.

WORK SPACE AND ANSWER

ANSWER KEY

Power of Ten Moves

GRADE 5 · NY-5.NBT.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 100,000 as a power of 10.	**10^5**
2	Find 37×10^3.	**37,000**
3	Find 6.09×10^2.	**609**
4	Find $84.5 \div 10^1$.	**8.45**
5	Find 0.072×10^3.	**72**
6	A student says that $9.3 \div 10^2 = 930$. Is the student correct? Explain.	**No. $9.3 \div 10^2 = 0.093$ because the decimal point moves 2 places left.**

PART 2 · APPLY IT

1. **3,200 megabytes** Multiply 3.2 by 10^3. Move the decimal point 3 places right.
2. **7.5 meters per second** Divide 750 by 10^2, or 100. Move the decimal point 2 places left.

CHALLENGE

50.6. The decimal point moves 4 places right, then 2 places left, so it moves 2 places right overall.

Accept equivalent answers with or without commas where appropriate. For written explanations, accept correct statements that multiplication moves the decimal right and division moves it left by the exponent's number of places.