LESSON MAKER PRO

Power Up Place Value

Use place-value patterns to read and write powers of 10.

GRADE 6 · 6.NS.3.d

6.NS.3.d "Recognize and represent powers of 10 with whole number exponents by examining patterns in place value."

NAME _____ DATE _____

POWERS BUILD ZEROS

A power of 10 tells how many factors of 10 are multiplied. For 10^n, the whole-number exponent n tells how many zeros are in the value. Also, 10^0 = 1, and increasing an exponent by 1 makes the value 10 times as large.

WORKED EXAMPLE

Write 10^4 in standard form.

1. The exponent is 4, so use four factors of 10.
2. 10 x 10 x 10 x 10 = 10,000.

Answer: 10^4 = 10,000

PRACTICE 6 problems

1 Write 10^3 in standard form.

ANSWER _____

2 Write 1,000,000 as a power of 10.

ANSWER _____

3 Write 6 x 10^2 in standard form.

ANSWER _____

4 Complete: 5,000,000 = 5 x 10^___.

ANSWER _____

5 Which is greater, 10^5 or 10^2? Write the greater power and its value.

ANSWER _____

6 Complete the pattern: 10^5, 10^6, 10^7, ___.

ANSWER _____

APPLY IT Show your work

1 An online game has 3 x 10^5 players during a weekend event. Write the number of players in standard form.

WORK SPACE

ANSWER _____

2 A student's first video gets 10^3 views. A second video gets 10^6 views. How many times as many views does the second video get?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Put 6 x 10^3, 6 x 10^5, and 6 x 10^4 in order from least to greatest. Then explain why the order follows a power-of-10 pattern.

_____

_____

ANSWER KEY

Power Up Place Value

GRADE 6 · 6.NS.3.d

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 10^3 in standard form.	**1,000**
2	Write 1,000,000 as a power of 10.	**10^6**
3	Write 6 x 10^2 in standard form.	**600**
4	Complete: 5,000,000 = 5 x 10^___.	**6**
5	Which is greater, 10^5 or 10^2? Write the greater power and its value.	**10^5 = 100,000**
6	Complete the pattern: 10^5, 10^6, 10^7, ___.	**10^8**

PART 2 · APPLY IT

1. **300,000 players** Since 10^5 is 100,000, multiply 3 by 100,000. The game has 300,000 players.
2. **1,000 times as many views** The exponents differ by 3, so the second number is 10^3 times as large. Since 10^3 = 1,000, it gets 1,000 times as many views.

CHALLENGE

6 x 10^3, 6 x 10^4, 6 x 10^5. The coefficient is the same, and each increase of 1 in the exponent makes the value 10 times larger.

Accept whole numbers written with or without commas. For the challenge explanation, accept any accurate statement that a larger exponent makes a power of 10 10 times greater for each increase of 1.