LESSON MAKER PRO

Power Pattern Quest

Use bases and exponents to show and solve growing patterns.

GRADE 6 · 6.NS.3.a

6.NS.3.a "Recognize and represent patterns with bases and exponents that are whole numbers."

NAME _____ DATE _____

BASES BUILD PATTERNS

An exponent tells how many times to use the base as a factor. A base with an exponent of 0 has a value of 1, as long as the base is not 0. Use exponents to write repeated multiplication in a short form.

WORKED EXAMPLE

Evaluate 2^4.

1. Write 2 × 2 × 2 × 2.
2. Multiply the first pair: 2 × 2 = 4.
3. Multiply the next pair: 2 × 2 = 4.
4. Multiply: 4 × 4 = 16.

Answer: $2^4 = 16$

PRACTICE 6 problems

1 Write 6^5 as repeated multiplication.

ANSWER _____

2 Write 7 × 7 × 7 using an exponent.

ANSWER _____

3 Evaluate 5^3.

ANSWER _____

4 Evaluate 9^0.

ANSWER _____

5 The first term in a pattern is 1. Each new term is 6 times the term before it. Write the sixth term as a power, then find its value.

ANSWER _____

_____

6 Find the values of 6^3 and 5^3. Which value is greater?

ANSWER _____

_____

APPLY IT Show your work

1 In a game, Jordan starts with 1 coin. After each round, Jordan's total number of coins is 5 times the total from the round before. How many coins does Jordan have after 3 rounds? Write a power and evaluate it.

WORK SPACE

ANSWER _____

2 A player is building a cube-shaped castle in a game. The castle is filled with 7 blocks along its length, 7 blocks along its width, and 7 blocks along its height. How many blocks fill the castle? Write a power and evaluate it.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student says that $6^3 = 18$ because $6 \times 3 = 18$. Explain the student's error. Then write 6^3 as repeated multiplication and find its value.

WORK SPACE AND ANSWER

ANSWER KEY

Power Pattern Quest

GRADE 6 · 6.NS.3.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 6^5 as repeated multiplication.	**$6 \times 6 \times 6 \times 6 \times 6$**
2	Write $7 \times 7 \times 7$ using an exponent.	**7^3**
3	Evaluate 5^3.	**125**
4	Evaluate 9^0.	**1**
5	The first term in a pattern is 1. Each new term is 6 times the term before it. Write the sixth term as a power, then find its value.	**$6^5 = 7{,}776$**
6	Find the values of 6^3 and 5^3. Which value is greater?	**$6^3 = 216$ and $5^3 = 125$; 6^3 is greater.**

PART 2 · APPLY IT

1. **$5^3 = 125$ coins** After 3 rounds, the total is $5 \times 5 \times 5$. This is 5^3, which equals 125.
2. **$7^3 = 343$ blocks** Multiply the number of blocks in the three dimensions: $7 \times 7 \times 7$. This is 7^3, which equals 343.

CHALLENGE

The exponent tells how many factors of 6 to multiply, not a number to multiply by 6. $6^3 = 6 \times 6 \times 6 = 216$.

Accept equivalent repeated-multiplication forms with the correct number of factors. For a nonzero base raised to the zero power, accept 1.