LESSON MAKER PRO

Power Patterns

Explore exponents and perfect squares.

GRADE 6 · 6.N.2.4

6.N.2.4 "Identify and represent patterns with whole-number exponents and perfect squares. Evaluate powers with whole-number bases and exponents."

NAME _____ DATE _____

THE BIG IDEA

An exponent tells you how many times to use the base as a factor. When you square a whole number, the result is a perfect square. You can model a perfect square with the same number of rows and columns.

WORKED EXAMPLE

Evaluate 7^2.

1. The exponent 2 means to use 7 as a factor twice.
2. $7^2 = 7 \times 7$
3. $7 \times 7 = 49$

Answer: 49

PRACTICE 6 problems

1 Evaluate 3^3.

ANSWER _____

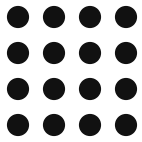
2 Evaluate 5^2.

ANSWER _____

3 Evaluate 2^5.

ANSWER _____

4 Write the number of dots in the array as a power. Then find the total.



ANSWER _____

5 Complete the pattern of perfect squares: 1, 4, 9, 16, ___, ___.

ANSWER _____

6 Which is greater, 8^2 or 4^3? Find both values to explain your answer.

ANSWER _____

APPLY IT Show your work

1 A game starts with one path. In each round, every path splits into 3 new paths. How many paths are there after 4 rounds? Write a power and find its value.

WORK SPACE

ANSWER _____

2 A pixel artist makes a square icon with 12 rows of 12 pixels. Write a power for the number of pixels, then find the total.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The number 256 is a perfect square. Write it as a square and as a different power with a whole-number exponent greater than 2. Show multiplication to explain both.

WORK SPACE AND ANSWER

ANSWER KEY

Power Patterns

GRADE 6 · 6.N.2.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Evaluate 3^3.	**27**
2	Evaluate 5^2.	**25**
3	Evaluate 2^5.	**32**
4	Write the number of dots in the array as a power. Then find the total.	**4^2 = 16 dots**
5	Complete the pattern of perfect squares: 1, 4, 9, 16, ___, ___.	**25, 36**
6	Which is greater, 8^2 or 4^3? Find both values to explain your answer.	**Neither is greater. 8^2 = 64 and 4^3 = 64.**

PART 2 · APPLY IT

1. **3^4 = 81 paths** There are 3 times as many paths after each round. Multiply 3 × 3 × 3 × 3 to get 81.
2. **12^2 = 144 pixels** The icon has the same number of rows and pixels per row, so square 12. Calculate 12 × 12 = 144.

CHALLENGE

$16^2 = 16 \times 16 = 256$, and $4^4 = 4 \times 4 \times 4 \times 4 = 256$.

For the challenge, also accept 2^8 as the second power if the multiplication is shown correctly. In the comparison problem, students should state that the values are equal.