Understand the place value system (Standards 5.NBT.1–4).
Standard 5.NBT.2 Explain patterns in the number of zeros of the product when **multiplying a number by powers of 10**, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
VERB-Explain - explain powers of ten decimal use power of ten and exponents

Key Element: explain patterns- zeros
- **multiply by the power of 10**

4th grade does not use exponents
See 5NBT.1 recognize pattern multiply/divide by ten. If they can see and predict patterns with the power of ten adding the exponent should not be a huge step.

The exponent of a number says how many times to use that number in a multiplication.

exponent
(or index,
or power)
8^2
base
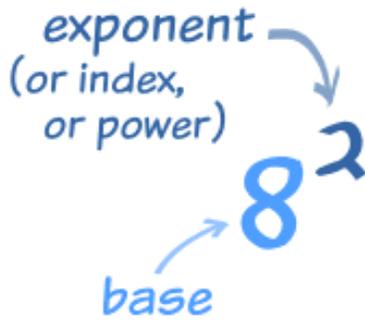
10^2=10 multiplied 2 times
10 x 10

10^3 =10 multiplied 3 times
10 x 10 x 10

10^4 =10 multiplied ? times
10x10x__x__

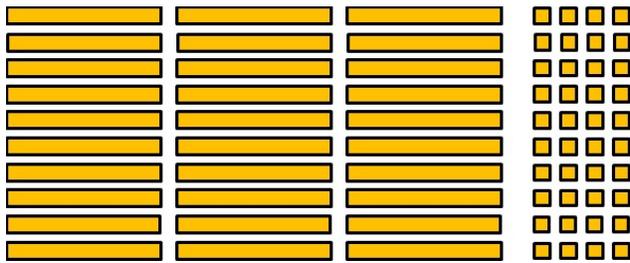10^6 =10 multiplied ? times

Tasks
Looking for patterns

-write number in expanded form then move to exponents, not include a representation for a place that holds a zero.

Worksheet- fill in the blank

Apply

1). **$3.4 \times 10 = 10 \times 3.4$ is 10 groups of 3.4, which we can think of as 10 groups with 3 ones and 4 tenths in each group.**

2). When you multiply by a multiple of ten or a power of ten, explain why you can add zeros. When you multiply 50 x 500.

50 x 700 = (5 x 10) + (7 x 100)

= (5 x 7) x (10 x 100)

= 35 x 1,000 or 10^3

= 35,000

3). Explain

Write the standard form for the number represented below:

$(7 \times 10^3) + (4 \times 10^2) + (2 \times 10^1) + (9 \times 1)$

Use what you know about powers of ten and exponents to explain your answer

Rubric
3 Excellent:
Full Accomplishment
Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors.

2 Proficient:

Substantial Accomplishment

Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.

1 Marginal:

Partial Accomplishment

Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.