

# Power of Ten Paths

Track zeros and decimal points with powers of 10.

GRADE 5 • 5.NBT.A.2

**CCSS.Math.Content.5.NBT.A.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..."

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## THE BIG IDEA

When you multiply a whole number by  $10^n$ , the product has  $n$  more zeros at the end. When you multiply a decimal by  $10^n$ , move the decimal point  $n$  places right. When you divide by  $10^n$ , move the decimal point  $n$  places left.

## WORKED EXAMPLE

Find  $0.36 \times 10^4$ .

1.  $10^4 = 10,000$ .

2. Move the decimal point 4 places right:  
 $0.36 \rightarrow 3600$ .

3.  $36 \times 10^4 = 3,600$ .

**Answer: 3,600**

## PRACTICE 6 problems

**1** Find  $34 \times 10^3$ .

ANSWER \_\_\_\_\_

**2** Find  $0.58 \times 10^2$ .

ANSWER \_\_\_\_\_

**3** Find  $9.204 \div 10^3$ .

ANSWER \_\_\_\_\_

**4** Find  $7 \times 10^6$ .

ANSWER \_\_\_\_\_

**5** Find  $65.1 \div 10^2$ .

ANSWER \_\_\_\_\_

**6** Write 1,000,000 as a power of 10.

ANSWER \_\_\_\_\_

## APPLY IT Show your work

- 1** A student records 0.032 gigabytes of audio for each short sound effect in a game. The student makes  $10^3$  sound effects. How many gigabytes of audio are recorded?

WORK SPACE

ANSWER \_\_\_\_\_

- 2** At a robotics contest, a robot travels 63.5 meters in a test. Since 1 kilometer =  $10^3$  meters, how many kilometers does the robot travel?

WORK SPACE

ANSWER \_\_\_\_\_

## CHALLENGE One step up

### CHALLENGE

Ava says that  $8.09 \times 10^2 = 8.0900$  because multiplying by 10 adds zeros. Is Ava correct? Explain your reasoning and give the correct product.

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## PART 1 • PRACTICE

| # | PROBLEM                           | ANSWER                   |
|---|-----------------------------------|--------------------------|
| 1 | Find $34 \times 10^3$ .           | <b>34,000</b>            |
| 2 | Find $0.58 \times 10^2$ .         | <b>58</b>                |
| 3 | Find $9.204 \div 10^3$ .          | <b>0.009204</b>          |
| 4 | Find $7 \times 10^6$ .            | <b>7,000,000</b>         |
| 5 | Find $65.1 \div 10^2$ .           | <b>0.651</b>             |
| 6 | Write 1,000,000 as a power of 10. | <b><math>10^6</math></b> |

## PART 2 • APPLY IT

1. **32 gigabytes** Compute  $0.032 \times 10^3$  by moving the decimal point 3 places right. The product is 32.
2. **0.0635 kilometer** Convert meters to kilometers by dividing 63.5 by  $10^3$ . Move the decimal point 3 places left.

## CHALLENGE

**No.  $8.09 \times 10^2 = 809$  because the decimal point moves 2 places right.**

Accept equivalent forms with extra zeros after a decimal, such as 0.6510 for 0.651. For the challenge, accept explanations that state the decimal point moves right when multiplying by a power of 10.