Understand Powers of 10

LESSON 7

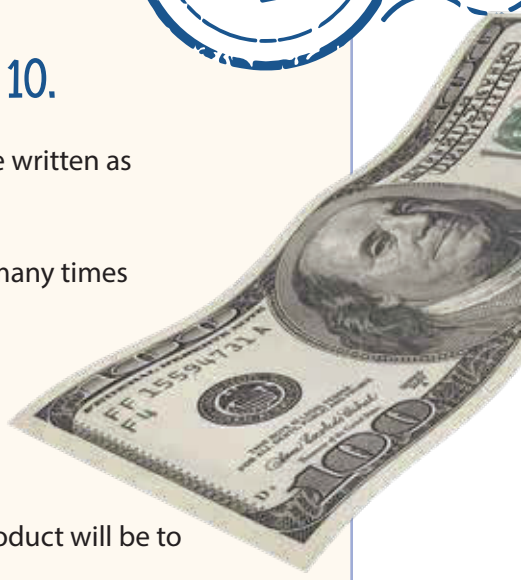
Dear Family,

This week your child is exploring powers of 10.

Your child is learning that numbers such as 10, 100, or 1,000 can be written as products of the number 10.

These numbers are called **powers of 10**. The **exponent** tells how many times to use 10 as a factor.

$10 = \mathbf{10} = 10^{1}$
$100 = \mathbf{10 \times 10} = 10^{2}$
$1{,}000 = \mathbf{10 \times 10 \times 10} = 10^{3}$



When you multiply a decimal by a power of 10, the digits in the product will be to the left of where they were in the factor and will have a new value.

Multiply by 10.
$0.03 \times 10 = 0.3$

The digit in the hundredths place is now in the tenths place.

Multiply by 100 (10×10).
$0.005 \times 100 = 0.5$

The digit in the thousandths place is now in the tenths place.

When you divide a decimal by a power of 10, the digits in the quotient will be to the right of where they were in the dividend and will have a new value.

Divide by 10.
$0.3 \div 10 = 0.03$

The digit in the tenths place is now in the hundredths place.

Divide by 100 (10×10).
$0.5 \div 100 = 0.005$

The digit in the tenths place is now in the thousandths place.

Invite your child to share what he or she knows about powers of 10 by doing the following activity together.

ACTIVITY MULTIPLY AND DIVIDE BY POWERS OF 10

Do this activity with your child to explore multiplying and dividing by a power of 10.

Work together with your child to show how the value of the product or quotient changes when you multiply or divide a decimal number by a power of 10.

- Have your child write the number 12345 with large digits on a separate sheet of paper or use the number below. Have your child read the five-digit number aloud.
- Have your child place his or her finger between the 3 and 4. Your child's finger represents the decimal point. Have your child read the new number aloud.
- Ask your child to multiply the number from the previous step by 100 and show the product by moving his or her finger to show the placement of the decimal point. (Your child should move his or her finger two places to the right.) Ask your child to explain the relationship between the factor 100, the placement of the decimal point, and the value of each digit in the product.
- Ask your child to divide the number from the previous step by 10 and show the quotient by moving his or her finger to show the placement of the decimal point. (Your child should move his or her finger one place to the left.) Again, have your child read the new number aloud and then explain the relationship between the divisor 10 and the value of each digit in the quotient.
- Ask your child to show you another multiplication or division by a power of 10. Have your child explain how the power of 10 is related to the placement of the decimal point in the product or quotient.