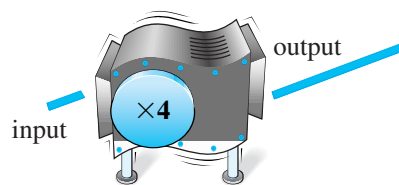


Family Letter

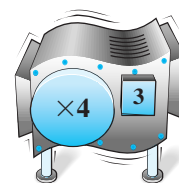
Dear Student and Family Members,

Our class is about to begin Chapter 3 about exponents and extremely large or extremely small numbers. Exponents can be thought of as a shortcut method of expressing repeated multiplication. For example, $4 \times 4 \times 4$ is the same as 4^3 . The base is 4—the number to be multiplied; the exponent is 3—the number of 4s you multiply together.

We will use a machine model to help us learn about exponents. *Stretching machines* are a model of multiplication. They stretch any input by the number on the machine. This machine will stretch something 4 times. Suppose you put a 1-inch piece of gum into the machine. How long will it be when it comes out?



A *repeater machine* is a special type of stretching machine that models exponents. Look at the repeater machine at the right. It will stretch an input 4 times, then 4 times again, and then 4 times again. A 1-inch piece of gum goes through the $\times 4$ machine 3 times, for a total of 64 stretches, and comes out 64 inches long!



Once we are comfortable with the idea of exponents, we will learn what it means to add, subtract, multiply, and divide numbers with exponents.

Vocabulary Along the way, we'll be learning about these new vocabulary terms:

base	exponential growth
exponent	exponential increase
exponential decay	power
exponential decrease	scientific notation

What can you do at home?

During the next few weeks, your student may show interest in different ways exponents are used in the world outside of school. You might help them think about one common use of exponents—compound interest in savings accounts. Let's say you have \$100 in an account that earns 5% interest a year. Without adding money to the account, after the first year you will have $\$100 \times 1.05$, or \$105. After 2 years, you will have $\$100 \times 1.05 \times 1.05$ or \$110.25. After 3 years, you will have $\$100 \times 1.05 \times 1.05 \times 1.05$ or \$115.76. After 20 years, the account total will be 100×1.05^{20} , or \$265.33—all from your original investment of \$100!