Standard: **8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.**

Vocabulary:
Integer - a whole number that is not a fraction
Base - the number being used as a factor in an exponential expression
Exponent - the number that shows how many times a base is used as a factor

To achieve mastery of this standard, students must be familiar with the rules for exponents and be able to simplify expressions containing exponents. For example, students must know that

3^3 = 3 x 3 x 3 = 27

$8^3 \times 8^7$ =(8 x 8 x 8) x (8 x 8 x 8 x 8 x 8 x 8 x 8) = 8^{10} = 1,073,741,824

To simplify the expressions, students must be aware of the following rules:

-When multiplying powers with like bases, add the exponents. $5^3 \times 5^2 = 5^{(3 + 2)} = 5^5$

-When dividing powers with like bases, subtract the exponents. $8^6/8^3 = 8^{(6 - 3)} = 8^3$

-When raising a power to a power, multiply the exponents. $(4^8)^5 = 4^{(8 \times 5)} = 4^{40}$

-Everything inside parentheses is being raised to a power. $(8/4)^3 = 8^3 / 4^3$

-When a base is being raised to a negative power, convert to a fraction with 1 as the numerator and the exponent becomes positive. $7^{-4} = 1/7^4$ $3^{-6} = 1/3^6$

-Any number raised to the zero power equals one. $9^0 = 1$ $1,654^0 = 1$

-Any number raised to the power of one equals itself. $7^1 = 7$ $865^1 = 865$

*Always work from the inside out! If you have something complicated inside parentheses, do the inside first, then distribute the exponent.

Helpful videos:

http://studyjams.scholastic.com/studyjams/jams/math/numbers/integers.htm

https://www.youtube.com/watch?v=A1wKTiBTsfk