

# Simplifying Exponential Expressions

## Summary

Students will write numbers in exponential and scientific notation.

## Main Core Tie

Mathematics Grade 6

Strand: EXPRESSIONS AND EQUATIONS (6.EE) Standard 6.EE.1

## Materials

Graphing calculators

Pair of dice for each pair of students

Linker Cubes

Worksheets: [Using 3 As A Factor Or As An Exponent](#), [The Power of Zero and 1](#)

Playing With Powers Game Record

## Background for Teachers

Enduring Understanding (Big Ideas):

Simplifying exponential expressions and scientific notation.

Essential Questions:

How does multiplying by 3 compare to a number cubed?

What is the value of an exponential expression?

What is any number to the zero power?

Skill Focus:

Find the value of exponential expressions.

Vocabulary Focus:

Base, exponent, power, cube, dimension, exponential expression.

Ways to Gain/Maintain Attention (Primacy):

Technology, game, cooperative groups, journaling, discussion.

## Instructional Procedures

Starter (launch):

Using your TI-73, find the value for each

$$3^1 =$$

$$3 \times 3 =$$

$$3^2 =$$

$$3^3 =$$

$$3 \times 3 \times 3 =$$

$$3 =$$

$$3 \times 3 \times 3 \times 3 =$$

$$3 =$$

$$3 \times 3 \times 3 \times 3 \times 3 =$$

Use the pattern you see from problems 1-9 to answer these questions:

Does the expression  $4^3$  have the same value as the expression  $4 \times 3$ ? Why or why not?

In the exponential expression,  $4^3$ , what does the exponent,  $^3$ , tell us to do with the base, 4?

Lesson segment 1: How does multiplying a number by three compare to cubing the number?

Give Linker Cubes to pairs of students to complete the activity from the attached " [Using 3 As A](#)

[Factor Or As An Exponent](#)". Discuss each model as the students build the model.

Lesson segment 2: What is the value of an exponential expression?

Have students play the following game using a calculator to review finding the value of exponential expressions.

Playing With Powers Game:

Students play against a partner. Give student pairs two dice (or simulate two dice using the TI-73.

Player 1 rolls both dice and decides which of the dice will be the base and which will be the exponent.

Player 1 writes that exponential expression on his/her assignment paper. Both players use their calculators to find the value of the exponential expression. Player 1 writes the value of his/her expression on the paper. It is then player 2's turn to roll the dice, choose which will be the base and which will be the exponent. Player two records the expression and the answer. The players continue taking turns until each has had 5 turns. At that point the players each find the sum of their 5 answers. The player with the greatest sum wins.

Lesson segment 3: What is any number to the zero power?

Q. Guide students through the "

[The Power of Zero](#)" investigation worksheet.

Assign text practice as appropriate for finding the value for exponential expressions

Give this exit quiz to assess skill and understanding.

Exit Quiz (no Calculators)

Find the value for each

8 1

8 0

1 8

2 3

5 x 3

3 3

Any number to the zero power has a value of \_\_\_\_\_.

### Assessment Plan

Questioning, observation, performance, Exit Quiz(attached).

### Bibliography

This lesson plan was created by Linda Bolin.

### Authors

[Utah LessonPlans](#)