Grade 6 Gifted
Day 1

| Standards	*8.EEI.1* Understand and apply the laws of exponents (i.e., product rule, quotient rule, power to a power, product to a power, quotient to a power, zero power property, negative exponents) to simplify numerical expressions that include integer exponents.
Learning Targets I Can Statements	I can apply the laws of exponents.
Essential Question(s)	How can the laws of exponents be applied in real-world situations?
Resources	You will need a pair of scissors and a glue stick to complete this assignment. All answers should be written on the page provided.
Learning Activities or Experiences	1. Complete at least 3 topics of your **ALEKS** pathway. (if available) 2. Review attached notes and complete the "Exponent Rules Puzzle." 3. Complete the "Today's Thought" activity.

NOTE: *For additional practice aligned to your grade for SC READY review please refer to the 6th grade level assignments.*

Lesson Notes

Rules of Exponents or Laws of Exponents	
Multiplication Rule	$a^x \times a^y = a^{x+y}$
Division Rule	$a^x \div a^y = a^{x-y}$
Power of a Power Rule	$\left(a^x\right)^y = a^{xy}$
Power of a Product Rule	$\left(ab\right)^x = a^x b^x$
Power of a Fraction Rule	$\left(\dfrac{a}{b}\right)^x = \dfrac{a^x}{b^x}$
Zero Exponent	$a^0 = 1$
Negative Exponent	$a^{-x} = \dfrac{1}{a^x}$
Fractional Exponent	$a^{\frac{x}{y}} = \sqrt[y]{a^x}$

Exponent Rules Puzzle

1. Cut out the nine puzzle pieces.

2. Pair up the matching expressions (each non-simplified expression has a matching simplified expression).

   $(xy)^2 \quad | \quad x^2y^2$
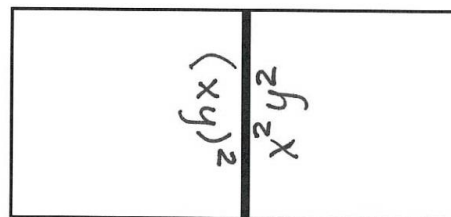
3. When complete, the puzzle will be a three-by-three square. Glue your final arrangement on the page provided. **GOOD LUCK!**

Card (E):
$$\frac{(2x^2)^{-1}}{x^2}$$
$10xy^3 \cdot 8x^5y^3$

E

1

Card (E):
$$\left(\frac{x^2}{y}\right)^{-3}$$

E

$$\frac{x^8}{256y^{10}}$$

Card (N):
$$\frac{5x^3}{3}$$

$(3x \cdot 2x)^2$

$$\frac{10x^3}{181x^8y^4}$$

N

$$\frac{1}{2x^4}$$

Card (N):
$$\frac{3x^7}{y^2}$$

N

$(3x^2 \cdot 2x^2)^2$

Card (O):
$$\frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

$$\frac{x^6}{y^3}$$

O

$$\frac{10x^4}{6x}$$

Card (P):
$(2y^2)^4$

P

$80x^6y^6$

Card (T):
$36x^8$

T

$36x^4$

$$\frac{2x^2y^4 \cdot 4x^2y^4 \cdot 3x}{3x^{-3}y^2}$$

Card (S):
$8x^8y^6$

S

$(7a^3b^{-1})^0$

Card (X):
$$\left(\frac{5x^3y}{20xy^5}\right)^4$$

X

$$\frac{9x^5y^8}{5}$$

$16y^8$

Exponent Rules Puzzle Solution

Today's Thought

1. Which expression is equivalent to **5^{-3}**?

    a. $\frac{1}{25}$

    b. $\frac{1}{15}$

    c. **$5 \bullet 5 \bullet 5^{-5}$**

    d. **-5 $\bullet$ -5 $\bullet$ -5**

2. What number represents $\left(\frac{6^0 \cdot 5^{-2}}{5^{-1}}\right)$ when simplified?

    a. **0**

    b. $\frac{1}{5}$

    c. **1**

    d. $\frac{6}{5}$

3. Which numerical expression is equivalent to $\left(\frac{3^6 \times 4^3}{3^2}\right)$?

    a. **2^5 x 3^3**

    b. **2^5 x 3^4**

    c. **2^6 x 3^3**

    d. **2^6 x 3^4**

4. What number represent **$(4^6 \bullet 4^{-8}) \div (4^{-5})$** when simplified? _____

5. Simplify the expression **$(-2x^2y^{-4})^{-2}$**.

6. Simplify the expression $\left(\frac{2x}{3y^2}\right)^3$.