

8th Grade Unit 2 Information

Exponents & Equations

CRCT Domain & Weight: Numbers, Expressions, & Equations 20%

[Flip Book: Unit 2](#)

[Overview of Unit 2](#)

[Prerequisites: Unit 2](#)

Unit Length: Approximately 21 days

[Checklist for Unit 2](#)

[Study Guide for Unit 2](#)

[Study Guide KEY for Unit 2](#)

Calculators or Not? *Students should learn to find answers without a calculator first. Next they should be shown how to find answers on the calculator. The common assessment will include questions that allow calculators as well as questions that do not. Click below to see examples:*

[Calculator Examples](#)

Click on the links below for resources by Concept:

[Concept One: Integer Exponents](#)

[Concept Two: Scientific Notation](#)

[Concept Three: Square Roots & Cube Roots](#)

[Concept Four: Rational vs. Irrational Numbers](#)

[Concept Five: Linear Equations](#)

TCSS 8th Math Unit 2 ~ Exponents & Equations

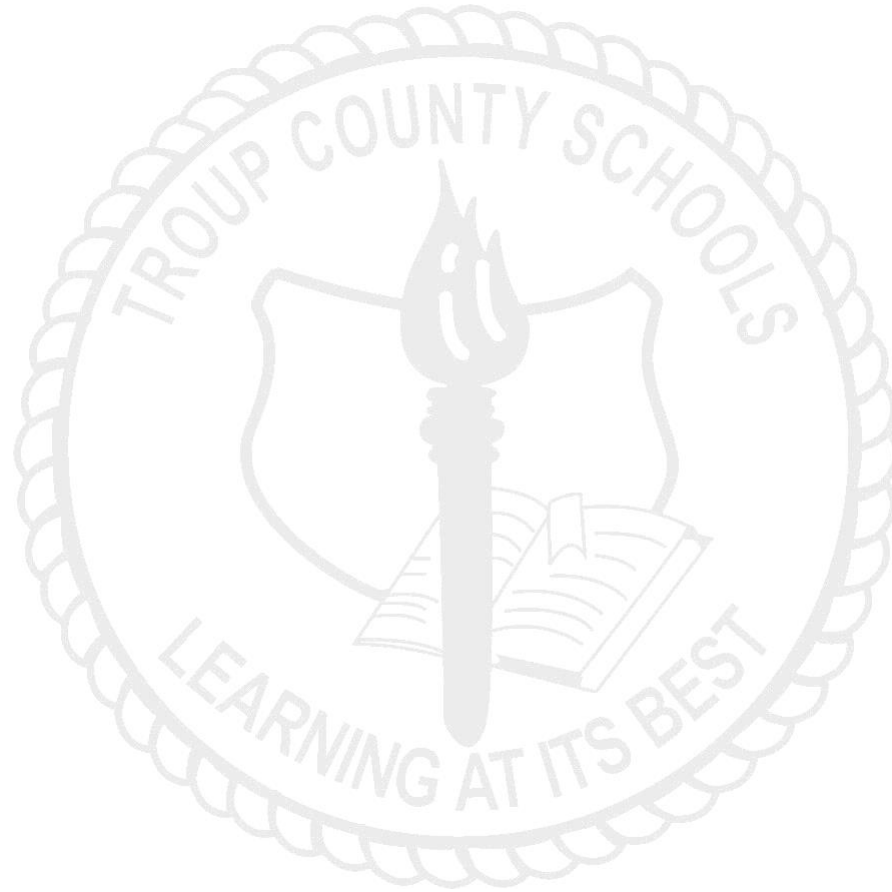
Concept One: Integer Exponents

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{(-5)} = 3^{(-3)} = 1/(3^3) = 1/27$.</p> <p>EQ: How do I simplify and evaluate numeric expressions involving integer exponents?</p>	<ul style="list-style-type: none"> ▪ Exponent 	<p>Activator – Chess Video</p> <p>Activator – Discovery Questions & Activity Sheet</p> <ul style="list-style-type: none"> • Eureka Math (2014 Common Core) <i>License</i> Concept One ~ TE SE • Problem-Based-Learning SE TE Discovery & practice (p.7 (82) for Accelerated) • Differentiation <ul style="list-style-type: none"> ○ Accelerated: Proofs of Laws SE TE ○ Support/On Target: Exponent Practice ○ Word Problem Practice ▪ Why Negative Exponents R Fractions (A+ Activity) ▪ Why X^0 is Always 1 (A+ Activity) ▪ Glencoe CCGPS Math Text (McGraw-Hill) p. 15-50 <ul style="list-style-type: none"> > Problem Solving Practice Multiplying and Dividing > Problem Solving Practice Power to a Power ▪ NEW Got Cubes Spotlight Task <ul style="list-style-type: none"> ○ <i>Note: Includes two 30 second video clips</i> ▪ CCGPS Frameworks: A Few Folds SE TE <ul style="list-style-type: none"> • <i>Note: Especially good for concrete learners</i> ▪ CCGPS Frameworks: Exponential Exponents SE TE <ul style="list-style-type: none"> • <i>Note: Includes cards to sort</i> ▪ CCGPS Frameworks: Exploring Powers Pt. 1 SE TE 	<p>CC.8.EE.1</p> <p>[Back to Top]</p>

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Concept One: Integer Exponents

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
		<ul style="list-style-type: none"><li data-bbox="940 250 1297 282">• <i>Note: Uses calculator</i>	



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Concept Two: Scientific Notation

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.EE.3 Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.</i></p> <p>E.Q. How can I represent very small and large numbers using integer exponents and scientific notation?</p>	<p>Scientific Notation</p> <p>Exponential Notation</p> <p>Magnitude – measure of size or quantity</p>	<p>Activator –Scale of the Universe</p> <p>MGSE.8.EE.3</p> <ul style="list-style-type: none"> Eureka Math (2014 Common Core) License Concept Two ~ SE TE Problem Based Learning SE TE Discovery & Practice Word Problems - Scientific Notation Glencoe CCGPS Math Text (McGraw-Hill) p. 51-58 Coach GPS Book Lesson 2 CCGPS Frameworks: Giantburgers SE TE Differentiation Opportunity: FAL: Estimating Length Using Scientific Notation Differentiated Gifted Lesson: CCGPS Frameworks: Exploring Powers of Ten Part II SE TE <i>Note: Uses calculator</i> <p><i>Continued on the next page...</i></p>	<p>MGSE.8.EE.3</p> <p>[Back to Top]</p>

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Concept Two: Scientific Notation

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.EE.4 Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Understand scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g. use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g. calculators).</p> <p>E.Q. How can I perform operations with numbers expressed in scientific notation?</p>		<p><i>...Continued from the previous page.</i></p> <p>MGSE.8.EE.4</p> <ul style="list-style-type: none"> • Glencoe CCGPS Math Text (McGraw-Hill) p. 59-66 • Differentiated Gifted CCGPS Frameworks: <ul style="list-style-type: none"> ▪ E-Coli SE TE • 8 Station Activities integer Exponents <ul style="list-style-type: none"> ○ Also covers other standards. ○ <i>Word problems w/operations</i> 	<p>MGSE.8.EE.4</p> <p>[Back to Top]</p>


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Concept 3: Square Roots & Cube Roots

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.EE.2 Use square root and cube root symbols to represent solutions to equations. Recognize that $x^2 = p$ (where p is a positive rational number and $x < 25$) has 2 solutions and $x^3 = p$ (where p is a negative or positive rational number and $x < 10$) has one solution. Evaluate square roots of perfect squares < 625 and cube roots of perfect cubes > -1000 and < 1000.</p> <p>EQ: Why is it useful for me to know the square root of a number?</p>	<p>Cube Root</p> <p>Perfect Square</p> <p>Radical</p> <p>Square Root</p>	<ul style="list-style-type: none"> • Eureka Math (2014 Common Core) License Concept Three ~ SE TE ▪ Glencoe CCGPS Math Text (McGraw-Hill) p. 71-78 ▪ FAL: Rational or Irrational Reasoning? ▪ MGSE Task <i>Edges of Squares & Cubes</i> ▪ 9 Station Activities Integer Exponents <ul style="list-style-type: none"> ○ Also covers other standards. ○ <i>Good word problems & use of number lines.</i> 	<p>MGSE.8.EE.2</p> <p>[Back to Top]</p>

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Concept 4: Rational vs. Irrational Numbers

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.NS.1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.</p> <p>E.Q. 1. What is the difference between rational and irrational numbers?</p> <p>E.Q. 2 How can I convert a repeating decimals to fractions to prove they are rational numbers?</p> <p>MGSE8.NS.2 Use rational approximation of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions (e.g., estimate π^2 to the nearest tenth). For example, by truncating the decimal expansion of $\sqrt{2}$ (square root of 2), show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</p> <p>E.Q. How do you locate the approximate location on a number line and estimate the value of irrational numbers?</p>	<p>Decimal Expansion</p> <p>Irrational</p> <p>Rational</p>	<ul style="list-style-type: none"> ▪ Eureka Math (2014 Common Core) <i>License</i> Concept Four ~ SE TE <ul style="list-style-type: none"> ○ Accelerated do all problems (Even #s are tricky) ○ Support/On Target do ODD ONLY ▪ Problem Based Learning SE TE Discovery & Practice <p>MGSE8.NS.1.</p> <ul style="list-style-type: none"> ▪ Glencoe CCGPS Math Text (McGraw-Hill, 2013) p. 7-14 ▪ 8th Station Activity Book Rational vs. Irrational ▪ Coach GPS Book Lesson 3 <p>Differentiation Opportunities:</p> <ul style="list-style-type: none"> ○ Shell FAL: Repeating Decimals <p>MGSE8.NS.2.</p> <ul style="list-style-type: none"> ▪ Square Root Wall Number Line  ▪ Glencoe CCGPS Math Text (McGraw-Hill) p. 81-97 ▪ Watch this lesson before converting repeating decimals to fractions. ▪ Converting Repeating Decimals to Fractions 	<p>MGSE.8.NS.1</p> <p>MGSE.8.NS.2</p> <p>Back to Top</p>

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Concept 5: Linear Equations

Standard(s) & Essential Questions	Vocabulary	Resources	Assessment
<p>MGSE8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x=a$, $a=a$, or $a=b$ results (where a and b are different numbers).</p> <p>EQ: What strategies can I use to create and solve linear equations with one solution, infinitely many solutions, or no solutions?</p> <p>MGSE8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>	<p>Addition Property of Equality Solution</p> <p>Additive Inverse</p> <p>Multiplicative Inverses</p> <p>Algebraic Expression</p> <p>Inverse Operation</p> <p>Addition Property of Equality</p> <p>Variable</p> <p>Evaluate an Algebraic Expression</p> <p>Linear Equation in One Variable</p> <p>Multiplication Property of Equality</p>	<ul style="list-style-type: none"> • Eureka Math (2014 Common Core) License Concept Five ~ SE TE • Problem Based Learning SE TE Discovery & Practice <ul style="list-style-type: none"> ▪ Differentiated for Accelerated Students: Linear Equations in Disguise SE TE ▪ Glencoe CCGPS Math Text p. 119-128 ▪ Glencoe CCGPS Math Text p. 145-168 ▪ Partner Solving Equations ▪ CCGPS Frameworks: Writing for a Math Website 	<p><u>MGSE.8.EE.7</u></p> <p>[Back to Top]</p>