Eighth Grade Math Essential Learnings

Students will be able to:

- Know and apply the properties of integer exponents to generate equivalent numerical expressions
- Use square root and cube root symbols to represent solutions to equations in the form x^2=p and x^3=p where p is a positive rational number
- Graph proportional relationships, interpreting the unit rate as the slope of the graph
- Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y=mx+b for a line intercepting the vertical axis at b
- Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms
- Understand that solutions to a system of of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously
- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations
- Solve real-world and mathematical problems leading to two linear equations in two variables
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically, in tables, or by verbal descriptions)
- Understand that a function is a rule that assigns to each input exactly one output
- Construct a function to model a linear relationship between two quantities
- Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or graph
- Describe qualitatively the functional relationship between two quantities by analyzing a graph

- Understand that a two- dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and transitions; given two congruent figures, describe a sequence that exhibits the congruence between them
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions
- Apply the Pythagorean Theorem to find the distance between two points in a coordinate system

Eighth Grade Literacy Essential Learnings

Students will be able to:

- Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text
- Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas
- Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone
- Assess how point of view or purpose shapes the content and style of a text
- Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence
- Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content
- Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences
- Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively
- Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally
- Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric
- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking
- Demonstrate command of the conventions of standard English capitalization,

punctuation, and spelling when writing
- Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression

Eighth Grade Science Essential Learnings

Students will be able to:

- Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and the seasons
- identify the lunar phases in relation to the sun
- understand the formation of solar and lunar eclipses
- understand why we have different seasons
- Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system
- Analyze and interpret data to determine scale properties of objects in the solar system
- Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity
- Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions
- Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates
- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment
- Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems
- Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century
- Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object
- Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system
- Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer

- Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample
- Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object
- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave
- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials
- Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals
- Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions
- Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success
- Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved

Eighth Grade Social Studies Essential Learnings

Students will be able to:

- Using the Declaration of Independence, including the grievances at the end of the document, describe the role this document played in expressing: • colonists' views of government. • their reasons for separating from Great Britain
- Explain how the new Constitution resolved (or compromised) the major issues, including sharing and separation of power and checking of power among federal government institutions; dual sovereignty (state-federal power); rights of individuals; the Electoral College; the Three-Fifths Compromise; the Great Compromise; and relationships and affairs with tribal nations
- Describe the formation and development of the abolitionist movement by considering the roles of key abolitionist leaders and the response of southerners and northerners to the abolitionist movement. Examples may include but are not limited to: John Brown and the armed resistance, Harriet Tubman, the Underground Railroad, Sojourner Truth, Maria Stewart, William Lloyd Garrison, and Frederick Douglass
- Establishing America's Place in the World –assess the changes in America's relationships with other nations by analyzing the origins, intents, and purposes of

treaties. Examples may include but are not limited to: TheJay Treaty (1795), French Revolution, Pinckney's Treaty (1795), Louisiana Purchase, War of 1812, and the Monroe Doctrine

- Analyze the antebellum women's rights (and suffrage) movement by discussing the goals of its leaders and comparing primary source documents from this era to the Declaration of Independence. Examples may include but are not limited to: Susan B. Anthony, Elizabeth Cady Stanton; the Declaration of Sentiments, Elizabeth Cady Stanton's Address on Women's Rights (September 1848)
- Challenge of Political Conflict – examine the origins and intentions of early American political parties,including how they emerged, who participated, and what influenced their ideologies. Examples may include but are not limited to: examine the competing ideas, experiences, and fears of Thomas Jefferson and Alexander Hamilton (and their followers), despite the worries the Founders had concerning the dangers of political division, by analyzing disagreements over relative power of the national government, the Whiskey Rebellion, Alien and Sedition Acts, foreign relations, economic policy, the creation of a national bank, assumption of revolutionary debt
- Draw conclusions about why the following increased sectional tensions: • the Missouri Compromise (1820). • the Wilmot Proviso (1846). • the Compromise of 1850, including the Fugitive Slave Act. • the Kansas-Nebraska Act (1854) and subsequent conflict in Kansas. • the Dred Scott v. Sandford decision (1857). • changes in the party system. Examples may include but are not limited to: the death of the Whig party, rise of the Republican party, and division of the Democratic party
- Comparing the Northeast and the South –compare and contrast the social and economic systems of the Northeast, the South, and the Western Frontier (Kentucky, Ohio Valley, etc.) with respect to geography, climate, and the development of: • agriculture, including changes in productivity, technology, supply and demand, and price. • industry, including the entrepreneurial development of new industries, such as textiles. • the labor force, including labor incentives and changes in labor forces. • transportation, including changes in transportation (steamboats and canal barges) and the impact on economic markets and prices. • immigration and the growth of nativism. • race relations. • class relations
- Discuss the social, political, economic, and cultural reasons for secession
- The Institution of Slavery – explain the ideology of the institution of slavery, its policies, and consequences
- Make an argument to explain the reasons why the North won the Civil War by considering the following: • critical events and battles in the war. • the political and military leadership of the North and South. • respective advantages and disadvantages of each side, including geographic, demographic, economic, and technological Westward Expansion – analyze the annexation of the west through the Louisiana Purchase, the removal of Indigenous Peoples from their homelands, the Mexican-American War,and the idea of Manifest Destiny and their consequences
- Describe the role of African-Americans in the war, including black soldiers and regiments, and the increased resistance of enslaved people
- Describe the early responses to the end of the Civil War by describing:

• the policies of the Freedmen's Bureau. • the restrictions placed on the rights and opportunities of freedmen, including racial segregation and Black Codes.

- Analyze the intent and the effect of the Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution

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