LUMEN CHRISTI
Catholic School

Eighth Grade Curriculum Guide

Patron Saint: Saint Thomas Aquinas

Welcome To Eighth Grade!

Dear Parents,

We are pleased to provide you with the curriculum standards that your child will learn this year in eighth grade. These standards spell out exactly what skills and knowledge we expect your child to be able to do and understand by the end of this year. Lumen Christi follows rigorous content standards aligned with national guidelines and Archdiocesan standards. But even the most rigorous standards cannot make our students successful without the support of parents. This booklet is designed to inform you, our parents, of the Lumen Christi expectations for students in the five major curriculum areas: Religion, English Language Arts, Math, Social Studies, and Science. These expectations are aligned with the eighth grade curriculum that is used by the classroom teacher for daily instruction.

As a school dedicated to excellence we are continually reviewing, developing, and improving our curricular choices. Therefore, we will occasionally and purposefully make changes to our scope and sequence as we continue to grow and refine our practice of education.

Blessings!

RELIGION

Creedal Church:

- Recognizes that we know God through creation, our own consciences and our longing for God
- Connects creedal beliefs of the Catholic Church to the lived experience of youth
- Recognizes that there are angels who praise and serve God
- Recognizes major periods in the Bible and in the history of the Catholic Church
- Describes the major traditions of our roots as Catholic Christians, e.g., marks of the church, church hierarchy, lay leadership and ecumenism
- Knows that Christ redeemed us from sin
- Describes the contribution of Mary, saints and holy people to faith tradition
- Knows that faith and science cannot contradict each other as both come from God
- Is able to explain and defend the core beliefs of the Catholic faith (apologetics)
- Recognizes the possibility we will be called to suffer for our faith
- Recognizes holy people of other traditions: Gandhi, Martin Luther King Jr.
- Identifies one's self as being a unique creation, made in God's image
- Recognizes that God has truly revealed His plan through Jesus Christ
    - Knows that to understand the Scriptures, one has to take into account the literary forms of the time
    - Tells stories from Scripture that describe the person and ministry of Jesus Christ: The Rich Man and Lazarus (Luke 16:19-31); The Money Changers in the Temple (Mark 11:15-18; The Baptism of Jesus (Luke 3:13-17); The Last Judgment (Matthew 25:35-40); Jesus Announces His Mission (Luke 4:14-23); Jesus: The Second Adam (1 Corinthians 15:47); The Temptation (Matthew 4:1-11)

Liturgy/Sacrament:

- Knows that Christ acting in the Church is the ultimate celebrant of every sacrament
- Identifies the symbolic nature of Sacraments with symbols in life
- Identifies and experiences Catholic rituals and rites, for example, blessings, the Sacraments and Rite of Christian Initiation of Adults (RCIA)
- Participates regularly in Sunday Eucharist and knows that Christ is present in the assembly, Word, presider and especially in the Blest Bread and Wine
- Participates in the Sacrament of Reconciliation regularly
- Articulates the cycles of the Liturgical Year, including special feasts
- Identifies the ritual nature of life and associates it with the ritual of Church, for example, family meals and the Eucharist, seasons of nature and seasons of the Church Year
    - Identifies sacramental actions in Scripture: Commissioning (Matthew 28:18-20, Jeremiah 1:4-8, John 14:25-26, Acts 2:1-13); Ritual Meals (2 Chronicles 35:16-19, Matthew 26:26-29, Luke 24:13-32, John 6:28-35); Forgiveness (Matthew 18:21-35, John 20:19-23); Healing (Mark 1:29-34, Luke 5:17-26, James 5:13-15); Marriage (Genesis 2:22-24, Matthew 19:1-6, John 2:1-11); Ministry (Leviticus 8:1-13, Matthew)

Moral Life:

- Names and describes the Ten Commandments, the Beatitudes and the Corporal and Spiritual Works of Mercy as guidelines for living a happy life and applies them to daily life
- Describes experiences of conscience which signal what is right and wrong
- Identifies personal moral choices as an expression of a Catholic Christian moral life
- Associates social, economic and political choices with Christian morality
- Recognizes that some sins are collective and social-the wrongful acts of a group
- Integrates the skills of justice and peacemaking into their actions
- Recognizes that the values of our Catholic faith are contrary to the message in some contemporary music and media
- Is conscious of racial, ethnic and class differences and makes definite efforts to be inclusive in relationships, reaching out to those not in the "in group"
- Experiences a variety of opportunities to serve one's neighbors
- Associates Jesus as a friend and model of how we are called to be friends
- Recognizes that responsible dating helps friendships, and must be built on mutual respect
- Knows that we are called to respect life from conception to death
- Recognizes that affirmation and communication are essential to human life and are found in strong families
- Knows that violence begins with a lack of respect for life
- Knows that peer pressure is a powerful force that sometimes contradicts Christian principles
- Can define bullying and harassment and recognize it when it occurs

- Knows how to use conflict management skills
- Can define and discuss the meaning of sexual harassment and sexual abuse

Christian Prayer:

- Experiences a relationship with God in individual prayer including meditation and spontaneous prayer
- Recognizes and experiences belonging to a community which prays with and for each other
- Prays and understands the Nicene Creed
- Prays the Our Father as the most perfect prayer
- Uses contemplative prayer
- Prays, blessing God for all He has bestowed
- Prays using Marian devotions and other devotions, i.e., Stations of the Cross
- Uses Scripture as a source for daily prayer
- Experiences the presence of God through prayerful retreat experiences
    - Connects Scripture stories to life issues through prayer: Life of the Christian (Acts 2:42-47, 4:32-35); Light under the Bushel Basket (Matthew 5:14-16); God's Mercy and Compassion (Luke 1:68-79); Church as a Family (Ephesians 2:14-21); Justice of God (Jeremiah 22:13, Luke 6:36,38); Kingdom Parable and Actions (Luke 10:33, 19:10, Mark 2:17); Share My Mission (Matthew 28:20)

ENGLISH LANGUAGE ARTS

Reading: Literature

Key Ideas and Details:

- Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.
- Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.

Craft and Structure:

- Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
- Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style.
- Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.

Integration of Knowledge and Ideas:

- Analyze the extent to which a filmed or live production of a story or drama stays faithful to or departs from the text or script, evaluating the choices made by the director or actors.
- Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new.

Range of Reading and Level of Text Complexity:

- By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6-8 text complexity band independently and proficiently.

Reading: informational Texts

Key Ideas and Details:

- Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.
- Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

Craft and Structure:

- Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
- Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.
- Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.

Integration of Knowledge and Ideas:

- Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
- Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
- Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the

texts disagree on matters of fact or interpretation.

Range of Reading and Level of Text Complexity:

- By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6-8 text complexity band independently and proficiently.

Writing

Text Types and Purposes:

- Write arguments to support claims with clear reasons and relevant evidence
    - Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
    - Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
    - Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
    - Establish and maintain a formal style.
    - Provide a concluding statement or section that follows from and supports the argument presented.
- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
    - Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
    - Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
    - Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
    - Use precise language and domain-specific vocabulary to inform about or explain the topic.
    - Establish and maintain a formal style.
    - Provide a concluding statement or section that follows from and supports the information or explanation presented.
- Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
    - Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.
    - Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters.
    - Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events.
    - Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.
    - Provide a conclusion that follows from and reflects on the narrated experiences or events.

Production and Distribution of Writing:

- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
- Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.

Research to Build and Present Knowledge:

- Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- Gather relevant information from multiple print and digital sources, using search terms effectively; assess the

credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- Draw evidence from literary or informational texts to support analysis, reflection, and research.
    - Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new").
    - Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").

Range of Writing:

- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening

Comprehension and Collaboration:

- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
    - Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
    - Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
    - Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
    - Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
- Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.

Presentation of Knowledge and Ideas:

- Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
- Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.

Language

Conventions of Standard English:

- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
    - Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences.
    - Form and use verbs in the active and passive voice.
    - Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood.
    - Recognize and correct inappropriate shifts in verb voice and mood.
- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
    - Use punctuation (comma, ellipsis, dash) to indicate a pause or break.
    - Use an ellipsis to indicate an omission.
    - Spell correctly.

Knowledge of Language:

- Use knowledge of language and its conventions when writing, speaking, reading, or listening.
    - Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact).

Vocabulary Acquisition and Use:

- Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.
    - Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
    - Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *precede, recede, secede*).
    - Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
    - Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).
- Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
    - Interpret figures of speech (e.g. verbal irony, puns) in context.
    - Use the relationship between particular words to better understand each of the words.
    - Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *bullheaded, willful, firm, persistent, resolute*).
- Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

PRE-ALGEBRA

The Number System

Know that there are numbers that are not rational, and approximate them by rational numbers

- 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.
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).

Expressions and Equations

Expressions and Equations Work with radicals and integer exponents

- 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 of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
- Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
- Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use 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

Understand the connections between proportional relationships, lines, and linear equations

- Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
- 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 for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.

Analyze and solve linear equations and pairs of simultaneous linear equations

- Solve linear equations in one variable.
    - 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).
    - Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- Analyze and solve pairs of simultaneous linear equations.
    - Understand that solutions to a system 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 simple cases by inspection.
    - Solve real-world and mathematical problems leading to two linear equations in two variables.

Functions

Define, evaluate, and compare functions

- Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.[1]
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

Use functions to model relationships between quantities

- 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 from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Geometry

Understand congruence and similarity using physical models, transparencies, or geometry software

- Verify experimentally the properties of rotations, reflections, and translations:
    - Lines are taken to lines, and line segments to line segments of the same length.
    - Angles are taken to angles of the same measure.
    - Parallel lines are taken to parallel lines.
- 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 translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
- Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

Understand and apply the Pythagorean Theorem

- Explain a proof of the Pythagorean Theorem and its converse.
- 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.

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres

- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Statistics & Probability

Investigate patterns of association in bivariate data

- Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
- Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
- Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

ALGEBRA

Number and Quantity: Quantities

Reason quantitatively and use units to solve problems

- Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- Define appropriate quantities for the purpose of descriptive modeling.
- Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Number and Quantity: The Real Number System

Extend the properties of exponents to rational exponents

- Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Use properties of rational and irrational numbers.

- Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Algebra: Seeing Structure in Expressions

Interpret the structure of expressions

- Interpret parts of an expression, such as terms, factors, and coefficients.
- Interpret complicated expressions by viewing one or more of their parts as a single entity.
- Use the structure of an expression to identify ways to rewrite it.
- Write expressions in equivalent forms to solve problems.
- Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
    - Factor a quadratic expression to reveal the zeros of the function it defines.
    - Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
    - Use the properties of exponents to transform expressions for exponential functions.

Algebra: Reasoing with Equatins and Expressions

Understand solving equations as a process of reasoning and explain the reasoning

- Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Algebra: Creating Equations

Create equations that describe numbers or relationships

- Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions*.
- Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret

solutions as viable or nonviable options in a modeling context.
- Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- Solve equations and inequalities in one variable.
- Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- Solve quadratic equations in one variable.
    - Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
    - Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
    - Solve systems of equations.
    - Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
    - Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
    - Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.
    - Represent a system of linear equations as a single matrix equation in a vector variable.
    - Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).

Represent and solve equations and inequalities graphically

- Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Functions: Interpreting Functions

Understand the concept of a function and use function notation

- Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.
- Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

Interpret functions that arise in applications in terms of the context

- For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*.
- Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Analyze functions using different representations

- Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
    - Graph linear and quadratic functions and show intercepts, maxima, and minima.

    - Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
    - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
    - Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
    - Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
    - Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
    - Use the properties of exponents to interpret expressions for exponential functions.
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Functions: Building Functions

Build a function that models a relationship between two quantities

- Write a function that describes a relationship between two quantities.*
    - Determine an explicit expression, a recursive process, or steps for calculation from a context.
    - Combine standard function types using arithmetic operations.
    - Compose functions.
- Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

Build new functions from existing functions

- Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
- Find inverse functions.
    - Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.
    - Verify by composition that one function is the inverse of another.
    - Read values of an inverse function from a graph or a table, given that the function has an inverse.
    - Produce an invertible function from a non-invertible function by restricting the domain.

Functions: Linear, Quadratic, & Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems

- Distinguish between situations that can be modeled with linear functions and with exponential functions.
    - Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
    - Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
    - Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
- For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

Interpret expressions for functions in terms of the situation they model

- Interpret the parameters in a linear or exponential function in terms of a context.

Statistics & Probability: Interpreting Categorical & Quantitative Data

Summarize, represent, and interpret data on a single count or measurement variable

- Represent data with plots on the real number line (dot plots, histograms, and boxplots).
- Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Summarize, represent, and interpret data on two categorical and quantitative variables

- Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
- Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
    - Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
    - Informally assess the fit of a function by plotting and analyzing residuals.
    - Fit a linear function for a scatter plot that suggests a linear association.

Interpret linear models

- Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
- Compute (using technology) and interpret the correlation coefficient of a linear fit.
- Distinguish between correlation and causation.

SOCIAL STUDIES

Grade 6, 7, and 8

Economics

Production/Consumption/Distribution:

- Describe how personal economic decisions impact global economy (e.g., starting new business initiatives, boycotts, and earning power of workers)
- Analyze the impact of personal decisions on global issues (e.g., trade agreements, recycling, and conserving the environment)
- Determine the location of natural resources and explain how they generate trade and economic patterns
- Describe effects of investments in infrastructure (e.g., education, healthcare, public safety, transportation, etc.) on the economy
- Identify and explain various points of view concerning economic issues (e.g., taxation, unemployment, inflation, the national debt, and distribution of income)
- Compare the standard of living in various societies

Exchange:

- Interpret and explain the development of money in history
- Differentiate among the various economic & political systems (e.g., feudalism, capitalism, communism, etc.)
- Distinguish and explain basic economic concepts (e.g., supply and demand; production, exchange, and consumption; labor, wages, and capital; inflation and deflation; public and private goods and services; market economy and command economy)
- Identify the economic roles of institutions (e.g., corporations and businesses, banks, labor unions, and the Federal Reserve System)

History

Time:

- Interpret the past using a variety of primary and secondary sources
- Compare ancient and present-day communities around the World
- Analyze the cause and effect relationship of different events over time

People:

- Identify and describe significant people in the major eras in the United States and World History
- Examine the impact of immigration on the United States and World History
- Summarize major issues associated with the history, culture, and tribal sovereignty of the indigenous peoples of Americas
- Research the political values of freedom, democracy, equality, & justice as embodied in important documents (e.g. the Magna Carta, Declaration of Independence, U.S. Constitution, and the Bill of Rights)
- Organize and analyze information to place people in historical perspective

Events:

- Analyze significant events and the major eras of the United States and the World
- Describe the relationship between and among significant events in the United States and World History
- Critically analyze current events in the United States and the World
- Explain the interpretation of historical events according to various viewpoints
- Identify major scientific discoveries and technological innovations and describe their social and economic effects on society
- Explain the need for laws and policies to regulate science and technology

Geography

Location:

- Identify past & present countries is the World
- Explain relative and absolute location of places using appropriate geographical terminology
- Locate and identify physical features in the World

Map Skills:

- Use maps, charts, and graphs to display and compare information
- Use an atlas to estimate distance, calculate scale, identify dominant patterns of climate and land use, and compute population density
- Construct mental maps of selected locales, regions, states, and countries and draw maps from memory, representing relative location, direction size, and shape
- Create different types of maps (e.g., political, physical, and thematic)

Regions:

- Identify past & present World regions
- Identify United State regions throughout history

Place:

- Identify components of culture (e.g., religion, art, language, customs, and cuisine)
- Understand the different characteristics of climate, landforms, bodies of water, cities, governments, and other characteristics of place

Human Environment Interaction:

- Describe and analyze ways in which people interact with, modify and adapt with the environment
- Research the causes and consequences of global issues (e.g., urbanization, extinction of species, consumption of natural resources, and World events)
- Identify changing boundaries and major land acquisitions of the United States

Movement:

- Explain the movement of people, ideas, products, and diseases in the World
- Evaluate the impact of science and technology on the United States and the World

Political Science

Citizenship:

- Demonstrate ways in which a citizen may participate in public policy debates Identify individual responsibilities to local, state, national and global communities
- Explain the role and impact of civil actions Locate, organize, and use relevant information to understand issues

Laws:

- Explain how laws are developed, changed, and enforced
- Analyze and discuss important political documents (e.g., the Magna Carta, Constitution, Bill of Rights, and landmark decisions of the Supreme Court)

Government:

- Explain the role of political parties and interest groups in American politics
- Identify and explain the different forms of government, including the basic principles of democracy
- Explain how legislative, executive, and judicial powers are separated and balanced at the federal level
- Describe and explain how the federal system separates the powers of federal, state, and local government
- Distinguish how the powers of government are acquired, maintained, justified, and sometimes abused
- Describe the role and effects of international organizations and political alliances throughout the World
- Analyze how various groups of people and cultures govern themselves

Behavioral Science

Individual:

- Describe and explain how various factors influence individual identity

Institution:

- Describe cooperation and interdependence among groups, societies, and nations
- Demonstrate knowledge of the World's religions

Society:

- Compare and contrast the components of various region’s culture
- Explain impact of World events globally
- Describe the reflection of cultural values and ideas in art and architecture
- Describe cultural contributions of racial and ethnics groups in the United States and the World

- Identify examples of bias and stereotyping and how they contribute to conflict
- Analyze cultural conflicts in Unites States History
- Give examples of media influence on behavior and decision-making of individuals and groups

Catholic Social Teachings

Life and Dignity of the Human Person:

- Analyzes social issues based on whether human dignity is valued or harmed
- Identifies elements of human dignity based on Catholic Social Teaching
- Acts to transform human dignity
- Uses conflict resolution skills
- Identifies abuses of human dignity found in American Society
- Identifies Biblical passages related to human dignity

The Call to Family, Community, and Participation:

- Models responsible behavior to family and community through service
- Is involved in service projects beyond the local community
- Uses the church's social teachings as a lens to look at the moral and human dimensions of public issues

The Rights and Responsibilities of the Human Person:

- Articulates the component parts of human dignity
- Identifies actions that would be considered abuses of human rights (local, national, international)
- Practices peaceful conflict resolution strategies within the family, school, and community
- Researches social data and church teaching as a way to begin to transform injustice

Option for the Poor and the Vulnerable:

- Shares personal resources to help the poor and vulnerable
- Can discuss laws and policies that can benefit the poor and vulnerable members of society
- Practices behaviors that help others
- Can articulate the causes of poverty and the systems which prevent people from overcoming poverty
- Does research on the 20th and the 21st century people who have fought for justice, e.g. Archbishop Romero, Dorothy Day, Martin Luther King
- Clearly articulates the difference between justice and charity

Dignity of Work and the Rights of Workers:

- Can discuss the role work can play as a contribution to self and society
- Can articulate the importance of intrinsic values
- Demonstrates putting forth the best effort in school, recreation, and work
- Demonstrates respect for the basic rights and responsibilities at school and neighborhood
- Gives examples of the basic rights and responsibilities of workers in at least three different job areas

Solidarity of the Human Family:

- Models attitudes and behaviors that accept and value differences (racial, ethnic, economic, etc.)
- Displays an awareness of responsibility to others throughout the world
- Demonstrates the policies, and behaviors that support a peaceful world

Care for God's Creation:

- Displays individual and group actions to protect and preserve the environment
- Takes an active role in programs and laws that support and help all forms of life

SCIENCE

Earth Science

Weather:

- Explain how heat, moisture, and air movement determine weather
- Understand that the Sun's energy drives the water cycle and that the water cycle is a continuous process of recycling
- Demonstrate wind flow from high pressure areas to low pressure areas
- Analyze how temperature, pressure, and the Coriolis Effect cause wind and water currents
- Describe how global atmospheric movement influences local weather
- Examine how geographic features affect climates
- Know the composition and structure of the Earth's atmosphere

Space:

- Understand how the force of gravity keeps the planets and other bodies in orbit
- State Newton's Laws of Gravitation
- Explain orbital motion of objects in the solar system
- Understand that stars give off light and produce energy by nuclear fusion
- Understand how humans use technology to explore space

Earth's Structure/Composition:

- Know the components of soil and other factors that influence soil texture, fertility, and resistance to erosion
- Communicate that the Earth is comprised of layers including a core, mantle, lithosphere, hydrosphere, and atmosphere
- Identify the characteristics of sedimentary, igneous, and metamorphic rocks and know the formation process
- Know the interrelationship involved in the process of the rock cycle
- Know that the fossils contained in the successive layers of rock can be used to confirm the age, history, and changing life forms of the Earth

Physical Science

Sound and Light:

- Explain how the Sun is the major source of energy for the Earth
- Identify and explain that photosynthesis is the process of using light to make food

Matter:

- Know the major ideas of atomic theory and molecular theory
- Know the history and development of the present atomic model
- Model how all matter is composed of atoms, consisting of protons, neutrons, and electrons
- Describe physical and chemical interactions among substances
- Develop an understanding of the physical and chemical properties of matter
- Realize that particles of matter are in constant motion, and when heated, the motion of the molecules increases and they move farther apart
- Understand the flow of electrons in bonding
- Understand how each element is represented on the Periodic Table
- Know the organization of the Periodic Table
- Know the materials that contain equal numbers of positive and negative charges are electrically neutral
- Realize that any change in the balance of charges produces an electric force proportional to the charge
- Know that electromagnetic forces exist with and between atoms

Forces, Motion, and Energy:

- Investigate the motion of objects and explain motion in terms of speed, velocity, acceleration, momentum, and Newton's Laws of Motion and their application to real-life situations
- Identify the Law of Conservation of Energy
- Explain how gravitational force is applied
- Explain that nuclear forces are stronger than electromagnetic forces, which are stronger than gravitational forces
- Demonstrate how machines can be used to do work more efficiently
- Investigate how work can be measured
- Identify how devices have been designed to convert energy from one form to another

- Give a basic explanation of the gas laws, Archimedes Principle, and Bernoulli's Principle and recognize their real-life applications
- Describe and investigate the properties of light, heat, gravity, magnetic fields, electrical fields and sound waves and their interactions with common objects
- Infer that as energy transformations occur, some energy escapes as heat, sound, or light
- Be aware of decisions about the future of energy resources

Life Science

Plants:

- Characteristics
    - Describe the chemical process of photosynthesis

Environment:

- Adaptations
    - Recognize how things evolve
    - Know the process of natural selection
    - Know the history of the Theory of Evolution

Cells, Heredity and Classification:

- Realize that both heredity and the environment contribute to the development of living things
- Know that organisms are classified based on similarities that reflect their evolutionary relationships
- Identify the levels of organization in living things: cells, tissues, organs, systems, and organisms
- Know the structure and function of the different parts of a cell
- Describe how chromosomes are contained in both egg and sperm and carry instructions for the new individual
- Model how an inherited trait is determined by one or more genes using a Punnett Square
- Know the chemical and structural properties of DNA and its role in specifying the characteristics of an organism within an organism

Standards and information obtained from:

- Archdiocese of Milwaukee Office of Schools
- National Benchmarks and Standards for College and Career Readiness
- Department of Defence Education Activity