MATHEMATICS

Enduring Understandings:

Mathematics is a coherent, consistent system that provides for the effective communication and representation of conjectures, processes, and conclusions.

- **How do mathematical concepts relate and build upon each other?**

Mathematics is the organized study of the systems that form the structure of our universe.

- **How do we use mathematics to create a rationale based upon logical reasoning that convinces others of "the truth" of your ideas?**

Mathematics is used in all areas to quantify and to model situations in order to make predictions, inferences, and form conclusions.

- **How are appropriate mathematical strategies and representations developed, selected, and applied in order to interpret a given situation and communicate the results?**

- **How is mathematics used to quantify the components that create the form and structure of our universe?**

The mathematics curriculum at Clayton High School provides a strong four-year program for all students. The state of Missouri requires three credits in mathematics for graduation. Most students at Clayton High School take four years of mathematics. Colleges generally require at least three units in high school mathematics, and four units are required at most selective colleges. The curriculum emphasizes problem solving with real-world applications, effective communication using the language of mathematics, reasoning skills, and making connections within mathematics and with other disciplines of study. Use of computers, calculators, and other technological tools extends the understanding of mathematical concepts and enriches problem-solving experiences.

The prerequisites required for some classes in the mathematics department cannot be satisfied by summer school courses alone. Repeating a course in summer school may satisfy the prerequisite requirement. **Students should verify the acceptance of any summer school course with the mathematics department chair BEFORE enrolling.**

COLLEGE-PREP SEQUENCE

Each year, this sequence addresses strand-specific courses typically studied in a college preparatory program: College-Prep Algebra 1; College-Prep Geometry; College-Prep Algebra 2; or College-Prep Functions Statistics and Trigonometry; Intermediate College Algebra; College-Prep Precalculus; Honors Calculus. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities, and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

COLLEGE-PREP ALGEBRA 1

9th – 12th Grade
Credit - 1
Full Year

Prerequisite: Teacher recommendation

College-Prep Algebra 1 is intended to build a foundation for students progressing through the College-Prep sequence. Topics studied in this course include algebraic expressions, linear equations and functions, linear inequalities, systems of linear equations, exponents and exponential functions, and quadratic expressions, functions and equations. Students will access the curriculum through McGraw-Hill's "Glencoe: Algebra I" textbook. The TI-Nspire CX graphing calculator is used for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

ALGEBRA I SUPPORT

9th – 12th Grade
Credit – 1/4
Semester 1 or 2 (A or B days)

Prerequisite: Teacher Recommendation

Algebra I Support is a course designed to help students having difficulties meeting the requirements of an Algebra I course. The course mirrors topics being studied concurrently in Algebra I. Teachers of this course will also be teaching Algebra I, providing an ideal environment for students who need additional support to be successful. Algebra I Support is for elective credit only. **(This course does not qualify for NCAA eligibility.)**

COLLEGE-PREP GEOMETRY

9th – 12th Grade
Credit - 1
Full Year

Prerequisite: Teacher recommendation

College-Prep Geometry will further the development of critical thinking skills in mathematics. Algebraic techniques are emphasized to further the understanding of geometry. Topics studied in this course include Euclidean Geometry, which consists of reasoning and proof, parallel lines, triangle congruence and similarity, area and volume, polygons (with special emphasis on triangles and quadrilaterals), right triangles and trigonometry and circles. Students will access the curriculum through "Glencoe: Geometry, CCSS edition". The TI-Nspire CX graphing calculator is used for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

GEOMETRY SUPPORT

9th - 12th Grade
Credit - 1/4
Semester 1 or 2 (A or B days)

Prerequisite: Teacher Recommendation

Geometry Support is a course designed to help students meet the requirements of Geometry. The course mirrors topics being studied concurrently in Geometry. Teachers of this course will also be teaching Geometry, providing an ideal environment for students who need additional support to be successful. Geometry Support is for elective credit only. **(This course does not qualify for NCAA eligibility.)**

COLLEGE-PREP ALGEBRA 2

10th - 12th Grade
Credit - 1
Full Year

Prerequisite: College-Prep Geometry

College-Prep Algebra 2 will review and expand algebraic skills. Topics studied in this course include linear functions, transformations, systems of equations and inequalities, quadratic functions, polynomials and polynomial functions, inverses and radical functions, exponential and logarithmic functions and properties, rational function operations, sequences and series, statistics and probability, right triangle trigonometry, and trigonometric functions. Students will access the curriculum through McGraw-Hill's "Glencoe: Algebra 2" textbook. The TI-Nspire CX graphing calculator is used for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

ALGEBRA 2 SUPPORT

10th - 12th Grade
Credit - 1/4
Semester 1 or 2 (A or B days)

Prerequisite: Teacher Recommendation

Algebra 2 Support is a course designed to help students having difficulties meeting the requirements of an Algebra 2 course. The course mirrors topics being studied concurrently in Algebra 2. Teachers of this course will also be teaching Algebra 2, providing an ideal environment for students who need additional support to be successful. Algebra 2 Support is for elective credit only. **(This course does not qualify for NCAA eligibility.)**

COLLEGE-PREP FUNCTIONS, STATISTICS AND TRIGONOMETRY

11th - 12th Grade
Credit - 1
Full Year

Prerequisite: College-Prep Algebra 2

Functions, Statistics, and Trigonometry combines the ideas of functions, trigonometry, statistics and data analysis. Functions, including linear, quadratic, exponential, logarithmic, and polynomial will be studied. Additional topics of study include probability, sequences, series, permutations, combinations, and trigonometric identities are included in this course. Students will collect, analyze, process and display data. Students will access the curriculum through McGraw-Hill's "Algebra & Trigonometry" by John Coburn. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

INTERMEDIATE COLLEGE ALGEBRA

12th Grade
Credit - 1
Full Year

Prerequisite: Algebra 3 or FST

Intermediate College Algebra is designed to prepare students for college-level mathematics. Emphasis will be on practicing and expanding algebraic topics to enable students to use mathematics as a modeling language for real life problems. The advanced algebraic topics studied include number systems, linear equations and inequalities, matrices, exponential and logarithmic functions, polynomial functions, conic sections, and rational functions. Students will access the curriculum through Larson's "Intermediate Algebra: Graphs and Functions". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator. **(This course does not qualify for NCAA eligibility.)**

COLLEGE-PREP PRECALCULUS

11th – 12th Grade
Credit - 1
Full Year

Prerequisite: College-Prep Functions, Statistics and Trigonometry or teacher recommendation from College-Prep Algebra 2 teacher

The primary goal of College-Prep Precalculus is to foster an appreciation for the axiomatic and deductive approaches used in many fields. This course consists of topics from Precalculus and discrete mathematics. Precalculus focuses on infinite and continuous processes, while discrete mathematics focuses on finite and iterative processes. Topics studied in this course include trigonometry, analytical geometry, introductory derivatives, integrals, polynomial, rational, exponential, and logarithmic functions and their graphs. Students will access the curriculum through Glencoe's "Precalculus: Common Core Edition". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

HONORS CALCULUS

12th Grade
Credit -1
Full Year

Prerequisite: Honors Precalculus or College-Prep Precalculus

Honors Calculus defines and demonstrates the fundamental concepts and rules of differential and integral calculus. This course is designed for students who intend to take Calculus as university freshmen and is not intended to prepare students for the AP Calculus exam. Topics studied in this course include limits and continuity, differentiation rules, graphing techniques, optimization, differentials, integration rules and techniques, simple slope fields and differential equations, area and volume. Many practical applications of calculus are included. The textbook used is Larson's "Calculus of a Single Variable, 9th edition". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

GENERAL MATHEMATICS

At CHS, students who participate in the General Mathematics sequence will receive mathematics instruction designed to meet the needs of students who need more time developing mathematical concepts. The General Mathematics sequence features hands-on study of topics such as algebra, geometry, statistics, trigonometry, discrete mathematics, and finances. Successful completion of the full course sequence prepares students for a college algebra course. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities, and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

PRE-ALGEBRA I

9th – 12th Grade
Credit - 1
Full Year

Prerequisite: Teacher Recommendation

Pre-Algebra I reviews the necessary concepts to be successful in a Pre-Algebra 2 course. Based on the needs of the students, topics will include a review of fractions, scientific notation, memorizing multiplication tables and perfect squares. Topics studied include operations with signed numbers, powers, roots, algebraic expressions, graphing

linear functions, solving one step and working to solve multi-step equations. Application problems include money problems, hourly rates to figure gross pay, and calculating tips. Students will access the curriculum through "Jamestown's Number Power: Algebra" by Robert Mitchell. Students utilize a scientific calculator, but most work is done without a calculator. **(This course does not qualify for NCAA eligibility.)**

PRE-ALGEBRA 2

9th -12th Grade
Credit – 1
Full Year

Prerequisite: Teacher Recommendation

Pre-Algebra 2 reviews the necessary concepts to be successful in an Algebra I course. Based on the needs of the students, topics studied will be a continuation of Pre-Algebra I, which includes a review of fractions, scientific notation, memorizing multiplication tables and perfect squares. Topics studied include operations with signed numbers, powers, roots, algebraic expressions, graphing linear and non-linear functions, and solving multi-step equations. Application problems include money problems, hourly rates to figure gross pay, and calculating tips. Students utilize a scientific calculator, but most work is done without a calculator. **(This course does not qualify for NCAA eligibility.)**

ALGEBRA 1

9th – 12th Grade
Credit - 1
Full Year

Algebra 1 creates a foundation for all future math coursework. Topics include order of operations, equations and inequalities, equations of lines, systems of equations and inequalities, exponent properties and exponential functions, radical expressions, and probability. Students will access the curriculum through Prentice Hall's "Algebra 1 Foundation Series". The TI-Nspire CX graphing calculator is used for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator. **(This course does not qualify for NCAA eligibility.)**

GEOMETRY

9th – 12th Grade
Credit - 1
Full Year

Prerequisite: Algebra 1

Geometry will develop geometric concepts which include tools of Geometry, reasoning, proof, parallel and perpendicular lines, congruent triangles, relationships with triangles, polygons and quadrilaterals, similarity, right triangles trigonometry, transformations, area, surface area volume. Students will access the curriculum through Prentice Hall's "Geometry Foundation Series". A graphing calculator will be utilized during the investigation of spatial topics, however most work will utilize a scientific calculator. It is strongly recommended that each student purchase a scientific calculator. **(This course does not qualify for NCAA eligibility.)**

ALGEBRA 2

10th - 12th Grade
Credit - 1
Full Year

Prerequisite: Geometry

Algebra 2 will review and expand algebraic skills. Topics studied in this course include expressions, equations and inequalities, functions, equations and graphs, linear systems, quadratic functions and equations, polynomials and polynomial functions, radical functions and rational exponents, exponential and logarithmic functions, direct and inverse variation, reciprocal function families, introduction to sequences and series, matrices, law of sines and cosines, and right-triangle trigonometry. Students will access the curriculum through Prentice Hall's "Algebra 2 Foundation Series". Students utilize the TI-Nspire CX Graphing Calculator to simplify procedures, investigate new functions, and visualize models. **(This course does not qualify for NCAA eligibility.)**

ALGEBRA 3

11th - 12th Grade
Credit - 1
Full Year

Prerequisite: Algebra 2

Algebra 3 focuses on the continuation of study of Algebra and Trigonometry. Topics studied in this course include linear equations and inequalities, polynomials, factoring, rational expressions, trigonometric identities and functions: exponential, logarithmic, trigonometric, inverse trigonometric. Students will access the curriculum through "Algebra and Trigonometry for College Readiness" by Lial and Hornsby. The TI-Nspire graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire graphing calculator.

INTERMEDIATE COLLEGE ALGEBRA

12th Grade
Credit - 1
Full Year

Prerequisite: Algebra 3 or FST

Intermediate College Algebra is designed to prepare students for college-level mathematics. Emphasis will be on practicing and expanding algebraic topics to enable students to use mathematics as a modeling language for real life problems. The advanced algebraic topics studied include number systems, linear equations and inequalities, matrices, exponential and logarithmic functions, polynomial functions, conic sections, and rational functions. Students will access the curriculum through Larson's "Intermediate Algebra: Graphs and Functions". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator. **(This course does not yet qualify for NCAA eligibility.)**

CONSUMER MATH

12th Grade
Credit - 1
Full Year

Prerequisite: Teacher recommendation

Consumer Math is designed to develop a strong foundation in household and financial management that will enable students to make informed decisions regarding matters of money and finance in their daily lives. Other topics studied include principles of finance, loans, compound interest and continuous interest, credit card debt, car ownership, budgets, and household management (recipe conversions, home maintenance that requires measurement). **(This course does not qualify for NCAA eligibility.)**

HONORS MATHEMATICS

At CHS, students who participate in the Honors Mathematics sequence are expected to complete a fast-paced, rigorous course of study. The Honors Mathematics sequence features an in-depth study of mathematics topics such as Honors Geometry, Honors Algebra/Trigonometry, Honors Precalculus and Honors Calculus. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator. Successful completion of the full course sequence prepares students for second or third semester university calculus.

HONORS GEOMETRY

9th - 12th Grade
Credit - 1
Full Year

Prerequisite: Honors Algebra

Honors Geometry develops topics from plane Euclidean Geometry. Topics studied include parallel and perpendicular lines, congruent triangles, similarity, right triangles and trigonometry, quadrilaterals, transformations, circles, measurement of figures and solids. A major emphasis is placed on the development of critical thinking skills, both inductive (geometric pattern recognition) and deductive (formal proofs), and selected rules of inference used in the development of geometry as an axiomatic system. Algebraic techniques are utilized to further the understanding of geometry. Students will access the curriculum through Larson's "Geometry, Common Core Edition". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

HONORS ALGEBRA AND TRIGONOMETRY

10th - 12th Grade
Credit - 1
Full Year

Prerequisite: Honors Geometry

The primary focus of Honors Algebra and Trigonometry is the study of functions and their properties. Polynomial, radical, rational, exponential, logarithmic, and trigonometric functions will be studied, with specific attention given to transformations and inverses. Additional topics of study include trigonometric identities, sequences, series, binomial probability, and conic sections. Students will access the curriculum through Glencoe's "Algebra 2" text. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

HONORS PRECALCULUS

11th - 12th Grade
Credit - 1
Full Year

Prerequisite: Honors Algebra and Trigonometry

Honors Precalculus consists of advanced algebraic and trigonometric topics selected to augment the students' background in preparation for Calculus. Functions including polynomial, rational, exponential, logarithmic, and trigonometric will be studied. Additional topics of study include trigonometric identities, sequences, series, probability, combinations, permutations, conic sections, vectors, and an introduction to derivatives and integrals. Students will access the curriculum through Larson's "Precalculus with Limits: A Graphing Approach". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

AP CALCULUS AB & BC

12th Grade
Credit -1
Full Year

Prerequisite: Honors Precalculus

AP Calculus (AB): This advanced placement course will allow for the possibility of earning one semester of college credit. This course studies all topics set by College Board for AP Calculus AB. Topics studied include limits and their properties, differentiation, applications of differentiation, integration, logarithmic and exponential, and other transcendental functions, differential equations, applications of integration, and L'Hopital's rule and integration by parts. To familiarize students with specific advanced placement expectations, exams and homework problems will include selections from past AP exams. Students taking the AP test in May will also be required to take a semester exam. Students will access the curriculum through Larson and Edward's "Calculus of a Single Variable: AP Edition". The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

AP Calculus (BC): This advanced placement course will allow for the possibility of earning two semesters of college credit. While the presentation will be faster paced and more in-depth than Calculus AB, considerable attention will be given to an intuitive and numerical perspective. In addition to the topics listed in the Calculus AB description, further development of integration techniques, differential equations, infinite series, polar functions, and vector functions will complete the syllabus. There will be a significant emphasis on problem solving and applications of the calculus. Students taking the AP test in May will also be required to take a semester exam. Students will access the curriculum through Foerster's "Calculus: Concepts & Applications". The course includes use of the TI-Nspire CX graphing calculator, and Geometer's Sketchpad software. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator.

AP STATISTICS

11th - 12th Grade
Credit -1
Full Year

Prerequisite: Honors Algebra & Trigonometry, or College-Prep Functions, Statistics & Trigonometry

AP Statistics introduces students to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Topics include exploring data, planning a study, anticipating patterns, and making statistical inferences. This course is designed to emphasize statistical thinking and minimize computational procedures. Content is designed as effective preparation for college classes in statistics and prepares students for the Advanced Placement Statistics exam. Students will access the curriculum through Peck's "Introduction to Statistics and Data Analysis". Daily access to a graphing calculator with powerful statistical capabilities is vital to success in this course. The TI-Nspire CX graphing calculator is used extensively for demonstrations, class activities and homework. It is strongly recommended that each student purchase a TI-Nspire CX graphing calculator. The mathematics department strongly recommends completion or concurrent enrollment in Honors Precalculus or College-Prep Precalculus.

ADVANCED MATHEMATICS

11th – 12th Grade
Credit – 1
Full Year

Prerequisite: Honors Precalculus

Advanced Mathematics introduces students to a variety of mathematical concepts and ideas that are not usually presented in a high school. This course is intended for students with an exceptionally solid background in mathematics, but also requires a natural interest in mathematics. Modules of this course focus on the historical origins, advancement, and modern day application of each covered topic. Throughout the year, students will research, analyze and present on a variety of mathematical related articles, mathematicians, ideas and theorems. Topics covered will include, but are not limited to: graph theory, non-Euclidean geometry, modular arithmetic, algebraic systems, number theory, topology, and discrete mathematics. **(This course not yet approved for NCAA eligibility.)**