

Britestar Grade 12 Scope and Sequence

This document outlines the comprehensive curriculum for Britestar Grade 12 courses, including detailed unit breakdowns, learning objectives, and pacing guides for Pre-Calculus, English 12, Physics, Government, and Economics

Precalculus - Course Summary

Precalculus develops students' understanding of higher algebra, trigonometry, and the foundations of calculus. In Semester A, students explore inverse, exponential, logarithmic, and trigonometric functions, along with complex numbers and vectors. Semester B builds on these concepts with conic sections, matrices, sequences, probability, and introductory calculus ideas such as limits and area under curves.

Semester A Overview

Semester A focuses on building a strong foundation in advanced functions, trigonometric identities, and complex numbers. Students apply mathematical models and tools to solve problems across a range of real-world and theoretical contexts.

Recommended Pacing

- UNIT 1: FUNCTIONS (DAYS 1 – 27)
- UNIT 2: TRIGONOMETRIC FUNCTIONS (DAYS 28 – 59)
- UNIT 3: VECTORS AND COMPLEX NUMBERS (DAYS 60 – 90)

Precalculus - Semester A Units

UNIT 1: FUNCTIONS

Students explore and model relationships using inverse, exponential, and logarithmic functions.

- Write functions that describe quantitative relationships
- Define and solve inverse functions
- Investigate and apply exponential models
- Explore the properties of logarithmic functions
- Use logarithmic models to solve problems
- Solve exponential and logarithmic equations
- Examine the number e and natural logarithms
- Interpret graphs of exponential and logarithmic functions
- Model real-world data with nonlinear functions
- Use calculators and technology to solve function problems

UNIT 2: TRIGONOMETRIC FUNCTIONS

This unit focuses on trigonometric functions, identities, and solving triangle-based problems.

- Use the unit circle to evaluate trigonometric functions
- Solve problems involving right triangles
- Explore symmetry and periodicity in trig functions
- Evaluate inverse trigonometric functions
- Apply sum, difference, and cofunction identities
- Use double-angle and half-angle identities
- Apply product-sum and sum-product identities
- Solve complex trigonometric equations
- Analyze simple harmonic motion using trigonometric models
- Use trigonometric identities to simplify and verify expressions

UNIT 3: VECTORS AND COMPLEX NUMBERS

Students analyze vectors and perform operations with complex numbers, including using polar form.

- Represent vectors and measure magnitude
- Apply vector operations and direction to model motion
- Multiply vectors by scalars and interpret negative vectors
- Define and operate with complex numbers
- Explore polar coordinates and graphs
- Use De Moivre's Theorem for powers and roots
- Represent complex numbers on the complex plane
- Apply complex operations in geometric contexts
- Simulate real-world vector scenarios
- Model mathematical relationships using vectors and complex numbers

Precalculus - Semester B Units

Semester B expands into analytic geometry, matrices, sequences and series, probability, and calculus foundations. Students build skills for college-level math through modeling, problem solving, and exploration of mathematical patterns and reasoning.

Recommended Pacing

- UNIT 1: POLYNOMIALS AND CONIC SECTIONS (DAYS 1 – 22)
- UNIT 2: MATRICES AND SYSTEMS (DAYS 23 – 46)
- UNIT 3: SEQUENCES AND SERIES (DAYS 47 – 65)
- UNIT 4: PROBABILITY AND LIMITS (DAYS 66 – 90)

UNIT 1: POLYNOMIALS AND CONIC SECTIONS

This unit reviews polynomial division and introduces conic sections through geometric and algebraic representations.

- Use long division and synthetic division with polynomials
- Analyze polynomial graphs using end behavior and zeros
- Identify and graph parabolas, circles, ellipses, and hyperbolas
- Write equations for conic sections in standard form
- Use completing the square to rewrite equations
- Apply geometric definitions to derive equations of conics
- Interpret conic sections in real-world contexts
- Model planetary motion with conic sections
- Solve systems involving conic equations
- Use graphing technology to visualize conic curves

UNIT 2: MATRICES AND SYSTEMS

Students learn how to represent and solve systems using matrices and explore applications of matrix operations.

- Represent systems of equations with matrices
- Use matrix addition, subtraction, and multiplication
- Solve systems using matrix inverse and row operations
- Apply Gaussian and Gauss-Jordan elimination
- Use determinants and Cramer's Rule to solve systems
- Analyze dimensions and properties of matrices
- Model real-life scenarios using matrix equations
- Interpret solutions and non-solutions graphically
- Apply technology to matrix-based problem solving
- Connect systems to economics, engineering, and coding

UNIT 3: SEQUENCES AND SERIES

This unit focuses on numerical patterns and their applications in finance and science.

- Identify and extend arithmetic and geometric sequences
- Write recursive and explicit formulas
- Use sigma notation to express series
- Calculate sums of arithmetic and geometric series
- Solve real-world problems with sequences
- Determine convergence and divergence of series
- Apply exponential growth and decay formulas
- Use sequences to model savings and investment
- Connect series to real-world science patterns
- Interpret formulas using real data

UNIT 4: PROBABILITY AND LIMITS

Students explore probability rules and build foundational understanding of calculus through limits.

- Define and calculate experimental and theoretical probability
- Use counting principles and combinations/permutations
- Calculate probabilities of compound and conditional events
- Create and interpret probability distributions
- Analyze random processes and expected values
- Introduce the concept of a mathematical limit
- Estimate limits numerically and graphically
- Explore continuity and discontinuities in functions
- Connect limits to rate of change and area
- Model real-world scenarios using foundational calculus concepts

English 12 - Course Summary

English 12 explores the evolution of British literature from the early medieval period through the modern era. Semester A traces the development of the English language, poetry, drama, and political writing through Old and Middle English, the Renaissance, and Neoclassicism. Semester B continues with the Romantic, Victorian, and Modern eras, emphasizing how history shaped literary forms and voices.

Semester A Overview

Semester A focuses on the literary and historical developments from Anglo-Saxon times to the neoclassical period. Students explore how cultural shifts influenced epic poetry, religious and court literature, Renaissance drama, and political commentary.

Recommended Pacing

- UNIT 1: THE ANGLO-SAXON AND MEDIEVAL PERIODS (DAYS 1 – 30)
- UNIT 2: THE ENGLISH RENAISSANCE (DAYS 31 – 66)
- UNIT 3: NEOCLASSICISM (DAYS 67 – 90)

English 12 - Semester A Units

UNIT 1: THE ANGLO-SAXON AND MEDIEVAL PERIODS

Students explore the roots of English literature, including *Beowulf*, Arthurian legends, Chaucer, and the rise of theater.

- Trace the history and evolution of the English language
- Analyze Old English epic poetry through *Beowulf*
- Examine themes and structure in *Sir Gawain and the Green Knight*
- Explore Chaucer's use of satire and social commentary in *The Canterbury Tales*
- Identify elements of medieval drama through morality plays like *Everyman*
- Compare the heroic and chivalric traditions in medieval literature
- Discuss the religious and social contexts of the Middle Ages
- Explore character development and allegory in early literature
- Develop arguments using literary evidence
- Write about medieval themes using research and analysis

UNIT 3: NEOCLASSICISM

Students explore political, social, and religious themes in neoclassical literature and analyze major works from the 17th and 18th centuries.

- Examine religious conflict and political change in England
- Analyze Milton's works and their ties to the English Civil War
- Evaluate how neoclassical writers promoted order and reason
- Explore satire and classical influence in political essays
- Compare Enlightenment ideas in literature and politics
- Investigate how changing governments affected writers' perspectives
- Analyze essays, speeches, and narrative styles of the period
- Explore literary trends including parody and rhetorical structure
- Write persuasive and explanatory texts based on neoclassical ideals
- Participate in group discussions on government and literature

UNIT 2: THE ENGLISH RENAISSANCE

This unit highlights Renaissance literature, focusing on sonnets, Shakespearean drama, and metaphysical poetry.

- Analyze how the Reformation influenced Renaissance writers
- Study the form and history of English and Italian sonnets
- Read and interpret *Hamlet*, Acts I–V, examining theme and character
- Read and analyze *Twelfth Night*, focusing on comedy and gender roles
- Explore metaphysical poetry and its historical context
- Investigate the development of drama in Elizabethan and Jacobean England
- Examine how Renaissance authors balanced logic, emotion, and faith
- Compare dramatic performances with original texts
- Identify poetic devices in metaphysical verse
- Write structured literary analyses using specific evidence

English 12 - Semester B Units

Semester B Overview

Semester B traces the major literary movements from the Romantic period to the present. Students analyze how literature reflects individualism, social reform, empire, modernism, and the postcolonial experience through poetry, fiction, drama, and nonfiction.

Recommended Pacing

- UNIT 1: THE ROMANTIC PERIOD (DAYS 1 – 23)
- UNIT 2: THE VICTORIAN AGE (DAYS 24 – 48)
- UNIT 3: THE MODERN ERA (DAYS 49 – 69)
- UNIT 4: THE CONTEMPORARY WORLD (DAYS 70 – 90)

UNIT 1: THE ROMANTIC PERIOD

Students explore the Romantic emphasis on emotion, nature, and the individual through poetry and prose.

- Define characteristics of Romantic literature
- Analyze the role of nature in Romantic poetry
- Study major works by Wordsworth, Byron, Shelley, and Keats
- Compare Romantic and neoclassical styles
- Examine Gothic themes and emotional expression
- Explore themes of rebellion, freedom, and introspection
- Analyze the individual's role in society and imagination
- Use figurative language and symbolism in literary analysis
- Compare Romantic writers' responses to industrialization
- Write analytical responses exploring Romantic ideals

UNIT 2: THE VICTORIAN AGE

This unit focuses on literature from the industrial era, including themes of social change, morality, and empire.

- Study novels and poetry reflecting industrialization and reform
- Analyze tone and structure in works by Tennyson, Browning, and Arnold
- Explore narrative style and moral themes in Dickens and other fiction
- Examine colonialism and imperialism in literature
- Compare realism and idealism in Victorian writing
- Trace shifts in gender roles and class systems
- Write essays evaluating social criticism in literature
- Interpret dramatic monologue and symbolism
- Analyze poetry in historical and political context
- Participate in discussions of reform, morality, and literary voice

UNIT 3: THE MODERN ERA

Students study early 20th-century responses to war, industrial decline, and shifts in cultural identity.

- Define characteristics of modernist literature
- Analyze works by Yeats, Eliot, Woolf, and Joyce
- Explore fragmentation and disillusionment in post-WWI texts
- Examine innovations in structure and narrative voice
- Study poetry and prose that reflect cultural anxiety
- Compare multiple modernist perspectives
- Analyze literary experimentation and allusion
- Write literary critiques on identity, alienation, and modernity
- Evaluate the influence of war on language and imagery
- Discuss how modernist works reflect global change

UNIT 4: THE CONTEMPORARY WORLD

This unit focuses on literature from post-WWII to the present, including postcolonial voices, global themes, and modern identity.

- Examine global and postcolonial literature in English
- Analyze voices from the Caribbean, Africa, India, and Ireland
- Explore how writers address displacement, culture, and belonging
- Study dramatic and poetic responses to globalization
- Compare contemporary works with earlier British literature
- Evaluate narrative structure in recent fiction
- Discuss identity, gender, race, and language in modern writing
- Write responses comparing cultural experiences and perspectives
- Engage in multimedia presentations and reflective writing
- Use literary analysis to explore current global themes

Physics Course Summary

Physics explores how matter and energy interact in the universe. In Semester A, students examine motion, forces, energy, and momentum. They also explore periodic motion and thermodynamics. Semester B expands into waves, light, electricity, magnetism, and quantum and nuclear physics, with emphasis on mathematical models and real-world applications.

Semester A Overview

Semester A introduces core concepts in mechanics and thermodynamics. Students model linear and curved motion, investigate Newton's laws, and apply energy and momentum principles to physical systems.

Recommended Pacing

- UNIT 1: KINEMATICS (DAYS 1 – 18)
- UNIT 2: KINEMATICS 2 (DAYS 19 – 31)
- UNIT 3: DYNAMICS (DAYS 32 – 46)
- UNIT 4: ENERGY AND MOMENTUM (DAYS 47 – 65)
- UNIT 5: PERIODIC MOTION (DAYS 66 – 76)
- UNIT 6: THERMODYNAMICS (DAYS 77 – 90)

Physics - Semester A Units

UNIT 1: KINEMATICS

Students begin by exploring physics as a discipline, then focus on motion in one dimension.

- Define physics and its connections to other sciences
- Understand scalar and vector quantities
- Perform basic operations in scientific math
- Use graphs to interpret motion
- Calculate distance, speed, velocity, and acceleration
- Solve equations for uniformly accelerated motion
- Graph relationships for motion in one dimension
- Interpret position vs. time and velocity vs. time graphs
- Explore patterns using data and variables
- Communicate findings from motion analysis

UNIT 2: KINEMATICS 2

This unit introduces motion in two dimensions using vectors and projectile motion.

- Perform vector operations graphically and algebraically
- Describe motion in two axes using parametric functions
- Solve motion problems in two dimensions
- Model horizontal and angled projectile motion
- Use gravity and launch angle to predict projectile paths
- Analyze components of velocity and displacement
- Apply trigonometric reasoning to motion problems
- Conduct investigations using motion data
- Create diagrams and graphs to support claims
- Use equations to model projectile trajectories

UNIT 5: PERIODIC MOTION

Students model repeated motion in springs, pendulums, and orbits.

- Define characteristics of periodic motion
- Explore spring-mass systems and simple harmonic motion
- Calculate frequency, period, and amplitude
- Analyze motion of pendulums under gravity
- Describe circular motion and centripetal force
- Apply $F = mv^2/r$ to orbital and circular motion
- Compare angular and linear motion
- Interpret real-life oscillating systems
- Graph and analyze waveforms from periodic motion
- Solve motion problems involving time and cycles

UNIT 3: DYNAMICS

Students explore how forces cause motion, applying Newton's laws and universal gravitation.

- State and apply Newton's three laws of motion
- Define inertia, mass, and equilibrium
- Solve net force problems using $F = ma$
- Analyze normal and tension forces in equilibrium
- Calculate gravitational force using Newton's law
- Study force vectors in two-dimensional systems
- Examine action-reaction pairs in collisions
- Connect free-body diagrams to net force models
- Explore effects of friction and applied force
- Analyze physical systems with multiple objects

UNIT 4: ENERGY AND MOMENTUM

This unit examines how energy and momentum are conserved and transferred in interactions.

- Calculate work done by a force
- Analyze kinetic and potential energy
- Use conservation of energy in closed systems
- Solve problems involving power and efficiency
- Define momentum and relate it to mass and velocity
- Calculate impulse and its effect on momentum
- Explore elastic and inelastic collisions
- Analyze collisions in one and two dimensions
- Use momentum conservation to solve system problems
- Model physical interactions using energy and momentum

UNIT 6: THERMODYNAMICS

This unit explores heat, temperature, and energy transfer in physical systems.

- Define heat, temperature, and thermal energy
- Compare conduction, convection, and radiation
- Calculate heat transfer with specific and latent heat
- Apply the first law of thermodynamics to systems
- Interpret energy conservation in thermal processes
- Understand entropy and the second law of thermodynamics
- Explore heat engines and efficiency
- Connect thermodynamic principles to global systems
- Model phase changes and energy exchange
- Analyze climate systems using thermodynamics

Physics - Semester B Units

Semester B Overview

Semester B introduces students to wave behavior, electromagnetic radiation, and electricity and magnetism. The course concludes with an introduction to modern physics, including quantum mechanics and nuclear reactions.

Recommended Pacing

- UNIT 1: WAVES (DAYS 1 – 21)
- UNIT 2: ELECTROMAGNETIC RADIATION (DAYS 22 – 42)
- UNIT 3: ELECTRICITY (DAYS 43 – 62)
- UNIT 4: MAGNETISM (DAYS 63 – 75)
- UNIT 5: MODERN PHYSICS (DAYS 76 – 90)

UNIT 1: WAVES

Students examine mechanical and electromagnetic waves, including sound.

- Define characteristics of waves: amplitude, frequency, wavelength, and speed
- Differentiate between transverse and longitudinal waves
- Analyze wave interference, reflection, and refraction
- Apply wave equations to calculate speed and frequency
- Examine Doppler effect and wave motion in different media
- Explore standing waves and resonance
- Compare properties of sound waves and light waves
- Use graphs to model wave behavior
- Perform experiments on wave interactions
- Explain how energy is transferred by waves

UNIT 2: ELECTROMAGNETIC RADIATION

This unit focuses on the electromagnetic spectrum and light behavior.

- Identify regions of the electromagnetic spectrum
- Compare energy, frequency, and wavelength of EM waves
- Analyze how light behaves in different materials
- Explore reflection, refraction, and diffraction of light
- Calculate angles using Snell's Law
- Study polarization and the dual nature of light
- Model wave-particle behavior of photons
- Investigate interference and diffraction patterns
- Apply lens and mirror equations
- Use ray diagrams to understand image formation

UNIT 5: MODERN PHYSICS

Students are introduced to key topics in quantum mechanics and nuclear physics.

- Describe photoelectric effect and quantization of energy
- Study the behavior of particles at atomic scales
- Compare classical and quantum models of the atom
- Explore Heisenberg's uncertainty principle
- Understand nuclear forces and radioactive decay
- Distinguish alpha, beta, and gamma decay
- Balance nuclear equations and calculate half-life
- Compare nuclear fission and fusion processes
- Discuss risks and benefits of nuclear energy
- Connect modern physics concepts to current technologies

UNIT 3: ELECTRICITY

Students explore electric fields, circuits, and current electricity.

- Define electric charge and Coulomb's Law
- Model electric fields around charged objects
- Calculate electric potential and voltage
- Explore current, resistance, and Ohm's Law
- Build and analyze series and parallel circuits
- Calculate equivalent resistance and power
- Use Kirchhoff's laws to analyze complex circuits
- Explore applications in electronics and power grids
- Conduct experiments using circuit diagrams
- Apply electricity concepts to real-world systems

UNIT 4: MAGNETISM

This unit investigates magnetic fields and electromagnetic induction.

- Describe magnetic fields and field lines
- Analyze motion of charged particles in magnetic fields
- Explore the relationship between electricity and magnetism
- Study electromagnets and magnetic force
- Apply the right-hand rule to current and fields
- Examine Faraday's and Lenz's laws of induction
- Model electric generation and transformers
- Explore applications in motors and communication
- Solve problems involving flux and induced EMF
- Use data to understand magnetic behavior in materials

Economics Course Summary

Economics is a social science that explores how individuals, businesses, and governments make decisions about using limited resources. This one-semester course introduces students to foundational concepts such as scarcity, opportunity cost, supply and demand, business structures, labor, government policy, and international trade. Special focus is placed on the U.S. economy and the role of the federal government and Federal Reserve.

Recommended Pacing

- UNIT 1: INTRODUCTION TO ECONOMICS (DAYS 1 – 23)
- UNIT 2: FREE MARKET AND BUSINESSES (DAYS 24 – 45)
- UNIT 3: GOVERNMENT (DAYS 46 – 67)
- UNIT 4: REGULATIONS (DAYS 68 – 88)

Economics Units

Unit 1: Introduction to Economics

Students learn the basic problems of economics—scarcity and choice—and explore different economic systems and market behavior.

- Explain why scarcity and opportunity cost are fundamental economic concepts
- Compare major economic systems and how they answer key questions
- Analyze how market economies differ from other systems
- Interpret shifts in supply and demand using basic graphs
- Understand how choices impact individuals and societies
- Use economic reasoning to analyze decisions
- Define factors of production and their roles
- Explain the relationship between incentives and behavior
- Identify trade-offs and marginal decision-making
- Explore foundational vocabulary in economics

Unit 2: Free Market and Businesses

This unit explores business structures, labor markets, and how production and trade drive growth in a market economy.

- Use production possibility curves to analyze resource use
- Identify the four factors of production and their relationship to efficiency
- Compare different types of business organizations
- Analyze how the free market encourages entrepreneurship
- Explore characteristics of the U.S. labor market
- Investigate how wages, unions, and labor conditions affect markets
- Explain how productivity, innovation, and trade contribute to economic growth
- Analyze the relationship between trade, technology, and GDP
- Evaluate how businesses and workers respond to incentives
- Connect labor and business trends to real-world developments

Unit 3: Government

Students examine how the government influences the U.S. economy through policies, taxation, and the Federal Reserve System.

- Explain the federal government's role in a mixed economy
- Analyze how fiscal policy and government spending affect economic outcomes
- Evaluate the benefits and costs of economic intervention
- Understand goals of government taxation and regulations
- Analyze progressive, regressive, and proportional tax systems
- Explore how public goods and externalities shape policy
- Describe the structure and functions of the Federal Reserve
- Explain how monetary policy is used to influence inflation and unemployment
- Compare fiscal and monetary policy tools
- Evaluate real-world examples of U.S. government economic policy

Unit 4: Regulations

This unit focuses on market structures, international trade, and the effects of regulation and globalization.

- Compare perfect competition, monopolistic competition, oligopoly, and monopoly
- Analyze the effects of competition on consumers and producers
- Explain why nations engage in international trade
- Evaluate how trade affects the U.S. economy
- Understand the roles of imports, exports, and comparative advantage
- Analyze how tariffs, quotas, and embargoes affect trade
- Examine how political borders and trade agreements influence the global economy
- Explore the impact of regulation on consumers, businesses, and trade
- Evaluate pros and cons of globalization
- Connect trade topics to current events and policy debates

U.S. Government Course Summary

U.S. Government explores the foundational principles of American democracy, the structure and functions of government, and the rights and responsibilities of citizenship. Students examine the U.S. Constitution, the three branches of government, and the division of power between local, state, and federal levels. The course also covers civil rights, elections, policy-making, and the government's role in domestic and international affairs.

Recommended Pacing

- UNIT 1: FOUNDATIONS OF U.S. DEMOCRACY (DAYS 1 – 27)
- UNIT 2: BRANCHES AND LEVELS OF GOVERNMENT (DAYS 28 – 52)
- UNIT 3: CIVIL RIGHTS, CITIZENSHIP, AND CIVIC PARTICIPATION (DAYS 53 – 68)
- UNIT 4: FOREIGN AND DOMESTIC POLICY (DAYS 69 – 88)

U.S. Government Unit

Unit 1: Foundations of U.S. Democracy

Students examine early political systems, historical events, and key documents that led to the founding of the United States.

- Compare historical and modern political systems
- Explore key events leading to the American Revolution
- Analyze the Declaration of Independence
- Study the weaknesses of the Articles of Confederation
- Examine the Constitutional Convention and compromises made
- Investigate the principles of the U.S. Constitution
- Understand the structure and purpose of the Bill of Rights
- Trace the development of American democratic ideals
- Identify influences from Enlightenment thinkers
- Write about founding documents and their historical impact

Unit 2: Branches and Levels of Government

This unit explores how power is divided and exercised across the legislative, executive, and judicial branches and among federal, state, and local levels.

- Describe the structure and powers of the legislative branch
- Analyze the process of making laws and checks and balances
- Examine the executive branch and the powers of the presidency
- Understand the organization and role of the judicial branch
- Study landmark Supreme Court decisions
- Compare powers shared and divided among government levels
- Analyze the structure of local and state governments
- Investigate how different levels of government collaborate
- Explore real-life examples of intergovernmental relationships
- Apply knowledge of branches to case studies and current events

Unit 3: Civil Rights, Citizenship, and Civic Participation

Students examine civil rights, the election process, and the responsibilities of civic life in a democracy.

- Explore constitutional rights and civil liberties
- Analyze amendments that expanded voting and civil rights
- Study major Civil Rights Movement events and leaders
- Understand how political parties function in elections
- Explore the role of media and campaign finance
- Learn how citizens can influence government decisions
- Describe the naturalization process and legal rights of citizens
- Examine civic responsibilities such as voting and jury duty
- Reflect on community service and political activism
- Develop and express viewpoints on public issues

Unit 4: Foreign and Domestic Policy

This unit focuses on how the U.S. develops and implements policies that affect both domestic life and international relations.

- Examine how foreign policy is formed and executed
- Analyze the role of the president, Congress, and agencies in foreign affairs
- Study the goals and strategies of U.S. diplomacy
- Evaluate domestic policies in areas like healthcare and education
- Understand basic economic principles relevant to policymaking
- Investigate how the federal government regulates the economy
- Explore the functions of government agencies and departments
- Compare types of policy tools used in governance
- Connect policy decisions to daily life and global events
- Write responses analyzing policy effectiveness and impact