



# WORLD BOOK

## Typical Course of Study: Grade 12

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### Grade 12 Math: Pre-Calculus or Statistics and Probability

#### Pre-Calculus

- Exponents and scientific notation
- Radicals and rational exponents
- Polynomials
- Factoring polynomials
- Rational expressions
- Linear equations and inequalities
- Quadratic equations
- Systems of equations
- Graphs of linear equations
- Lines and slopes
- Distance and midpoint formulas
- Vectors and operations on vectors
- Matrices and operations on matrices
- Applications of matrices
- Basic functions and properties of functions
- Interpreting and analyzing functions
- Combinations of functions
- Graphs of functions
- Transformations of functions
- Modeling with functions
- Complex number system
- Arithmetic operations with complex numbers
- Quadratic functions and applications
- Polynomial functions and graphs
- Zeros of polynomial functions
- Rational functions and graphs
- Polynomial and rational inequalities
- One-to-one functions
- Inverse functions
- Exponential functions
- Logarithmic functions
- Properties of logarithms
- Logarithmic and exponential equations
- Exponential growth and decay
- Logistic growth and decay
- Modeling with exponential and logarithmic functions
- Trigonometric functions
- Trigonometric equations
- The unit circle
- Angles and their measure
- Right triangle trigonometry
- Trigonometric identities and proof
- Trigonometric functions of any angle
- Law of Sines and Law of Cosines

- Graphs of sine, cosine, tangent, cotangent, cosecant, and secant functions
- Inverse trigonometric functions
- Applications of trigonometric functions
- Sum and difference formulas
- Double-angle and half-angle identities

### Statistics and Probability

- Definition of statistics and data
- Statistical questions
- Summarizing and representing data, including with technology programs and models
- Interpreting models of data
- Definitions of mean, median, and mode
- Computation of mean, median, and mode from a data set
- Shape, center, and spread of data sets
- Extreme points in data
- Relative frequencies, possible associations, and trends
- Relationships between data items
- Variance and standard deviation
- Line of best fit to a given data distribution
- Mean and standard deviation to estimate population percentage
- Correlation coefficient of two variables
- Sampling distribution and population distribution
- Random sampling
- Evaluating random processes
- Margin of error for random sampling
- Uses of statistical data
- Making inferences from surveys, observations, and experiments
- Conditional probability
- Probabilities of compound events
- Probabilities of mutually exclusive and non-mutually exclusive events
- Probabilities for independent events
- Probabilities for dependent events
- Permutations and combinations
- Expected value of a random variable
- Interpreting results of probability experiments
- Odds in favor and odds against an occurrence
- Using probability to make decisions
- Using probability to solve real-world problems

## Grade 12 Language Arts

### Reading Literature and Informational Text History/Social Studies, Science, and Technical Subjects

- Cite evidence from text to support analysis of both explicit and implicit messages within the text
- Cite evidence from text to support analysis of primary and secondary sources
- Identify the theme or central idea of a text and analyze its development
- Identify in detail a series of events described and the relationships among them
- Summarize literary and informational or explanatory texts
- Follow a multistep procedure when performing science or technical tasks
- Compare and contrast treatments of the same topic from several sources
- Analyze how the author's choices effect the development of a story
- Analyze how a text makes connections among individuals, events, or ideas
- Analyze how a complex primary source is structured
- Determine meanings and effects of words, phrases, or symbols as used in a text
- Evaluate the effectiveness of the structure of a work in furthering the key ideas or argument
- Analyze how the structure of parts of a text contribute to the overall meaning

- Analyze a work that uses satire, sarcasm, irony, or understatement
- Determine author's purpose or point of view and how rhetoric is used to advance that purpose or point of view
- Analyze multiple interpretations of a story, drama, or poem
- Compare the point of view or claims of two or more authors on similar topics
- Show knowledge of 18th-, 19th-, and 20th-century foundational works of American (or home country) literature
- Integrate and evaluate multiple sources of information in different formats
- Integrate information from diverse primary and secondary sources
- Analyze whether an author supports a claim with sound reasoning and sufficient evidence
- Analyze and evaluate 17th-, 18th-, and 19th-century foundational U.S. literary and historical documents (or similar documents from appropriate periods for home country)
- Evaluate the hypotheses, data, analysis, and conclusions of a science or technical text
- By the end of the academic year, read and understand grade-level literary and informational texts (including history/social studies, science, and technical subjects) independently and with proficiency

### Speaking and Listening

- Participate in collaborative discussions on a variety of grade-level topics
- Express ideas clearly and respectfully in group discussions
- Follow agreed-upon rules and preparation procedures for discussions
- Ask questions and respond to others, building on others' ideas
- Integrate into speech preparation diverse sources of information in a variety of formats
- Evaluate a speaker's point of view, reasoning, and use of rhetoric and evidence
- Identify an argument, claims; evaluate the soundness of reasoning and evidence
- Present claims or information in logical sequence, communicating a clear perspective, supported with sound reasoning and relevant facts and details
- Use clear pronunciation and appropriate eye contact and volume when speaking
- Add digital media and other visual components to clarify ideas in presentations
- Adapt speech to a variety of tasks, showing command of formal English

### English Language Skills

- Show a command of conventions of standard English grammar and usage when writing or speaking
- Use conventions of English correctly when writing (capitalization, punctuation, and spelling)
- Make effective choices of language for meaning and style when writing or speaking
- Know the difference between formal and informal English and when to use each

### Vocabulary

- Use context clues to determine word and phrase meanings
- Use word structure clues to determine meanings of unknown words
- Use relationships between words to better understand each word's meaning
- Use references (print and digital) to determine or verify a word's meanings, or to find its pronunciation or part of speech
- Interpret, analyze, and use figurative language in context
- Analyze nuances in the meaning of words with similar denotations
- Distinguish shades of meaning among related words
- Distinguish among connotations of words with similar denotations
- Learn and use grade-level general academic vocabulary

### Writing

- Write arguments supported with clear reasons and relevant evidence, including arguments in history, social studies, science, and technical topics
- Write informative or explanatory pieces developed with relevant details, including arguments in history, social studies, science, and technical topics
- Write narrations that include details, put events in order, and provide a conclusion
- Produce writing appropriate to the task, purpose, and audience
- Strengthen writing by getting feedback, revising, editing, and rewriting

- Add dialogue and descriptions to develop characters and events
- Use technology, including the Internet, to produce and publish writing
- Contribute to collaborative group writing projects
- Conduct short and sustained research projects on a topic through investigation
- Draw and cite evidence from a variety of texts to support analysis
- Assess the credibility and accuracy of sources
- Quote or paraphrase data and conclusions while avoiding plagiarism
- Include evidence from literary or informational texts to support analysis
- Regularly produce clear writing for a variety of tasks, purposes, and audiences (including writing in history/social studies, science, and technical subjects)

## Grade 12 Social Studies: Government/Economics

### United States Government (or national government of home country)

- Foundations of the U.S. government
- Major traditions informing the founding of the U.S.
- Characteristics of and political ideas behind a constitutional government
- Contributions of key individuals to the founding political philosophies
- Federalism
- U.S Constitution, the Bill of Rights, and other significant documents
- Amendments to the Constitution; the amendment process
- Structure of the U.S. government
- Powers of the federal and state governments, and shared powers
- Historical conflicts over the roles of state and federal governments
- Executive branch: structure, powers, functions, agencies, and cabinet
- Legislative branch: structure, powers, functions, committees
- Judicial branch: structure, powers, functions
- Limits on the powers of government and on each branch
- Checks and balances; separation of powers
- How laws are made
- The U.S. Supreme Court; key court decisions
- State and local governments
- Other governmental agencies and organizations
- Voting, campaigns, and elections; voting rights
- Electoral college and electoral processes
- Political parties and the political process
- Government finances and taxes
- Policy making process
- Fiscal policy
- Social and domestic policy
- Foreign and defense policy
- Economic policy
- Environmental policy
- Influence of political parties, interest groups, public, and media on public policy
- Civil rights and civil liberties
- Equality and due process
- Personal liberties and social responsibility
- Personal liberty and safety
- Responsibilities of citizens
- Freedom of the press
- National security
- Military service
- Social welfare
- Impact of science and technology on government and society

- Key issues facing the government
- Compare political systems with other countries
- International relationships and interconnectedness

## Economics

- Market economy; free enterprise system
- Characteristics of the United States economy
- Kinds of resources; scarcity of resources
- Economic decision making
- Costs and benefits
- Allocation of goods and services
- Incentives
- International trade and exchange rates
- Specialization
- Markets and prices; role of prices
- Supply and demand
- Profits and losses
- Competition and market structure
- Economic institutions
- Other institutions that influence economics
- Jobs, employer and employee issues, rights of workers
- Human productivity
- Business cycles
- Moral, ethical, and legal business issues
- Money and inflation
- Interest, credit, and debt
- Income
- Investment
- Entrepreneurship
- Economic growth; measuring economic performance
- Economic role of government in a market economy
- Government failure
- Economic fluctuations and economic indicators
- Unemployment and inflation
- Fiscal and monetary policy
- Global economic dependence
- Effects of technology on economies and economic practices
- World financial issues
- Comparison of economic systems
- Personal financial literacy

## Grade 12 Science: Physics

### Force

- Laws of conservation of energy
- Energy transfer
- Energy in chemical processes
- Measurement and mathematics for physics
- Force and calculations of force
- Force fields
- Kinematics
- Statics and dynamics
- Relative motion

- Concepts of distance, displacement, speed, average velocity, instantaneous velocity, and acceleration
- Relationships between force and motion
- Gravitation
- Friction
- Momentum
- Definitions of energy and forms of energy
- Work and energy

### Thermal energy transfer processes

- Laws of thermodynamics
- Electric fields, currents, and circuits
- Magnetism
- Wave properties and behaviors
- Real-world applications of wave behaviors
- Light
- Wave-particle duality
- Electromagnetic radiation
- Electromagnetic spectrum
- Nuclear structure and processes
- Atomic and nuclear phenomena
- Real-world atomic and nuclear applications
- Quantum phenomena
- Particle physics
- Safe practices during investigations

## Grade 12 Health and Safety

- Gaining, analyzing, and applying health information
- Knowledge about and use of available health services
- Health choices and long-term consequences of choices
- Benefits of, practices for, and personal responsibility for health
- Personal health profile and plan
- Interrelationships of physical, mental, and social health
- Impacts of social pressures on physical, emotional, and social health
- Marketing and advertising effects on health behavior
- Structure, functions, and interdependence of major body systems
- Causes and effects of poor body image
- Eating disorders and their prevention and treatment
- Changes in anatomy during puberty
- Role of hormones in growth, development, and personal health
- Reproductive processes; healthy development of fetus
- Consequences of sexual activity
- Strategies to resist pressures to become sexually active
- Characteristics of healthy relationships and dating behaviors
- Lifelong strategies for identifying and preventing depression and anxiety
- Avoidance of risky or self-destructive behaviors
- Health risks and effects of technology use
- Environmental conditions and factors harmful to health
- Myths and facts related to disease transmission and prevention
- Laws relating to tobacco, alcohol, drugs, and other controlled substances
- Treatment options for drug and other addictions
- Understanding of first-aid procedures and emergency response
- Use, abuse, and effects of medications, tobacco, alcohol, and other controlled substances
- Relationship between tobacco, alcohol, or illegal drugs and such unsafe situations as date rape, sexually-transmitted disease, and drinking and driving

- Prevention of and response to deliberate and accidental injuries
- Reasons and ways to avoid violence, gangs, weapons, and illegal drugs
- Skills to identify, avoid, report, and cope with potentially dangerous situations
- Positive and negative characteristics of social groups, gangs, clubs, cliques
- Development of self-confidence, self-esteem, and self-control
- Understanding appropriate ways to express emotions
- Skills for building and maintaining healthy relationships
- Bullying, alternative behaviors to bullying, and appropriate responses to bullying
- Strategies for resolving conflicts with peers and others

## Grade 12 Arts

- Watching, listening, and responding to works of art
- Background and elements of particular art form
- Understanding of the processes and techniques of particular forms
- Principles of design
- Vocabulary of particular art forms
- Interpretation, analysis, and evaluation of works of art
- Reflecting on own experiences and creations or performances
- Art history
- Well-known artists and works of visual or performing art forms
- Cultural contexts and expressions of art
- Style, materials, and techniques used in a work of art
- Generating questions about a work of art
- Considering messages and purposes of a particular work of art
- Responding orally, in writing, or some other way to works of art
- Reflecting on the contributions of artists to society
- Careers in art
- Discipline and mindset for improving and developing skills in art
- Fostering of creativity and self-expression
- Development of artistic awareness, imagination, perception, skill
- Experimenting with a variety of media, forms, and techniques
- Solving design problems
- Use of digital media and tools for producing, viewing, or responding to art
- Polishing and furthering personal skills in a chosen area of art
- Participation in collaborative discussions about works of art
- Participation in collaborative creation of works of art
- Proper safety procedures for activities in the specific arts

Note about high school arts curriculum: High school curriculum generally requires some sort of study and credit in the arts. Most schools offer experiences and study in a variety of areas in the arts. Some examples are:

- Animation
- Architecture
- Casting
- Ceramics
- Choral music
- Computer graphics and applications
- Construction
- Dance or other creative movement
- Digital arts
- Drama (including mime, storytelling, and technical aspects of theater)
- Drawing
- Film
- Graphic design

- Improvisational music
- Instrumental music
- Jewelry-making
- Metal Sculpture
- Mosaics
- Painting
- Photography
- Printmaking
- Sculpture
- Textiles and fiber art

## Grade 12 Technology

General goal for high school students: Use technology within all content areas to collaborate, communicate, generate innovative ideas, create original works, and investigate and solve problems.

- Demonstrating proficient keyboarding skills
- Understanding of operating system tools, applications, and storage devices
- Use of a variety of common applications and productivity tools
- Creating products combining text, images, sound, music, and video
- Creating and publishing stories, games, animations, problems, and solutions
- Creating Web pages
- Use of spreadsheet and concept-mapping software
- Use of interactive tools to design polls or surveys to gather data
- Making contributions to blogs, wikis, and other digital collaborative forums
- Use of online databases or simulation software to interpret and predict trends
- Increasing knowledge about many cultures through digital content
- Communicating with multiple audiences through a variety of formats and media
- Increasing understanding of a local or global issue
- Researching and using information fluently
- Choosing appropriate search engines, directories, and online applications
- Selecting appropriate, relevant sources for a purpose or audience
- Analysis and synthesis of information to make decisions or develop solutions
- Assessing the credibility and validity of online sources
- Use of bibliography tools to cite sources from digital sources
- Reporting and sharing results or solutions
- Exploring ways to receive feedback from multiple, appropriate audiences
- Demonstrate understanding and avoidance of potential online dangers
- Understanding health hazards of frequent technology use
- Demonstrating safe and legal use of online sites and information
- Use of passwords, virus prevention, and other protective procedures
- Understanding risks of social networking sites; safe sharing of personal information online
- Understanding privacy issues and how data are kept and available publicly
- Practicing ethical and respectful behavior online
- Careful, responsible use and maintenance of digital equipment
- Demonstrating openness to learning new technologies and procedures