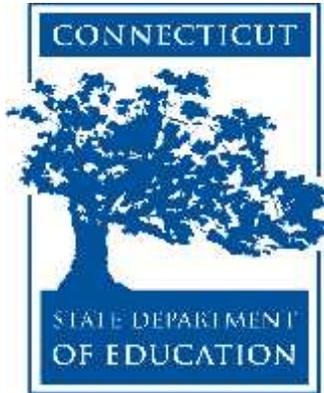


CONNECTICUT STATE DEPARTMENT OF EDUCATION



Technology Education Standards

December 2014

**Academic Office
165 Capitol Avenue
Hartford, CT 06106**

Connecticut Technology Education Standards Revised December 2014

In most dictionaries, technology is defined as the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as manufacturing, transportation, energy and power, construction, video production, engineering, applied science, and pure science. Many individuals think that technology in education is mostly the teachers' tools for instruction, especially computers. While the computer is a technology tool, technology education is much more.

Technology Education is about Innovation! It is about how people think and how to apply technology solutions to the problems facing society. The aim is to solve problems and create opportunities within a realistic context.

Students use their ingenuity with tools, materials, processes and resources to create solutions and opportunities for themselves and others. The nature of learning goes from the very early years of just "knowing" to more developed applications that relate Engineering, Assessment, Innovations and Technological Systems. It is a dynamic subject in our schools that is as fast moving and as up-to-date as the thinking of technology in our society. It is future workforce thinking!

In Technology Education programs students most importantly gain knowledge and skills essential to all kinds of work, university study and a successful life. They are encouraged to show initiative, be innovative and creative, learn independently, and to take responsibility. They learn teamwork and communication skills and the importance of contributing to the community both socially and economically.

Students learn skills that can effect changes in their own lives and community, and perhaps even nationally or globally. Through Technology Education, they are helped to develop a critical eye with which to assess the implications of new technologies – issues such as the dwindling supplies of fossil fuels, alternative fuels, and the impacts of both on the environment, or the health impacts of our increasing production and consumption of processed foods, their production. Technology allows for students to look at the world differently.

Technology Education is the T and E in STEM, (Science, technology, engineering and mathematics). STEM education affords students opportunities to make sense of their world universally, instead of learning ideas and concepts in individual, non-integrated courses. STEM education offers the promise of students learning in an interdisciplinary way that couples rigorous standards to real world experiences allowing students to apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and their world.

STEM provides four basic functions that will help all students be life- long learners and prepare them for college and careers. The first is the teaching and learning through inquiry. "Memorizing facts and information is not the most important skill in today's world. Facts change, and information is readily available -- what's needed is an understanding of how to get and make sense of the quantity of information and data available. Inquiry requires students to go beyond data and information accumulation and learn to acquire and apply knowledge and skills.

Through the process of inquiry, individuals construct much of their understanding of the natural and human-designed worlds. Inquiry implies a "need or want to know" premise. Inquiry is not so much seeking the right answer -- because often there is none -- but rather seeking appropriate resolutions to questions and issues. For educators, inquiry implies emphasis on the development of inquiry skills and the nurturing of inquiring attitudes or habits of mind that will enable individuals to continue the quest for knowledge throughout life."¹

Connecticut Technology Education Standards Revised December 2014

Integration is another central promise of STEM. Educators no longer teach and students no longer learn skills and concepts in silos and isolated situation. An integrated educational experience, must offer a curriculum and other learning experiences where the content combine the acquisition and creation of knowledge with the quest for meaning and purpose. The learning environment encourages students to make connections across the core curriculum and elective courses. It helps students relate their classroom learning with their out-of-classroom learning, through community-based education, learning communities, student organizations, athletics and/or recreation, and other experiences.

Design is the basic element in all STEM disciplines. It is found in science in creating investigations that help students understand their physical world; in technology students find design in the creation of tools and materials to make their world easier to manage; engineering is all about the design process. New ideas are designed, tested, changed and designed again based on the results of testing; mathematics uses design to solve complex and challenging problems. It is engineering that the design concepts are mastered and applied to real world solution. Design (through engineering) is the method to solve practically any problem and is how students will learn to change their environment to meet their own and the community's needs and desires.

STEM will provide students with the knowledge and practice necessary to transfer acquired skills in new and unfamiliar situations. With a rapidly changing world, students will be required to take what they already know and achieve and apply it in situations that cannot be imagined today. Change is the one constant throughout a student's life, learning to adapt and command change cannot be left for chance but must be taught and practiced.

The Connecticut Technology Education Standards are divided in to two distinct levels, 6-8 and 9-12. Within each level there exist identified pathways, in each pathway the standards are organized as follows:

Pathway Content Standard—Are a general statement indicating the broad area of knowledge covered in each pathway.

Performance Elements—Represent the major topical areas within each pathway. Generally, each pathway has 2 to 13 Performance Elements.

Performance Indicators—Are more precise statements that serve as an indication of the knowledge/ability the student should possess.

Measurements—Are sample measurable activities that students might carry out to indicate attainment of each Performance Indicator.

Connecticut Technology Education Standards
Revised December 2014

This document contains newly revised standards for Technology Education in Connecticut. It is the result of several hours of dedication by teachers in the field. The standards are based on nationally recognized standards including, Pathways to College and Career Readiness, Career Clusters and ITEEA Technology Literacy Standards. The nationally recognized standards were developed with the input of business, industry and post-secondary institutes. The Connecticut Career Assessment Standards in Automotive Technology, Computer Aided Drafting and Design, Pre-Engineering Technology, Video Production Systems and Wood Technology (Building Construction is assessed through Wood Technology) are identified with an asterisk. Questions and concerns please contact:

Harold Mackin
Associate Consultant for Technology Education
Connecticut State Department of Education
165 Capitol Avenue, Room 215
Hartford, CT 06106
Phone: 860-713-6779
Fax: 860-713-7049
harold.mackin@ct.gov

**Connecticut Technology Education Standards
Revised December 2014**

Contents	Page
ESSENTIAL KNOWLEDGE AND SKILLS	7
GRADES 6-8 STANDARDS	11
NATURE OF TECHNOLOGY	11
GRADES 6-8 STANDARDS	13
IMPACT OF TECHNOLOGYGY	13
GRADES 6-8 STANDARDS	14
DESIGN AND DEVELOPMENT (ENGINEERING)	14
GRADES 9-12	16
ARCHITECTURE TECHNOLOGY	16
GRADES 9-12 STANDARDS	18
AUTOMOTIVE TECHNOLOGY	18
GRADES 9-12 STANDARDS	22
BUILDING CONSTRUCTION.....	22
GRADES 9-12 STANDARDS	25
COMPUTER AIDED DRAFTING AND DESIGN (CADD).....	25
GRADES 9-12 STANDARDS	28
COMMUNICATIONS	28
GRADES 9-12 STANDARDS	30
DIGITAL VIDEO PRODUCTION	30
GRADES 9.12 STANDARDS.....	32
ENGINEERING TECHNOLOGY	32
GRADES 9.12 STANDARDS.....	36
MANUFACTURING.....	36

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS.....	37
GRAPHICS DESIGN TECHNOLOGY	37
GRADES 9.12 STANDARDS.....	40
TRANSPORTATION TECHNOLOGY	40
GRADES 9.12 STANDARDS.....	42
WOOD TECHNOLOGY.....	42
Appendix I	46
COMMON CORE STATE STANDARDS ENGLISH/LANGUAGE ARTS ALIGNMENT	46
Appendix II	75
COMMON CORE STATE STANDARDS MATHEMATICS ALIGNMENT.....	75
Appendix III	110
COMMON CORE STATES STANDARDS ENGLISH/LANGUAGE ARTS	110
Appendix IV.....	150
CCSS FOR LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS.....	150
Appendix V.....	160
COMMON CORE STATES STANDARDS FOR MATHEMATICS	160

**Connecticut Technology Education Standards
Revised December 2014**

ESSENTIAL KNOWLEDGE AND SKILLS

The following knowledge and skill statements are essential to success for careers in all areas and pathways. Persons preparing for careers at any level should be able to demonstrate these skills in the context of their chosen area and pathway.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut's academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in Technology Education.

EKS.01	Complete required training, education, and certification to prepare for employment in a particular career field.
EKS.01.01	Identify training, education and certification requirements for occupational choice.
EKS.01.02	Participate in career-related training and/or degree programs.
EKS.02	Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities.
EKS.02.01	Model behaviors that demonstrate active listening.
EKS.02.02	Organize oral and written information.
EKS.02.03	Compose focused copy for a variety of written documents such as: agendas, audio-visu-als, bibliographies, drafts, oral presentations, reports, and technical terminology.
EKS.02.04	Evaluate oral and written information for: accuracy, adequacy/sufficiency, appropriateness, clarity, conclusions/solutions, fact/opinion, propaganda, relevancy, validity, and relationship of ideas.
EKS.02.05	Present formal and informal speeches including: discussion, information requests, interpretation, and persuasive arguments.
EKS.03	Demonstrate mathematics knowledge and skills required to pursue the full range of post-secondary education and career opportunities.
EKS.03.01	Demonstrate use of relational expressions such as: equal to, not equal, greater than, less than, etc.
EKS.03.02	Apply data and measurements to solve a problem.
EKS.03.03	Analyze Mathematical problem statements for missing and/or irrelevant data.
EKS.03.04	Construct charts/tables/graphs from functions and data.
EKS.03.05	Analyze data when interpreting operational documents.
EKS.04	Demonstrate science knowledge and skills required to pursue the full range of post-secondary and career education opportunities.

**Connecticut Technology Education Standards
Revised December 2014**

ESSENTIAL KNOWLEDGE AND SKILLS	
EKS.04.01	Evaluate scientific constructs including: conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables.
EKS.04.02	Apply scientific methods in qualitative and quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.
EKS.05	Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate).
EKS.05.01	Identify common tasks that require employees to use problem-solving skills.
EKS.05.02	Analyze elements of a problem to develop creative solutions.
EKS.05.03	Describe the value of using problem-solving and critical thinking skills to improve a situation or process.
EKS.05.04	Create ideas, proposals, and solutions to problems.
EKS.05.05	Evaluate ideas, proposals, and solutions to problems.
EKS.05.06	Use structured problem-solving methods when developing proposals and solutions.
EKS.05.07	Generate new and creative ideas to solve problems by brainstorming possible solutions.
EKS.05.08	Critically analyze information to determine value to the problem-solving task.
EKS.05.09	Guide individuals through the process of recognizing concerns and making informed decisions.
EKS.05.10	Identify alternatives using a variety of problem-solving and critical thinking skills.
EKS.05.11	Evaluate alternatives using a variety of problem-solving and critical thinking skills.
EKS.06	Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.
EKS.06.01	Assess workplace conditions with regard to safety and health.
EKS.06.02	Align safety issues with appropriate safety standards to ensure a safe workplace/jobsite.
EKS.06.03	Identify safety hazards common to workplaces.
EKS.06.04	Identify safety precautions to maintain a safe worksite.
EKS.06.05	Select appropriate personal protective equipment as needed for a safe workplace/jobsite.
EKS.06.06	Inspect personal protective equipment commonly used for selected career choice.
EKS.06.07	Use personal protective equipment according to manufacturer rules and regulations.
EKS.06.08	Employ a safety hierarchy and communication system within the workplace/jobsite.
EKS.06.09	Implement safety precautions to maintain a safe worksite.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 6-12 ESSENTIAL KNOWLEDGE AND SKILLS	
EKS.07	Employ leadership skills to accomplish organizational goals and objectives.
EKS.07.01	Exhibit traits such as empowerment, risk, communication, focusing on results, decision-making, problem solution, and investment in individuals when leading a group in solving a problem.
EKS.07.02	Exhibit traits such as compassion, service, listening, coaching, developing others, team development, and when acting as a manager of others in the workplace. Understanding and appreciating others
EKS.07.03	Exhibit traits such as enthusiasm, creativity, conviction, mission, courage, concept, focus, principle-centered living, and change when interacting with concept, focus, principle-centered living, and change when interacting with others in general.
EKS.07.04	Consider issues related to self, team, community, diversity, environment, and global awareness when leading others.
EKS.07.05	Exhibit traits such as innovation, intuition, adaptation, life-long learning and coachable to develop leadership potential over time.
EKS.07.06	Analyze leadership in relation to trust, positive attitude, integrity, and willingness to accept key responsibilities in a work situation.
EKS.07.07	Describe observations of outstanding leaders using effective management styles.
EKS.07.08	Participate in civic and community leadership and teamwork opportunities to enhance skills.
EKS.08	Identify and demonstrate positive work behaviors and personal qualities needed to be employable.
EKS.08.01	Demonstrate self-discipline, self-worth, positive attitude, and integrity in a work situation.
EKS.08.02	Demonstrate flexibility and willingness to learn new knowledge and skills.
EKS.08.03	Exhibit commitment to the organization.
EKS.08.04	Identify how work varies with regard to site, from indoor confined spaces to outdoor areas, including aerial space and a variety of climatic and physical conditions.
EKS.08.05	Apply communication strategies when adapting to a culturally diverse environment.
EKS.08.06	Manage resources in relation to the position (i.e. budget, supplies, computer, etc.).
EKS.08.07	Identify positive work-qualities typically desired in each career.
EKS.08.08	Manage work roles and responsibilities to balance them with other life roles and responsibilities.
EKS.09	Demonstrate skills related to seeking and applying for employment to find and obtain a desired job.
EKS.09.01	Use multiple resources to locate job opportunities.
EKS.09.02	Prepare a résumé.
EKS.09.03	Prepare a letter of application.
EKS.09.04	Complete an employment application.
EKS.09.05	Interview for employment.

Connecticut Technology Education Standards
Revised December 2014

GRADES 6-12
ESSENTIAL KNOWLEDGE AND SKILLS

EKS.09.06	List the standards and qualifications that must be met in order to enter a given industry.
EKS.09.07	Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 6-8 STANDARDS
NATURE OF TECHNOLOGY**

Students need to be able to identify, operate and explain the appropriate technology necessary to accomplish a task.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. Understanding the complexity of the nature of technology are predicated on the assumption that academic skills have been attained. Some Nature of Technology statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to nature of technology.

NT.01	Recognize the nature, characteristics and scope of technology.
NT.01.01	Explain that new products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.
NT.01.02	Explain that technology is closely aligned to creativity, which has resulted in innovation.
NT.01.03	Describe how new technologies (products and systems) are developed to solve problems.
NT.01.04	Recognize and explain that creativity is the basis for the development of products and systems.
NT.01.05	Explain that technology is a powerful force that improves human productivity.
NT.01.06	Recognize and explain that technology is a process for transforming raw materials into useful goods and services.
NT.01.07	Explain that technology is evident in every culture, regardless of its level of sophistication or stage of development.
NT.01.08	Recognize and explain that technology involves inventing new things and modifying the old ones to make them more efficient.
NT.01.09	Describe technology as a process for transforming raw materials into useful goods and services.
NT.01.010	Explain that new products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.
NT.01.011	Explain that technology is closely linked to creativity, which has resulted in innovation.
NT.01.012	Explain that technological innovation is driven by the profit motive.
NT.01.013	Explain that technology creates new economic opportunities and social benefits and, at the same time, produces new social problems.
NT.01.014	Describe how and why people use technology to modify their natural environment and the impact of those modifications.
NT.01.015	Explain that technology incorporates human knowledge into physical hardware that will eventually respond to some human need or desire.
NT.01.016	Explain that new products and systems can be developed to solve problems or to help do things that could not be done without the help of technology.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 6-8 STANDARDS NATURE OF TECHNOLOGY	
NT.01.017	Explain that corporations can often create demand for a product by bringing it onto the market and advertising it.
NT.02	Demonstrate an understanding of the core concepts of technology.
NT.02.01	Explain a technological system by identifying its parts (inputs, processes, output and feedback)
NT.02.02	Differentiate between the systems found in nature vs. human made technological systems.
NT.02.03	Show evidence of how parts relate to each other through systems thinking.
NT.02.04	Differentiate between an open and closed system.
NT.02.05	Explain the benefits and consequences of and technological innovation.
NT.02.06	Explain that a trade-off is a decision process recognizing the need for careful compromises among competing factors.
NT.02.07	Define the parameters of a product.
NT.02.08	Define the processes used to complete a system.
NT.02.09	Evaluate the importance of maintenance on a system ensure proper functioning, extending life and upgrading capability.
NT.03	Define and explain the relationships among technologies and the connections between technology and other fields of study.
NT.03.01	Illustrate how technology systems often interact with each other.
NT.03.02	Demonstrate how technological systems are combined to create more complex systems.
NT.03.03	Implement knowledge from other fields of study and show effect on the development of technological products and systems.
NT.03.04	Describe how technological ideas are sometimes protected through the process of patenting.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 6-8 STANDARDS IMPACT OF TECHNOLOGY	
Students need to be able to analyze the impact that technology has made in creating the world we live in.	
ACADEMIC EXPECTATIONS	
All secondary students should meet Connecticut's academic standards. Understanding how the impact of technology has created the world in which we live is predicated on the assumption that academic skills have been attained. Some Impact of Technology statements will further define critical linkages and applications of academics.	
KNOWLEDGE AND SKILLS	
The following knowledge and skill statements apply to impact of technology.	
IT.01	Develop abilities to assess the impacts of products and systems.
IT.01.01	Design and use instruments to gather data.
IT.01.02	Identify trends and monitor potential consequences of technological development.
IT.01.03	Interpret and evaluate the accuracy of the information obtained and determine if it is useful.
IT.01.04	Determine if the human use of a product or system creates positive or negative results.
IT.01.05	Use data collected to analyze and interpret trends in order to identify the positive or negative effects of technology.
IT.01.06	Interpret and evaluate the accuracy of the information obtained and determine if it is useful.
IT.01.07	Analyze important ideas and messages in informational text to determine the impact of a technology product or system.
IT.02	Recognize and explain the cultural, social, economic, and political effects of technology.
IT.02.01	Assess the impact of technology as it affects humans.
IT.02.02	Examine how technology use changes our environment.
IT.02.03	Describe how the use of technology poses ethical problems.
IT.02.04	Describe achievements of people from different backgrounds and abilities who have made various contributions to technology and science.
IT.02.05	Evaluate the historical impact of various technological and scientific contributions.
IT.02.06	Cite instances where technology has caused cultural, social, economic, and political changes.
IT.03	Explain the effects of technology on the environment.
IT.03.01	Assess the impact of the management of technological waste on society.
IT.03.02	Investigate how the decision to use technology puts environmental and economic concerns in direct competition with each other.
IT.03.03	Recognize and explain that technological changes and advances have consequences for the immediate environment.
IT.03.04	Evaluate local, regional or global issues surrounding technology.
IT.03.05	Defend how technologies can be used to repair damage caused by natural disasters.
IT.03.06	Describe how technologies can be used to break down wastes that result from the use of various products and systems.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 6-8 STANDARDS DESIGN AND DEVELOPMENT (ENGINEERING)	
Description: Develop abilities to assess the impact of technology.	
ACADEMIC EXPECTATIONS	
All secondary students should meet Connecticut’s academic standards. Understanding how to solve complex problems utilizing design and development methods is predicated on the assumption that academic skills have been attained. Some Design and Development statements will further define critical linkages and applications of academics.	
KNOWLEDGE AND SKILLS	
The following knowledge and skill statements apply to design and development.	
DD.01	Explore the major enterprises of the designed world.
DD.01.01	Evaluate the major enterprises of the designed world, in the fields of communications, construction, manufacturing and transportation.
DD.01.02	Incorporate science concepts and mathematic processes applied through-the use of technology.
DD.01.03	The positive and negative aspects of a design.
DD.01.04	Plan multiple design solutions to solve a problem.
DD.01.05	Explain why a design process leads to useful products and processes.
DD.01.06	Critique designs and products created to solve a problem.
DD.01.07	Explain that requirements for a design are made up of criteria and constraints.
DD.02	Explore the engineering design.
DD.02.01	Demonstrate that evaluating, modeling, modifying and testing can be used to transform ideas into practical solutions.
DD.02.02	Gather information to gain background knowledge related to a problem.
DD.02.03	Construct a timeline to solve a problem.
DD.02.04	Select and use appropriate, materials, tools and machines.
DD.02.05	Construct tables, charts, databases, spreadsheets, and graphs to display data.
DD.02.06	Relate the design process beyond the classroom.
DD.02.07	Create various graphic representations or drawing of the design solution.
DD.02.12	Evaluate the effectiveness of a model and recommend necessary changes.
DD.03	Explore the four human productive areas of technology: communications, construction, manufacturing, transportation and other related fields.
DD.03.01	Explain that information and communication systems allow information to be transferred from human to human, human to machine, and machine to human.
DD.03.02	Explain that communication systems are made up of a source, encoder, transmitter, receiver, decoder, and destination.
DD.03.03	Explain that the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 6-8 STANDARDS DESIGN AND DEVELOPMENT (ENGINEERING)	
DD.03.04	Identify and describe types of land, water air and space transportation systems.
DD.03.05	Investigate and describe the functioning of structural, propulsion, suspension, and guidance control vehicular subsystems.
DD.03.06	Diagram and demonstrate the processes used for operating an efficient transportation system.
DD.03.07	Explain how secondary manufacturing processes are used to change the form of materials.
DD.03.08	Explain that manufactured goods are classified as durable and non-durable.
DD.03.09	Explain the primary manufacturing processes used to extract material.
DD.03.10	Identify the factors used to select the designs for structures based on building laws and codes, style, convenience, cost climate, and function.
DD.03.11	Explain that buildings contain a variety of subsystems.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12

ARCHITECTURE TECHNOLOGY

People with careers in architecture create our future! They turn a concept into a set of plans. Their plans guide other construction professionals as they continue the building process.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut's academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in architecture.

ARCH.01	Identify significant historical events and trends that have impacted architecture.
ARCH.01.01	Discuss current trends in commercial and residential architecture
ARCH.01.02	Research and differentiate between design periods that shaped today's structures.
ARCH.02	Demonstrate an understanding of socio-cultural and environmental impacts on architectural design.
ARCH.02.01	Identify how location, resources and materials influence design.
ARCH.02.02	Differentiate between human wants and needs.
ARCH.02.03	Apply "Green" building practices to project design.
ARCH.02.04	Apply culture, community and diversity needs to project design
ARCH.03	Demonstrate an understanding of regulations in architectural design.
ARCH.03.01	Research and identify regulations and codes that are needed to establish a legal and safe design.
ARCH.03.02	Evaluate a site that takes into consideration local, state and national restrictions, zoning and codes.
ARCH.03.03	Differentiate between residential and commercial building codes/standards.
ARCH.03.04	Develop an understanding of the American Disability Act.
ARCH.04	Apply principles of physics in selecting and working with materials and load applications
ARCH.04.01	Explain various forces that bear on, and within, structures.
ARCH.04.02	Analyze architectural physics of soil mechanics, foundation design, and engineering material as they relate to structural design.
ARCH.04.03	Demonstrate an understanding of static and dynamic loads as they relate to a structure.
ARCH.04.04	Develop and communicate an assigned building design.
ARCH.05	Research, plan and design functional structure.
ARCH.05.01	Apply prior knowledge to discuss daily needs and influences identified in their environment.
ARCH.05.02	Produce preliminary designs, final sketches and presentation drawings.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 ARCHITECTURE TECHNOLOGY	
ARCH.05.03	Utilize commercial and residential suggestions and specifications to create functional floor plans.
ARCH.05.04	Utilize an architectural drawing to estimate the cost and the materials necessary for a project.
ARCH.06	Develop technical drawings drafted by hand and computer aided drafting and design (CADD).
ARCH.06.01	Identify, research, develop and explain architectural and construction plans, drawings, diagrams and specifications.
ARCH.06.02	Draw and sketch by hand to communicate ideas effectively.
ARCH.06.03	Utilize CADD software to produce technical drawings and architectural proposals.
ARCH.07	Employ appropriate media to communicate concepts and design.
ARCH.07.01	Convey information using multi-dimensional drawings.
ARCH.07.02	Create effective working drawings, and presentation drawing.
ARCH.07.03	Employ basic model building techniques.
ARCH.08	Maintain a portfolio to document knowledge, skills and experience in architecture.
ARCH.08.01	Research and Collect data that relates to architectural drafting and design
ARCH.08.02	Select and organize appropriate examples that demonstrate knowledge, skills and experience.
ARCH.08.04	Prepare and conduct effective oral presentation.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9-12 STANDARDS
AUTOMOTIVE TECHNOLOGY**

Description: The Automotive Technology Pathway prepares students for postsecondary education and employment in the transportation industry, which includes, but is not limited to, motor vehicles, rail systems, marine applications, and outdoor power equipment.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut's academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in automotive technology.

AUTO.01	Students demonstrate the value and necessity of practicing personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards.
AUTO.01.01	List and explain common environmental conservation practices and their applications.
AUTO.01.02	Demonstrate knowledge of proper use, storage, and disposal of hazardous materials for an automotive facility according to OSHA regulations.*(B4)
AUTO.01.03	Explain the way in which waste gasses, emissions, and other environmentally destructive substances are generated and their effects on the environment.
AUTO.01.04	Describe a safe working environment for both employees and the shop environment.
AUTO.01.05	Demonstrate and explain knowledge of personal safety practices such as eyewear, clothing, footwear, and personal protective equipment (PPE).*(B5)
AUTO.01.06	Demonstrate and explain knowledge of shop safety procedures when performing tasks, such as raising a vehicle with a floor jack.*(B6)
AUTO.01.07	Identify basic hand tools and their usage in the automotive industry.*(B7)
AUTO.02	Customer Relations and Shop Procedures: Explain the basic processes and procedures for maintaining a clean, safe and customer-friendly shop.
AUTO.02.01	Interpret repair and work orders including differentiating between parts and labor cost.*(A1)
AUTO.02.02	Differentiate between flat rate labor and hourly labor.*(A2)
AUTO.02.03	Explain what is included in an automobile maintenance schedule.*(A3)
AUTO.03	Explain scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems.
AUTO.03.01	Demonstrate the operating principles of internal and external combustion engines
AUTO.03.02	Describe basic valve train operation and configuration, such as DOHC, SOHC, OHV, and flathead.*(C8)
AUTO.03.03	Describe basic engine cylinder configurations such as V, inline, and horizontally opposed.*(C9)
AUTO.03.04	Identify and describe the function of the basic engine components.*(C10)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS AUTOMOTIVE TECHNOLOGY	
AUTO.03.05	Describe principles of pneumatic and hydraulic power and their applications.
AUTO.03.06	Describe the purpose, operation, and basic components of lubrication systems.*(C13)
	Describe the purpose, operation, and basic components of engine cooling systems.*(C14)
AUTO.03.07	Illustrate principles of electricity, electronics and electrical power generation, and distribution systems.
AUTO.03.08	Differentiate between the 4-stroke and 2-stroke operating cycles.*(C11)
AUTO.03.09	Differentiate between spark ignition and compression ignition engines.*(C12)
AUTO.03.10	Perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and malfunctions.
AUTO.04	Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.
AUTO.04.01	Follow the procedures and practices of various manufacturers regarding repair and maintenance schedules.
AUTO.04.02	Demonstrate how to properly document maintenance procedures in accordance with applicable rules, laws, and regulations.
AUTO.04.03	Use reference books, technical service bulletins, and other documents and materials related to the automotive service industry available in print and through electronic retrieval systems to accurately diagnose and repair vehicles.
AUTO.04.04	Evaluate the advantages and disadvantages of existing, new, and emerging systems and the effects of those systems on the environment.
AUTO.04.05	Complete a work order, including customer information, description of repairs, and billing information, in accordance with applicable rules, laws, and regulations.
AUTO.05	Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems
AUTO.05.01	Perform general engine maintenance, diagnosis, service, and repair in accordance with portable national industry standards.
AUTO.05.02	Maintain, diagnose, service, and repair lubrication and cooling systems.
AUTO.05.03	Maintain, diagnose, and repair computerized engine control systems and other engine-related systems.
AUTO.05.04	Describe and demonstrate the process for performing exhaust inspection and service.
AUTO.06	Demonstrate the function, principles, and operation of electrical and electronic systems using manufacturer and industry standards.
AUTO.06.01	Maintain, diagnose, and repair electrical systems.
AUTO.06.02	Explain the process for performing battery diagnosis and service.*(D16)
AUTO.06.03	Describe the purpose, operation, and components of basic starting systems.*(D17)
AUTO.06.04	Describe the purpose, operation, and components of basic charging systems.*(D18)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS AUTOMOTIVE TECHNOLOGY	
AUTO.06.05	Describe the purpose, operation, and components of basic lighting systems.*(D19)
AUTO.06.06	Differentiate between series and parallel circuits.*(D20)
AUTO.06.07	Define volts, amperes, and resistance.*(D21)
AUTO.06.08	Perform simple calculations for volts, amperes, and resistance using Ohm's Law.*(D22)
AUTO.07	Engine Performance: Describe the components and functions of the various systems that are related to engine performance.
AUTO.07.01	Describe the purpose, operation, and basic components of the ignition system.*(E23)
AUTO.07.02	Describe the purpose, operation, and basic components of fuel and air induction systems.*(E24)
AUTO.07.03	Describe the purpose, operation, and basic components of exhaust and exhaust emissions systems.*(C15)
AUTO.07.04	Explain the use of a computer scanner to read Diagnostic Trouble Codes (DTC).*(E27)
AUTO.07.05	Identify the differences between carburetion and fuel injection.*(E25)
AUTO.07.06	Describe the purpose, operation, and basic components of evaporative emission control systems.*(E26)
AUTO.08	Suspension and Steering: Identify and describe the function of the components that make up suspension and steering systems.
AUTO.08.01	Describe the purpose, operation, and basic components of the steering system.*(F28)
AUTO.08.02	Describe the purpose, operation, and basic components of the suspension system.*(F29)
AUTO.08.03	Explain caster, camber, and toe-in wheel alignment angles.*(F30)
AUTO.08.04	Identify factors that cause abnormal tire wear.*(E31)
AUTO.09	Demonstrate function and principles of automotive drivetrain, steering and suspension, brake, and tire and wheel components and systems in accordance with portable national industry standards.
AUTO.09.01	Explain hydraulic systems as they pertain to the service braking systems.*(G32)
AUTO.09.02	Describe the purpose, operation, and basic components of drum brakes.*(G33)
AUTO.09.03	Describe the purpose, operation, and basic components of disc brakes.*(G34)
AUTO.09.04	Describe the components of power assist braking systems.
AUTO.09.05	Describe the purpose, operation, and basic components of parking brake systems.*(G35)
AUTO.09.06	Describe the purpose, operation, and basic components of anti-lock braking systems (ABS) and traction control systems (TCS).*(G36)
AUTO.09.07	Describe the function and operation of automatic and manual transmissions and transaxles.
AUTO.09.08	Select appropriate wheels and tires for vehicles.
AUTO.09.09	Maintain, diagnose, service, and repair under-vehicle systems and malfunctions.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS AUTOMOTIVE TECHNOLOGY	
AUTO.10	Explain collision repair scientific principles in relation to chemical, mechanical, and physical functions and in relation to industry and manufacturer standards
AUTO.10.01	Diagram principles of mechanical, electrical, hydraulic, and pneumatic power in relation to collision repair and refinishing
AUTO.10.02	Analyze physical and chemical characteristics of metals, plastics, and other materials.
AUTO.10.03	Describe various body and frame construction types.
AUTO.11	Perform and document collision repair procedures in accordance with manufacturer recommendations and industry standards.
AUTO.11.01	Perform collision repairs according to recommended procedures and practices of various manufacturers.
AUTO.11.02	Use reference books and materials, technical service bulletins, and other related documents to determine repairs and rate of pay.
AUTO.11.03	Perform frame inspection and repair.
AUTO.11.04	Demonstrate applications, installations, and removal of fixed and moveable glass and hardware.
AUTO.11.05	Perform metal welding and cutting.
AUTO.11.06	Prepare and analyze vehicles for repair.
AUTO.11.07	Perform outer body panel repairs, replacements, and adjustments.
AUTO.11.08	Prepare vehicles for metal finishing and body filling.
AUTO.12	Painting and refinish vehicles in accordance with manufacturer recommendations and industry standards.
AUTO.12.01	Identify, use, and repair plastics and adhesives
AUTO.12.02	Prepare surfaces for painting and finishing
AUTO.12.03	Operate of spray guns and related equipment.
AUTO.12.04	Mix, match, and apply paint.
AUTO.12.05	Diagnose causes and apply cures of paint defects.
AUTO.12.06	Prepare vehicles for final detail.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9-12 STANDARDS
BUILDING CONSTRUCTION**

Description: Building and Construction trades literally build our future! These are the people who build and remodel houses, apartments, industrial buildings, warehouses, office buildings, churches, schools and recreational facilities. This area includes builders of highways, streets, bridges, tunnels and airports as well as power plants, chemical plants, refineries and mills.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in wood technology.

BC.01	Identify and appraise the impacts construction has on their future aspirations; both career based and/or as an educated consumer.
BC.01.01	Develop career goals and objectives as part of a plan for future career direction.
BC.01.02	Develop strategies to reach career objectives.
BC.01.03	Compare the advantages and disadvantages of different types of home purchases, additions, renovations and repairs.
BC.02	Describe and demonstrate the procedures related to workplace and job-site safety including personal protective equipment, machine safety, and material handling practices.
BC.02.01	Demonstrate safe material handling practices.
BC.02.02	Demonstrate and explain knowledge of workplace safety procedures.*(A2)
BC.02.03	Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in wood technology.*(A3)
BC.02.04	Describe safety practices for the following machines: table saw, drill press, stationary sander, router table, and miter saw.*(A4)
BC.02.05	Demonstrate and explain knowledge of proper use and storage of basic hand tools.*(A5)
BC.02.06	Demonstrate and explain knowledge of proper use and storage of portable power tools.*(A6)
BC.02.07	Evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.
BC.02.08	Read and discuss information on OSHA, EPA and other safety regulations.
BC.02.09	Obtain, understand and follow MSDS (Material Safety Data Sheets) information.
BC.02.10	Explain safe proper use, disposal, and storage of chemicals following OSHA standards.*(A7)
BC.02.11	Demonstrate knowledge of proper use, storage, and disposal of hazardous materials following OSHA’s proper safety practices for a woodworking facility.*(A1)
BC.03	Identify and describe the safe and appropriate use of various types of layout, hand and power tools and machinery used for building construction.
BC.03.01	Identify, use, and maintain the following measuring, layout, and marking tools steel rule, tape measure, combination square, sliding “T” bevel, and compass.*(B8)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS BUILDING CONSTRUCTION	
BC.03.02	Identify proper use and function of the following portable power tools: circular saw, drill, jig/saber saw, finishing sanders, and routers.*(B9)
BC.03.03	Identify proper use and function of the following fastening tools: hammer, Phillip head screw driver, and slotted/flat head screw driver.*(B10)
BC.03.04	Identify proper use and function of portable power tools.
BC.03.05	Identify proper use and function of the following hand tools: cross cut saw, rip saw, level, coping saw, nail set, hand plane, chisel, and file.*(B11)
BC.03.06	Identify proper use and function of the table and miter saws.*(B12)
BC.03.07	Identify the proper use and function specialty machinery (e.g., drill presses, jointers, surface planers, table saws, power miter saws, band saws, scroll saws, and stationary sanders.
BC.03.08	Explain correct use of planers.
BC.03.09	Explain use of molders.
BC.03.10	Identify functions and demonstrate use of wood lathes.
BC.03.11	Identify and demonstrate use and function of sanders.
BC.04	Understand and be able to demonstrate the methods involved in turning materials into useable structures and products.
BC.04.01	Describe and identify fractional measurements from a basic plan and assembly drawings.*(C13)
BC.04.02	Describe and prepare rough drawings and sketches.*(C14)
BC.04.03	Explain and prepare a cut list or bill of material from a basic plan and assembly drawing.*(C15)
BC.04.04	Interpret a design to facilitate replication
BC.04.05	Measure accurately to a sixteenth of an inch.*(C16)
BC.04.06	Identify the difference between both nominal and actual dimensions.*(C17)
BC.04.07	Explain and use fractional dimensions.
BC.04.08	Extrapolate information from a set of plans.
BC.04.09	Consider the natural characteristics of grain, knots, and checks when laying out a board.*(C19)
BC.04.10	Estimate materials quantities in both board feet and linear feet.*(C18)
BC.04.11	Identify various types of joints.
BC.04.12	Prepare stock for use.*(G28)
BC.04.13	Identify and assemble the following types of joints: butt, miter, dado, rabbet, and lap.*(G27)
BC.04.14	Identify and describe the purpose and use of the following woodworking fasteners: common nails, round head screws, flat head screws, and oval head screws.
BC.04.15	Identify, describe purpose of and use woodworking adhesives.
BC.04.16	Identify and describe the purpose of the following clamping devices: bar clamp, c clamp, parallel/hand screw clamp, and spring clamps.*(H30)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS BUILDING CONSTRUCTION	
BC.04.17	Identify and apply various wood finishes for interior and exterior, with brush or wipe on, for the following: paint, stain, and clear coat.*(I31)
BC.04.18	Describe the abrasive grit numbering grading system.*(F26)
BC.04.19	Differentiate among various abrasive materials.
BC.04.20	Identify and select the proper cutting process based on grain direction.*(E23)
BC.04.21	Identify how grain direction affects a material's strength.*(E24)
BC.04.22	Understanding kerf and its application to cutting and layout operations.*(E25)
BC.05	Describe characteristics and determine appropriate applications for various building material selections.
BC.05.01	Identify characteristics and applications of the following coniferous softwoods: pine, cedar, and fir.*(D20)
BC.05.02	Identify characteristics and applications of the following deciduous hardwoods: oak, maple, and poplar.*(D21)
BC.05.03	Identify characteristics and applications of the following engineered lumber: plywood and medium density fiberboard.*(D22)
BC.05.04	Identify building systems needed to complete a construction project.
BC.05.05	List all building systems involved in a project.
BC.05.06	Identify and describe the function of the components of building systems needed to complete a construction project.
BC.05.07	Incorporate appropriate building systems into a construction project.
BC.05.08	Develop building plans and schedules by using processes common to residential and commercial construction.
BC.05.09	Explain the sub-systems, (e.g., structural, electrical, mechanical, finish, foundations) appropriate to the architectural design and residential construction.
BC.05.10	Explain and demonstrate site layout procedures.
BC.05.11	Describe the phases of residential and commercial construction.
BC.06	Develop an understanding of local, state and global building and construction issues using critical and creative thinking skills; logical reasoning; analytical thinking and problem solving techniques.
BC.06.01	Describe the economic implications of using problem-solving and critical thinking skills to improve a situation or process.
BC.06.02	Create ideas, proposals, and solutions to building construction problems.
BC.06.03	Evaluate ideas, proposals, and solutions to building construction problems.
BC.06.04	Generate new and creative building construction ideas to solve problems using a structured problem solving method.
BC.06.05	Critically analyze environmental implications in building construction materials and processes.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9-12 STANDARDS
COMPUTER AIDED DRAFTING AND DESIGN (CADD)**

Description: The CADD standards provide learning opportunities for students interested in preparing for careers in the design and production of visual communications. The students plan, prepare, and interpret drawings and models through traditional drafting or computer-aided drafting and design techniques.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in CADD.

CADD.01	Demonstrate an understanding of the historical and current events related to CADD and the impact on society.
CADD.01.01	Develop a timeline showing important periods that have significance to CADD and explain the impact on society.
CADD.01.02	Evaluate current events that have relevance to process digital information.
CADD.01.03	Describe the development of graphic language in a digital age.
CADD.01.04	Explain the significance of the development Computer Aided Drafting and Design had on society.
CADD.02	Analyze the use of current CADD design technology.
CADD.02.01	Apply conventional Computer Aided Drafting and Design processes and procedures accurately, appropriately, and safely.
CADD.02.02	Describe physical objects as geometric entities.*
CADD.02.03	Describe and demonstrate the process of using a mechanical or electronic caliper accurately as required by the design intent.*(A2)
CADD.02.04	Describe and demonstrate the use of graphic communication skills through sketching.*(A3)
CADD.02.05	Evaluate and select appropriate method of communication for a given problem.*
CADD.02.06	Send and access information through a network.*(A4)
CADD.02.07	Express a design of an object as a 3D model.*(A5)
CADD.02.08	Export and import images/files in a variety of file formats*(A6)
CADD.02.09	Evaluate the choice and placement of dimensions, notes and annotations to clearly communicate design intent.*(A7)
CADD.02.10	Revise a design and update finished drawings appropriately.*(A8)
CADD.02.11	Identify basic geometric elements (e.g., line, circle, rectangle, sphere, and cube).*(A9)
CADD.02.12	Describe objects as geometric entities.*(A1)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS COMPUTER AIDED DRAFTING AND DESIGN (CADD)	
CADD.02.13	Describe and apply the following basic geometric concepts to building 3D models: tangent and parallel concentric.*(A10)
CADD.03	Utilize measurement and annotation systems as they apply to CADD technology design.
CADD.03.01	Explain how the various measurement systems are used in CADD drawings.
CADD.03.02	Describe the measurement standards used in the manufacturing industry.
CADD.03.03	Determine the proper dimensioning styles for a variety of applications.
CADD.03.04	Apply dimensioning to various objects and features.
CADD.03.05	Edit a dimension by using various editing methods.
CADD.03.06	Demonstrate the processes of lettering and text editing.
CADD.03.07	Develop drawings using notes and specifications.
CADD.03.08	Demonstrate the methods of creating a title block.
CADD.04	Identify, describe, and utilize the basic hardware and operating systems used in CADD.
CADD.04.01	Identify and describe various types of hardware and software.*(B11)
CADD.04.02	Identify and describe the purpose of operating system components.*(B12)
CADD.04.03	Define and apply computer terminology*(B13)
CADD.04.04	View file names of a storage device.*(C14)
CADD.04.05	Store, copy, move, and retrieve information to/from various drives.*(C15)
CADD.04.06	Rename and backup files*(C16)
CADD.04.07	Identify the hardware requirements of a given CADD software package.
CADD.05	Utilize Proper projection techniques to develop orthographic and pictorial drawings.
CADD.05.01	Understand the commands and concepts necessary for producing drawings through traditional or computer-aided means.
CADD.05.02	Understand the orthographic projection process for developing multi-view drawings.
CADD.05.03	Differentiate the various techniques for viewing objects.
CADD.05.04	Use the concepts of geometric construction in the development of design drawings.
CADD.05.05	Create orthographic, isometric, section, and auxiliary views.(E25)
CADD.05.06	Explain the Cartesian Coordinate System.*(E20)
CADD.05.07	Describe the process for setting and editing drawing elements.*(E21)
CADD.05.08	Create and edit line types, colors and layers/levels.*(E22)
CADD.05.09	Create and edit basic geometry.*(E23)
CADD.05.10	Place and edit text and fonts.*(E24)
CADD.05.11	Explain and demonstrate the process for creating orthographic, isometric, section views, and auxiliary view.*
CADD.05.12	Place and edit dimensions.*(E26)
CADD.05.13	Generate a 2-D multi-view drawing.*(E27)
CADD.05.14	Generate a pictorial drawing.*(E28)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS COMPUTER AIDED DRAFTING AND DESIGN (CADD)	
CADD.05.15	Scale and print hard copy of an output device.*(E29)
CADD.05.16	Explain the use and need for scaled drawings.*(E30)
CADD.06	Demonstrate use and application of alternate view applications and functions.
CADD.06.01	Identify the function of alternate views.
CADD.06.02	Demonstrate the use of cutting planes to clarify hidden features of an object.
CADD.06.03	Create and edit construction planes through reference geometry.*(G35)
CADD.06.04	Generate/modify geometric components on construction planes.*
CADD.06.05	Create a 2-D drawing from a 3-D model.*(G34)
CADD.06.06	Create a 3-D model from a 2-D drawing.*(G35)
CADD.07	Create assemblies and views in 3-D format.
CADD.07.01	Create an assembly in 3-D geometry.*(F31)
CADD.07.02	Create an exploded view of a 3-D assembly.*(F32)
CADD.08	Explain and Utilize the concepts of sketching and the sketching process used in preliminary design and development.
CADD.08.01	Produce proportional two- and three-dimensional sketches and designs.
CADD.08.02	Use sketching techniques as they apply to a variety of objects.
CADD.08.03	Use freehand graphic communication skills to represent conceptual ideas, analysis, and design concepts.
CADD.08.04	Explain the purpose of sketching and how it applies to design.
CADD.09	Identify various symbols to interpret and read technical drawings.
CADD.09.01	Interpret basic views and dimensions in a working drawing.*(D17)
CADD.09.02	Identify geometric tolerance symbols.*(D18)
CADD.09.03	Interpret drawings, pictures, and symbols.*(D19)
CADD.10	Maintain a portfolio to document knowledge, skills, materials and experience in CADD.
CADD.10.01	Gather educational and work highlights to include in portfolio.
CADD.10.02	Organize and provide a compact disc, web site and/or other digital media for use in demonstrating knowledge, skills, and experience.
CADD.10.03	Prepare and conduct effective portfolio oral presentation(s).

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9-12 STANDARDS
COMMUNICATIONS**

Description: Individuals that work in the communications industry produce, design, install, integrate, operate and repair communications equipment. They are involved in the production and presentation of various media for communication systems. The major activity sectors in the communications industry are distributive service firms' manufacturers of media presentations and communications products and large end-users.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut's academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in communications.

AVC.01	Identify, analyze and synthesize historical, social, economic, environmental, and government regulations impact on Communications technology from multiple authoritative sources.
AVC.01.01	List and explain historical innovations in the evolution of-communications systems.
AVC.01.02	Gather relevant information from multiple authoritative print, digital resources, using advanced researches, to Predict the social, economic and environmental impacts of existing and evolving communication technologies.
AVC.01.03	Identify key factors that have impacted the evolution of the communications technologies.
AVC.01.04	Explain how governmental regulations impact communications.
AVC.02	Define and utilize communications technology systems domain specific words and phrases.
AVC.02.01	Define and properly use common communication terminology.
AVC.02.02	Read, interpret and utilize media communication equipment instruction manuals, troubleshooting guides, and specification requirements.
AVC.03	Demonstrate the use of appropriate communication equipment for the delivery of a message.
AVC.03.01	Select equipment required for specific types of audio productions.
AVC.03.02	Describe how an audio mixing console, quality-monitoring equipment, and basic recording equipment are utilized.
AVC.03.03	Demonstrate how to record and mix audio.
AVC.03.04	Distinguish between analog and digital audio formats.
AVC.03.05	Describe the difference in data signals and equipment for analog and digital technology.
AVC.03.06	Demonstrate how audio is synchronized with other audio or video.
AVC.03.07	Identify the key elements required in production scripts.
AVC.03.08	Explain how various styles of music can create a specific emotional impact.
AVC.03.09	Apply writing skills to the development of a production script.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS COMMUNICATIONS	
AVC.03.10	Identify types and placement and use of lighting fixtures for various lighting effects.
AVC.03.11	Demonstrate lighting techniques used for remote and studio productions.
AVC.03.12	Demonstrate operation of communication technology equipment.
AVC.03.13	Demonstrate how to maintain equipment.
AVC.03.14	Describe how to frame and maintain composition.
AVC.03.15	Identify types of software used in the development of media (IE: video files. game design files. and animations).
AVC.03.16	Demonstrate how to use software for developing a message.
AVC.04	Edit media productions to demonstrate basic skills in operating various elements in a production system.
AVC.04.01	Define editing related to media productions.
AVC.04.02	Identify editing skills related to various delivery requirements, for various forms of distribution.
AVC.04.03	Describe the significance of digital technology-production, and the required equipment related to editing.
AVC.04.04	Describe linear and nonlinear systems.
AVC.04.05	Demonstrate skills required for editing using these systems.
AVC.04.06	Edit programming utilizing various digital platforms.
AVC.05	Analyze and apply laws affecting communication enterprises to maintain up-to-date compliance with key regulations influencing the industry.
AVC.05.01	Analyze the copyright laws in relation to seeking formal permission to use materials.
AVC.05.02	Identify steps for securing permission to use copyrighted materials.
AVC.05.03	Exhibit how credit is given for use of copyrighted materials.
AVC.05.04	Define what original content is and when credit does not need to be given.
AVC.05.05	Identify the benefits and restrictions of copyright laws.
AVC.05.06	Identify consequences if formal permission is not secured.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9-12 STANDARDS
DIGITAL VIDEO PRODUCTION**

Description: Individuals that work in the digital video production industry create story boards, produce, and design, operate cameras and editing equipment to deliver a message. The major activity sectors in digital video production are pre and post production of video, writing and directing, editing and distribution.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

DVP.01	Video Production Skills: Understand video production as a communication tool and the equipment and skills required to properly communicate a message.
DVP.01.01	Describe the various video production processes, when integrated together to create a successful message.*(A1)
DVP.01.02	Describe the differences between a studio production and a field production.*(A2)
DVP.01.03	Identify various career paths in digital/video production.*(A3)
DVP.02	Safety: Describe and apply the fundamental principles that relate to both field and studio production.
DVP.02.01	Demonstrate fire safety prevention and extinction, and trip hazards as it relates to lighting and electrical equipment.*(B4)
DVP.02.02	Describe the fundamentals of step ladder safety.*(B5)
DVP.02.03	Identify proper methods of transport and storage for appropriate production and personal equipment.*(B6)
DVP.02.04	Describe and apply fundamentals of cable safety.*(B7)
DVP.03	Pre-Production: Describe the process used for concept development and storyboarding as part of the pre-production process while focusing on the importance of communication, deadlines, and legal considerations.
DVP.03.01	Identify a target audience and design an appropriate message for the target market.*(C8)
DVP.03.02	Describe the process used for concept development/treatment.*(C9)
DVP.03.03	Identify and describe the script elements of storyboarding, two column, and screenplay format.*(C10)
DVP.03.04	Define and describe the legal concerns of copyrights, ethics, releases, and royalties.*(C11)
DVP.03.05	Explain the importance of budgets, scheduling, and deadlines in meeting the requirements of a project.*(C12)
DVP.03.06	Evaluate a shooting location in terms of lighting, sound, production equipment needs, and electrical essentials.*(C13)
DVP.04	Production: Identify and describe the elements of production to effectively deliver a message.
DVP.04.01	Describe, plan the use of, and apply 3-point lighting, source light, white balance, scrims, and reflectors using the appropriate techniques.*(D14)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9-12 STANDARDS DIGITAL VIDEO PRODUCTION	
DVP.04.02	Describe the various types of sound equipment and techniques used with handheld, lavalier, shot gun, condenser, omni and directional methods.*(D15)
DVP.04.03	Describe the equipment and personnel necessary for producing a studio production.*(D16)
DVP.04.04	Describe the equipment and personnel necessary for producing a field production.*(D17)
DVP.05	Cinematic Principles: Describe and apply fundamental camera operations, movement, and composition.
DVP.05.01	Describe white balance, iris, aperture, auto and manual focus, audio settings, and levels in camera operations.*(E18)
	Describe dolly, truck, pan, and tilt as it relates to camera movements.*(E19)
	Describe the following methods of stabilization: tripod, monopod, slider, steady cam, fluid head, friction head, and dolly.*(E20)
	Describe the rule of thirds, head room, lead room/talk space, establishing shot, extreme close up, close up, medium, medium wide, wide, extreme wide, and depth of field as it relates to camera composition/framing.*(E21)
DVP.06	Post-Production: Identify and describe the elements of post-production to effectively deliver a message.
DVP.06.01	Create graphics and titles appropriate to the project.*(F22)
DVP.06.02	Describe play head, timeline, bin, multiple tracks, trimming, and edit points within nonlinear video editing.*(F23)
DVP.06.03	Describe and apply import, file, and asset management.*(F24)
DVP.06.04	Edit and finalize images and video for rough cut, transitions, color correction, keying, and pacing with nonlinear software.*(F25)
DVP.06.05	Edit audio for voice over, sound levels, music, and sound effects with application software.*(F26)
DVP.07	Media Components and Concepts: Identify and understand the technological literacy of video production.
DVP.07.01	Describe the following digital literacy terminology: aspect ratios, screen resolution, frame rate, file formats, codec, compression, bit rate, and display properties.*(G27)

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
ENGINEERING TECHNOLOGY**

Description: Pre-Engineering is the discipline, art and profession of acquiring and applying technical, scientific, and mathematical knowledge to design and implement materials, structures, machines, devices, systems, and processes that safely realize a desired objective or invention.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in pre-engineering.

ENG.01	Identify the roles, responsibilities and requirements of engineering.
ENG.01.01	Describe the following engineering fields: mechanical, chemical, civil, and electrical.*(A1)
ENG.01.02	Identify the following job functions and responsibilities: research and development, design, production, supervision, management, testing, and analysis in mechanical, chemical, civil, and electrical engineering. *(A2)
ENG.01.03	Identify the following educational requirements in engineering: associate, bachelor, master, and doctorate degrees.*(A3)
ENG.01.04	Describe the employment opportunities of an engineer.
ENG.01.05	Describe ethics related to engineering in the following situations: environmental, sustainable engineering, and corrupt practices.*(A4)
ENG.02	Use the design process to solve problems by creating and refining prototypes.
ENG.02.01	Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototype, test/evaluate, and communicate results.*(H25)
ENG.02.02	Identify the elements of a well-written problem statement.*(H26)
ENG.02.03	Describe the process for researching relevant information.*(H28)
ENG.02.04	Describe the process of brainstorming.*(H27)
ENG.02.05	Brainstorm possible solutions.
ENG.02.06	Analyze and research between alternate solutions.
ENG.02.07	Describe the process of developing a solution.*(H29)
ENG.02.08	Develop details of a solution.
ENG.02.09	Build a prototype from working drawings using appropriate materials.*(H30)
ENG.02.10	Test prototype to defined criteria.*(H31)
ENG.02.11	Redesign prototypes.
ENG.02.12	Communicate processes and results.
ENG.02.13	Use a variety of productivity software to explain the results of the design process, including, spreadsheets, word processing, data analysis, and presentations.*(H32)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS ENGINEERING TECHNOLOGY	
ENG.03	Ensure quality control using the major components of manufacturing processes including measurement systems, tools and instruments to produce a product.
ENG.03.01	Explain the major manufacturing processes.
ENG.03.02	Explain the following quality controls: geometric dimensioning and tolerances, and go-no go gauge.*(E12)
ENG.03.03	Use the following measurement tools and instruments: rulers, micrometers, and Vernier calipers.*(E13)
ENG.03.04	Explain quality control.
ENG.03.05	Identify the following elementary statistical process controls: distribution curves, normal curves, and skew curves.*(E14)
ENG.04	Design using the appropriate materials in engineering by identifying. Comparing, selecting and testing.
ENG.04.01	Identify common materials used in engineering.
ENG.04.02	Describe the following mechanical properties of steel, concrete, wood, and plastic: ductility/brittleness, tension, shear, and compression.*(D9)
ENG.04.03	Test materials for specific characteristics.*(D11)
ENG.04.04	Explain the process used for selecting the correct materials for specific functions.*(D10)
ENG.05	Works collaboratively in engineering teams throughout the design process.
ENG.05.01	Read and understand design documentation and technical manuals.
ENG.05.02	Write technical reports.
ENG.05.03	Make an oral presentation.
ENG.05.04	Actively contribute to a team project.
ENG.05.05	Identify the following characteristics of an effective design team: team norms, leadership, responsibility, respect, rapport, and time management.*(C8)
ENG.05.06	Identify the roles and responsibilities of the following engineering design team members: team leader, designers, reporters, testers, and fabricators.*(C7)
ENG.06	Use engineering equipment, laboratory materials and tools appropriately and safely.
ENG.06.01	Describe the function of a safety device.
ENG.06.02	Demonstrate safe personal behavior in the classroom.
ENG.06.03	Use all tools and equipment safely
ENG.06.04	Describe and demonstrate the proper use of engineering laboratory equipment.*(B6)
ENG.06.05	Describe and demonstrate the components of personal and group laboratory safety.
ENG.06.06	Describe and use safety laboratory equipment.
ENG.06.07	Explain and demonstrate the proper use of personal protective equipment (PPE).*(B5)
ENG.07	Identify and demonstrate the use of various software programs used in the engineering field.
ENG.07.01	Identify available resources for researching problem solutions.*(F15)
ENG.07.02	Use word processing software to develop reports.*(F16)
ENG.07.03	Use presentation software to develop oral presentation of findings.*(F17)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS ENGINEERING TECHNOLOGY	
ENG.07.04	Describe and demonstrate the process for using CAD in a design solution.*(F18)
ENG.07.05	Use spreadsheet software to develop tables, graphs and charts and track data.*(F19)
ENG.08	Demonstrate the application of science and math principles to the electrical engineering process.
ENG.08.02	Describe and apply the following electricity principles: Ohm's, Watt's, series, parallel, combination circuits, AC/DC systems, and conductors/insulators.*(G22)
ENG.08.03	Use appropriate electrical units to solve problems.
ENG.08.04	Draw a circuit diagram and lay out the circuit.
ENG.08.05	Describe work in electrical systems.
ENG.08.06	Explain rate in electrical systems.
ENG.08.07	Describe resistance in electrical systems.
ENG.09	Demonstrate the application of science and math principles to the fluids engineering process.
ENG.09.01	Identify what causes resistance in a fluid system.
ENG.09.02	Describe the following components and applications of fluid power principles: reservoir, fluid conductors, valves, pumps, actuators, Pascal's Law, and Bernoulli's Principle.*(G23)
ENG.09.03	Describe components of hydraulic and pneumatic systems.
ENG.09.04	Describe work in electrical, mechanical, fluid and thermal systems.
ENG.09.05	Explain rate in electrical, mechanical, fluid and thermal systems.
ENG.09.06	Describe resistance in electrical, mechanical, fluid and thermal systems.
ENG.10	Demonstrate the application of science and math principles to the thermal engineering process.
ENG.10.01	Identify the three ways heat is transferred.
ENG.10.02	Describe the following principles and applications of thermodynamics: heat flow and transfer, convection, conduction, radiation, temperature scales, and conductors/insulators.*(G24)
ENG.10.03	Solve thermal problems using appropriate units.
ENG.10.04	Describe work in thermal systems.
ENG.10.05	Explain rate in thermal systems.
ENG.10.06	Describe resistance in thermal systems.
ENG.11	Demonstrate the application of science and math principles to the mechanical engineering process.
ENG.11.01	Describe and apply the following mechanical systems principles: Law of Conservation of Energy, six simple machines, mechanical advantage, efficiency, work, rate, and friction/resistance.(G21)
ENG.11.02	Solve problems using appropriate units in engineering systems.
ENG.11.03	Describe and apply the following statics principles: vectoring to predict resultant forces, equilibrium, trusses, and moment of inertia.*(G20)
ENG.11.04	Explain the effects of gear ratios.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS ENGINEERING TECHNOLOGY	
ENG.11.05	Describe work in mechanical systems.
ENG.11.06	Explain rate in mechanical systems.
ENG.11.07	Describe resistance in mechanical systems.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS

MANUFACTURING

Description: Manufacturing careers involve production work on the shop floor making parts or assembling them; working with machines, making or assembling electronic parts, constructing or assembling modular housing, performing welding jobs, or printing various materials. Individuals perform preventive maintenance procedures on machines, tools and equipment. These are performed routinely and on a regular basis. They also troubleshoot and repair electrical, electronic and mechanical systems. This will include mechanical repair as well as using computer-based inventory control systems, retrieving information histories on each machine from computer records, and recording repair activities on the system to keep accurate records of repairs performed on each machine.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut's academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in manufacturing.

MAN.01	Employ engineering design process to achieve desired outcomes
MAN.01.01	Describe the process of interpreting and preparing technical drawings and rough drawings and sketches
MAN.01.02	Demonstrate the process for interpreting technical drawings to extrapolate information from a set of plans using appropriate mathematical functions
MAN.01.03	Apply accepted design principals of text and graphics to the layout of printed and electronically published materials
MAN.02	Identify and use appropriate engineering materials
MAN.02.01	Identify and describe the four major types of engineering materials; metallic, Polymeric, ceramic and fibrous.
MAN.02.02	Identify and describe seven major types of material properties
MAN.02.03	Select materials based on properties required by the project
MAN.02.04	Describe the relationship between materials and manufacturing
MAN.03	Demonstrate the methods involved in turning raw materials into usable products
MAN.03.01	Identify and describe the primary processes for obtaining raw materials
MAN.03.02	Demonstrate the safe and accurate secondary process to create a finished product; forming; separating; combining; assembly; finishing
MAN.03.03	Apply a variety of manufacturing techniques and processes to create a usable product
MAN.03.04	Distinguish between organic and inorganic materials
MAN.03.05	Experiment with the alteration of material characteristic
MAN.03.06	Differentiate between natural and artificial materials

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
GRAPHICS DESIGN TECHNOLOGY**

Description: Graphics Technology provides students with the processes involved in the technologies of printing, publishing, packaging, electronic imaging, and their allied industries. In addition, the graphics technology offers a range of cognitive skills, aesthetics, and crafts that includes typography, visual arts, and page layout.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

GDT.01	Discuss developments and individuals relating to the history of the graphics and design industry and explore emerging trends and technologies.
GDT.01.01	Research technologies that advanced graphic design.
GDT.01.02	Describe past, present, and future styles in the graphic design field.
GDT.01.03	Identify art movements that impacted graphic design.
GDT.01.04	Describe the importance of graphic design’s influence on society.
GDT.01.05	Identify persons with major contributions to the field of graphic design.
GDT.01.06	Identify and describe emerging trends and technologies.
GDT.02	Communicate ideals using industry standard terminology
GDT.02.01	Formulate written and verbal communications using industry standard terms.
GDT.02.02	Prepare and deliver a visual presentation utilizing appropriate industry terminology.
GDT.03	Explore careers available in the field of graphic communications and the design industry.
GDT.03.01	Identify the certificates, diplomas, and degrees available.
GDT.03.02	Compare and contrast careers in graphics and design, along with their education, training requirements, and salary ranges.
GDT.03.03	Identify the college majors that are found in the area of graphics design and communication.
GDT.03.04	List and describe professional organizations in the field of graphic design.
GDT.04	Examine the professional and ethical issues involved in the graphic design industries.
GDT.04.01	Identify basic copyright issues for graphic design industries to include understanding the use of Creative Commons copyright.
GDT.04.02	Explain the consequences of copyright infringement.
GDT.04.03	Explain ethics issues for the graphic design industries.
GDT.05	Identify and apply the elements of design.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS GRAPHICS DESIGN TECHNOLOGY	
GDT.05.01	Identify the applications of color, line, shape, texture, size, and value in samples of graphic work.
GDT.05.02	Analyze the use of color, line, shape, texture, size, and value in samples of graphic work.
GDT.05.03	Incorporate color, line, shape, texture, size, and value in student-generated graphic work.
GDT.05.04	Demonstrate the elements of design through manual sketching.
GDT.05.05	Demonstrate the elements of design through digital sketching.
GDT.06	Identify and apply the principles of design.
GDT.06.01	Analyze the principles of balance, contrast, alignment, rhythm, repetition, movement, harmony, emphasis, and unity in samples of graphic works.
GDT.06.02	Incorporate principles of balance, contrast, alignment, rhythm, repetition, movement, harmony, emphasis, and unity in student-generated graphic works.
GDT.06.03	Demonstrate the principles of design through various drawing techniques.
GDT.07	Identify and apply the principles of typography.
GDT.07.01	Identify the anatomical components and qualities of type (i.e., x-height, ascenders, descenders, counters, etc.)
GDT.07.02	Construct graphic works utilizing and manipulating type.
GDT.07.03	Apply and adjust formatting to type.
GDT.08	Identify and apply the principles of design to layout.
GDT.08.01	Apply effective use of negative space, composition, message structure, graphics, etc., to graphic works.
GDT.08.02	Create graphic works utilizing grids.
GDT.08.03	Create graphic works utilizing templates.
GDT.08.04	Demonstrate layout skills for print collaterals (i.e., business cards, newspapers, packaging, etc.)
GDT.08.05	Demonstrate layout skills for digital media.
GDT.08.06	Explain the importance of consistency of design.
GDT.08.07	Explain the importance of usability.
GDT.08.08	Explain the importance of core messaging.
GDT.08.09	Apply measurement tools and ratio analysis to image positioning in graphic works.
GDT.08.10	Solve aspect ratio proportion measurement in video and animation development.
GDT.09	Demonstrate knowledge of concept development.
GDT.09.01	Generate project ideas through the use of thumbnails, roughs, mock-ups, wireframes, etc.
GDT.09.02	Create a storyboard for a project
GDT.10	Demonstrate knowledge of concept image creation and manipulation.

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS GRAPHICS DESIGN TECHNOLOGY	
GDT.10.01	Analyze differences and appropriate applications of vector-based and bitmap images.
GDT.10.02	Use a variety of input devices to import photos, images, and other content.
GDT.10.03	Incorporate the use of image manipulation and illustration software into final products.
GDT.10.04	Apply nondestructive image editing techniques such as layering and masking.
GDT.10.05	Practice using different selection tools and techniques to manipulate images.
GDT.10.06	Practice in-camera composition and cropping.
GDT.11	Demonstrate application of media outputs.
GDT.11.01	Use appropriate resolution, compression, and file formats for various media outputs including web, video, and print.
GDT.11.02	Incorporate appropriate color modes in graphic works including but not limited to RGB and CMYK.
GDT.12	Demonstrate application of media outputs.
GDT.12.01	Develop a workflow for a project.
GDT.12.02	Synthesize information collected from communications with various stakeholders.
GDT.12.03	Describe project management.
GDT.12.04	Create projects that define core message.
GDT.13	Identify and apply the design process.
GDT.13.01	Explain the design process.
GDT.13.02	Apply the design process to generate graphic works. Explain the design process Apply the design process to generate graphic works.
GDT.14	Demonstrate knowledge of branding and corporate identity.
GDT.14.01	Analyze branding and corporate identity, its purpose and constituents.
GDT.14.02	Create a visual that contains all the richness of the brand.
GDT.15	Identify and produce files utilizing different digital formats.
GDT.15.01	Describe the strengths and weaknesses of TIFF, EPS, JPG, GIF, PDF, and PNG in a Postscript environment.
GDT.15.02	Create documents/images and demonstrate the ability to save as digital files.
GDT.15.03	Demonstrate how to place scanned graphics/photos into an existing page layout program.
GDT.15.04	Produce digital files using appropriate DPI and PPI resolution for media.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
TRANSPORTATION TECHNOLOGY**

Description: Transportation Technology will provide a comprehensive coverage of vehicular systems such as air, land, marine, and space. In addition, it will explore support systems for moving cargo in various environments. Students will design and apply the effects of transportation technology on individuals, society, and the environment, as well as the evolution of transportation are introduced and explored. Teachers will provide students the opportunity to apply knowledge through “hands on” activities related to topics and careers within Transportation Technology.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in transportation.

TRAN.01	Identify historical, social, economic, environmental, and government regulations impact transportation technology.
TRAN.01.01	Demonstrate historical innovations in the evolution of transportation systems.
TRAN.01.02	Demonstrate how technological developments have changed how goods and people are transported
TRAN.01.03	Predict the social, economic and environmental impacts of existing and evolving transportation technologies.
TRAN.01.04	Describe the importance of transportation systems to maintaining our quality of life.
TRAN.01.05	Explain how governmental regulations impact transportation.
TRAN.02	Define transportation technology systems.
TRAN.02.01	Define and properly use common transportation technology terminology (e.g. combustion. pathways. velocity. vehicle. mode. payload. and terminal).
TRAN.02.02	Demonstrate and apply how propulsion, control, guidance, payload, and support systems for various land, water, space, air, and materials handling systems are used in transportation technologies.
TRAN.02.03	Demonstrate and apply basic applications for transportation technology (e.g. moving people. transporting goods. and recreation) and generate examples of each.
TRAN.02.04	Design, build and evaluate a simple fixed path or variable path transportation system.
TRAN.02.05	Solve a simple transportation problem by designing, building, and testing a vehicle that will carry a payload a specified distance.
TRAN.02.06	Describe and give examples on how transportation plays a vital role of other technologies including but not limited to manufacturing, construction, communications, health and safety and agriculture.
TRAN.02.07	Identify, design and apply and the uses of different energy and power technologies.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
TRANSPORTATION TECHNOLOGY**

TRAN.02.08	Use design-based learning approaches that intentionally integrate the content and process of science and/or mathematics education with the content and process of technology and/or engineering education.
------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
WOOD TECHNOLOGY**

Description: Individuals working in wood manufacturing construct and repair wooden products. Students are immersed in a design and manufacturing environment that strengthens three-dimensional thought while utilizing tools safely and efficiently. Students work collaboratively and independently. Skills taught and assessed promote technologically literate citizen in an economy founded on manufacturing.

ACADEMIC EXPECTATIONS

All secondary students should meet Connecticut’s academic standards. All Knowledge and Skills are predicated on the assumption that academic skills have been attained. Some knowledge and skill statements will further define critical linkages and applications of academics.

KNOWLEDGE AND SKILLS

The following knowledge and skill statements apply to all careers in wood technology.

WM.01	Identify and appraise the impacts wood manufacturing has on their future aspirations; both career based and/or as an educated consumer.
WM.01.01	Develop career goals and objectives as part of a plan for future career direction.
WM.O1.02	Develop strategies to reach career objectives.
WM.02	Describe and demonstrate the procedures related to workplace and job site safety including personal protective equipment, machine safety, and material handling practices.
WM.02.01	Demonstrate safe material handling practices.
WM.02.02	Demonstrate and explain knowledge of workplace safety procedures.*(A2)
WM.02.03	Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in wood technology.*(A3)
WM.02.04	Describe safety practices for specific machines.
WM.02.05	Demonstrate knowledge of proper use, storage, and disposal of hazardous materials following OSHA’s proper safety practices for a woodworking facility.*(A1)
WM.02.06	Obtain, read and follow SDS (Safety Data Sheets) information.
WM.02.07	Follow safe practices relating to environmental hazards.
WM.02.08	Explain safe proper use, disposal, and storage of chemicals following OSHA standards.*(A7)
WM.02.09	Describe safety practices for the following machines: table saw, drill press, stationary sander, router table, and miter saw.*(A4)
WM.03	Identify and describe the safe and appropriate use of various types of hand and power tools and machinery used for building.
WM.03.01	Identify, use, and maintain the following measuring, layout, and marking tools: steel rule, tape measure, combination square, sliding “T” bevel, and compass.*(B8)
WM.03.02	Identify proper use and function of the following portable power tools: circular saw, drill, jig/saber saw, finishing sanders, and routers.*(B9)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS WOOD TECHNOLOGY	
WM.03.03	Identify proper use and function of the following fastening tools: hammer, Phillip head screw driver, and slotted/flat head screw driver.*(B10)
WM.03.04	Demonstrate and explain knowledge of proper use and storage of portable power tools.*(A6)
WM.03.05	Demonstrate and explain knowledge of proper use and storage of basic hand tools.*(A5)
WM.03.06	Identify proper use and function of the following hand tools: cross cut saw, rip saw, level, coping saw, nail set, hand plane, chisel, and file.*(B11)
WM.03.07	Identify proper use and function of stationary saws.
WM.03.08	Identify the proper use and function specialty machinery (e.g. drill presses. jointers. surface planers. table saws. power miter saws. band saws. scroll saws. and stationary sanders.*
WM.03.09	Identify proper use and function of the table and miter saws.*(B12)
WM.03.10	Explain and demonstrate correct use of planers.
WM.03.11	Explain and demonstrate use of molders
WM.03.12	Identify functions and demonstrate use of wood lathes.
WM.03.13	Identify and demonstrate use and function of sanders.
WM.03.14	Select appropriate tools, procedures, and/or equipment.
WM.03.15	Follow laboratory safety rules and procedures.
WM.03.16	Demonstrate good housekeeping at a workstation within total laboratory.
WM.03.17	Identify color coding safety standards.
WM.03.18	Explain fire prevention and safety precautions and practices for extinguishing fires.
WM.03.19	Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
WM.04	Explain and be able to demonstrate the methods involved in turning raw materials into useable products.
WM.04.01	Describe and interpret technical drawings.
WM.04.02	Describe and prepare rough drawings and sketches.*(C14)
WM.04.03	Explain and prepare a cut list or bill of material from a basic plan and assembly drawing.(C15)
WM.04.04	Interpret a design to facilitate replication
WM.04.05	Describe and identify fractional measurements from a basic plan and assembly drawings.*(C13)
WM.04.06	Identify the difference between both nominal and actual dimensions.*(C17)
WM.04.07	Extrapolate information from a set of plans.
WM.04.08	Measure accurately to a sixteenth of an inch.*(C16)
WM.04.09	Estimate materials quantities in both board feet and linear feet.*(C18)
WM.04.10	Interpret a design to facilitate replication
	Prepare stock for use.*(G28)

**Connecticut Technology Education Standards
Revised December 2014**

GRADES 9.12 STANDARDS WOOD TECHNOLOGY	
WM.04.11	Consider the natural characteristics of grain, knots, and checks when laying out a board.*(C19)
WM.04.12	Identify and assemble the following types of joints: butt, miter, dado, rabbet, and lap.*(G27)
WM.04.13	Identify and select the proper cutting process based on grain direction.*(E23)
WM.04.14	Identify how grain direction affects a material's strength.*(E24)
WM.04.15	Understanding kerf and its application to cutting and layout operations.*(E25)
WM.04.16	Identify characteristics and applications of the following coniferous softwoods: pine, cedar, and fir.*(D20)
WM.04.17	Identify characteristics and applications of the following deciduous hardwoods: oak, maple, and poplar.*(D21)
WM.04.18	Identify characteristics and applications of the following engineered lumber: plywood and medium density fiberboard.(D22)
WM.04.19	Identify and describe the purpose and use of the following woodworking fasteners: common nails, round head screws, flat head screws, and oval head screws.*(H29)
WM.04.20	Identify, describe purpose of and use woodworking adhesives.*
WM.04.21	Identify and describe the purpose of the following clamping devices: bar clamp, c-clamp, parallel/hand screw clamp, and spring clamps.*(H30)
WM.04.22	Identify and apply various wood finishes for interior and exterior, with brush or wipe on, for the following: paint, stain, and clear coat.*(I31)
WM.04.23	Describe the abrasive grit numbering grading system.*(F26)
WM.04.24	Differentiate among various abrasive materials.
WM.05	Describe and demonstrate the attributes of wood design.
WM.05.01	Utilize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.
WM.05.02	Check and critique a design continually, and improve and revise the idea of the design as needed.
WM.05.03	Design and create cabinet and wood products
WM.05.04	Develop a production plan, including the layout, bill of materials, and cost analysis, for the production of cabinets or wood products.
WM.06	Read blueprints and specifications
WM.06.01	Explain the purpose and components of contract documents and specifications.
WM.06.02	Identify and explain the following elements: Dimensions; Construction views; Section views; Site plans; Foundation plans; Floor plans and elevations; Details; Wiring details.
WM.06.03	Identify building symbols.
WM.06.04	Identify lists of materials and specifications.

**Connecticut Technology Education Standards
Revised December 2014**

**GRADES 9.12 STANDARDS
WOOD TECHNOLOGY**

WM.06.05	Use architectural and engineering scales.
WM.06.06	Demonstrate a basic understanding of computer-aided design.

Appendix I

COMMON CORE STATE STANDARDS ENGLISH/LANGUAGE ARTS ALIGNMENT

Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Speaking & Listening – SL – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.1</u> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 6,7, and 8 topics, texts, and issues, building on others’ ideas and expressing their own clearly.	02.01, 05.03, 05.07, 06.01, 06.05, 06.08, 07.01-07.05, 07.08, 08.01, 08.02, 09.05		01.01-01.07, 02.01-02.06, 03.01-03.06	01.01-01.07
<u>6.2</u> Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study. <u>7.2</u> Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. <u>8.2</u> 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.	05.03, 05.07, 05.09, 05.11, 06.02, 07.01-07.05, 08.04, 09.05		01.01-01.07, 02.01-02.06, 03.01-03.06	01.01-01.07
<u>6.3</u> Delineate a speaker’s argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not. <u>7.3</u> Delineate a speaker’s argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence	05.03, 05.07, 05.09, 05.11, 07.01-07.05, 09.05		01.01-01.07, 02.01-02.06, 03.01-03.06	01.01-01.07

Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Speaking & Listening – SL – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>8.3</u> 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.				
<u>6.4</u> Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. <u>7.4</u> Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation. <u>8.4</u> 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.	05.07, 05.11, 06.04, 07.06, 08.05, 09.05		01.01-01.07, 02.01-02.06, 03.01-03.06	01.01-01.07
<u>6.5</u> Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information. <u>7.5</u> Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. <u>8.5</u> Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.	05.11, 08.05, 09.05			

Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Speaking & Listening – SL – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.6</u> Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.	08.05, 09.05			

Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Reading Standards for Information Text – RSIT – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.1</u> Cite specific textual evidence to support analysis of science and technical texts.	01.01, 05.08, 05.10, 08.07			
<u>6-8.2</u> Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	01.01, 05.05, 05.08, 05.10			
<u>6-8.3</u> Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	04.02			
<u>6-8.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6–8 texts and topics</i> .	04.01, 05.05			

6-8.5 Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	04.01, 05.05, 05.08			
6-8.6 Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	04.01, 05.05, 05.08			
6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	02.02, 04.01, 05.05	02.01,	01.01-07, 02.01-06	

Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Reading Standards for Information Text – RSIT – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.8</u> Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	02.04, 04.01, 05.05, 05.09		01.01-07, 02.01-06	
<u>6-8.9</u> Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	04.01, 05.05	02.02	01.01-07	
Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.1</u> Write arguments focused on <i>discipline-specific content</i> .	04.02, 05.10	01.01, 01.02, 01.05, 01.07, 01.10-13, 01.15-01.17,	03.01-03.06,	01.01-01.07,
<u>6-8.1a</u> Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.	04.02, 05.10			
<u>6-8.1b</u> Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.	04.02, 05.10			
<u>6-8.1c</u> Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.	04.02			
<u>6-8.1d</u> Establish and maintain a formal style.	04.02			

<u>6-8.e</u> Provide a concluding statement or section that follows from and supports the argument presented.	04.02			
<u>6-8.2</u> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.	05.04			01.03, 01.09, 01.14
Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Reading Standards for Information Text – RSIT – (Grade Level, Standard #)	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
<u>6-8.2</u> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.				
<u>6-8.2a</u> Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	09.02			
<u>6-8.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	02.04, 05.04, 05.06, 09.02-09.04			
<u>6-8.5</u> 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.	02.04, 05.06			
<u>6-8.6</u> Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	02.03, 02.05, 05.07			

<p><u>6-8.7</u> 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.</p>	<p>01.01, 02.02, 04.02, 05.01</p>		<p>03.01-03.06</p>	<p>01.01-01.07</p>
<p>Technology Education Grades 6-8 Standards CCSS ENGLISH LANGUAGE ARTS Reading Standards for Information Text – RSIT – (Grade Level, Standard #)</p>	<p>PATHWAYS</p>			
	<p>ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)</p>	<p>NATURE OF TECHNOLOGY (NT)</p>	<p>IMPACT OF TECHNOLOGY (IT)</p>	<p>DESIGN AND DEVELOPMENT (Engineering) (DD)</p>
<p><u>6-8.8</u> 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.</p>	<p>01.01, 02.02, 04.02, 05.01, 07.07</p>		<p>03.01-03.06</p>	<p>01.01-01.07, 02.12</p>
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Science & Technical Subjects Literacy Grade 9-12</p>	<p>PATHWAYS</p>			
	<p>ARCHITECTURE TECHNOLOGY (ARCH)</p>	<p>AUTOMOTIVE TECHNOLOGY (AUTO)</p>	<p>BUILDING CONSTRUCTION (BC)</p>	<p>COMPUTER AIDED DRAFTING (CADD)</p>
<p><u>RST.9-10.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p><u>RST.11-12.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p>	<p>01.02</p>		<p>05.05</p>	
<p><u>RST.9-10.2</u> Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p><u>RST.11-12.2</u> Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information</p>	<p>01.02, 03.04</p>	<p>03.08, 11.04</p>		

presented in a text by paraphrasing them in simpler but still accurate terms.				
<p><u>RST.9-10.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p> <p><u>RST.11-12.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>		01.05, 03.04, 03.06, 03.09, 04.01, 04.03, 05.01-05.04, 06.01-06.06, 07.02-07.05, 08.01-08.04, 09.01-09.07, 10.03, 11.01-11.08, 12.01-12.06	03.01-03.11, 05.04, 05.06	
<p><u>RST.9-10.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.</p> <p><u>RST.11-12.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>	01.02, 03.04	04.02, 04.03	02.07, 04.01, 05.08	04.03, 09.01-09.03
<p><u>RST.9-10.5</u> Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p><u>RST.11-12.5</u> Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p>	01.02	04.03	01.03, 04.02	
<p><u>RST.9-10.6</u> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.</p> <p><u>RST.11-12.6</u> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p>	01.02			

<p><u>RST.9-10.7</u> Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p><u>RST.11-12.7</u> Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>	01.02, 03.01, 03.03	02.02, 04.03	04.04	
<p><u>RST.9-10.8</u> Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem.</p> <p><u>RST.11-12.8</u> Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p>	01.02			
<p><u>RST.9-10.9</u> Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p><u>RST.11-12.9</u> Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>	01.02, 03.01, 03.03		02.05	
<p><u>RST.9-10.10</u> By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.</p> <p><u>RST.11-12.10</u> By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.</p>	01.02			

Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTIO N (BC)	COMPUTER AIDED DRAFTING (CADD)
<u>WHST.9-12.1</u> Write arguments focused on discipline-specific content.	02.02, 04.01, 05.05			
<u>WHST.9-10.1a</u> Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. <u>WHST.11-12.1a</u> Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.	02.04, 04.01, 05.05, 05.09		02.02, 02.04, 02.09	
<u>WHST.9-10.1b</u> Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. <u>WHST.11-12.1b</u> Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.	04.01, 05.05			
<u>WHST.9-10.1c</u> Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. <u>WHST.11-12.1c</u> Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.			05.06, 05.09	

Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTION (BC)	COMPUTER AIDED DRAFTING (CADD)
<p><u>WHST.9-10.1d</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p><u>WHST.11-12.1d</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	04.02, 05.10			
<p><u>WHST.9-10.1e</u> Provide a concluding statement or section that follows from or supports the argument presented.</p> <p><u>WHST.11-12.1e</u> Provide a concluding statement or section that follows from or supports the argument presented.</p>	04.02, 05.10			
<p><u>WHST.9-10.2</u> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p>	01.01	01.01-01.04, 03.02		
<p><u>WHST.9-10.2a</u> Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p><u>WHST.11-12.2a</u> Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p>	01.01	01.01-01.04, 03.02, 03.03, 03.05, 03.07, 05.04, 06.02, 06.03, 06.05, 07.02-07.05, 08.01-08.04, 09.01-09.07, 10.03	01.03, 02.03, 04.11-04.16, 05.11	
<p><u>WHST.9-10.2b</u> Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.</p> <p><u>WHST.11-12.2b</u> Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details,</p>	01.01	01.01-01.04, 03.02, 03.03, 03.05, 03.07, 05.04, 06.02, 06.03, 06.05, 07.02-07.05, 08.01-08.04, 09.01-09.07, 10.03	02.03, 05.11, 06.02	

quotations, or other information and examples appropriate to the audience's knowledge of the topic.				
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST</p>	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTION (BC)	COMPUTER AIDED DRAFTING (CADD)
<p><u>WHST.9-10.2c</u> Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.</p> <p><u>WHST.11-12.2c</u> Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.</p>	01.01	04.02		
<p><u>WHST.9-10.2d</u> Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</p> <p><u>WHST.11-12.2d</u> Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>	01.01	01.01-01.04, 03.02, 03.03, 03.05, 03.07, 05.04, 06.02, 06.03, 06.05, 07.02-07.05, 08.01-08.04, 09.01- 09.07, 10.03		
<p><u>WHST.9-10.2e</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing</p> <p><u>WHST.11-12.2e</u> Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p>	01.01			
<p><u>WHST.9-10.2f</u> Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).</p>	01.01			
<p><u>WHST.9-10.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>	09.02		01.01, 04.03, 06.01	

<u>11-12.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.				
<u>WHST.9-10.5</u> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. <u>WHST.11-12.5</u> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.			05.01-05.03,	
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTION (BC)	COMPUTER AIDED DRAFTING (CADD)
<u>WHST.9-10.6</u> Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically <u>WHST.11-12.6</u> Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information..	08.02			01.01, 10.02
<u>WHST.9-10.7</u> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. <u>WHST.11-12.7</u> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			06.03, 06.05	01.01, 10.02
<u>WHST.9-10.8</u> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question;	08.02			01.01, 10.02

<p>integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. <u>WHST.11-12.8</u> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>				
<p><u>WHST.9-10.9</u> Draw evidence from informational texts to support analysis, reflection, and rese <u>WHST.11-12.9</u> Draw evidence from informational texts to support analysis, reflection, and rese</p>				
<p><u>WHST.9-10.10</u> Write routinely over extended time frames (time for 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. <u>WHST.11-12.10</u> Write routinely over extended time frames (time for 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.</p>	<p>02.04, 05.04, 05.06, 09.02-09.04</p>			
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Speaking & Listening » Grade 9-12</p>	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTION (BC)	COMPUTER AIDED DRAFTING (CADD)
<p><u>SL.9-10.1</u> Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively. <u>SL.11-12.1</u> Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.</p>	<p>01.02, 02.02, 05.01</p>			<p>01.02-01.04, 05.11, 05.16, 06.01, 06.02, 08.04, 10.02, 10.03</p>

<p><u>SL.9-10.1a</u> Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p><u>SL.11-12.1a</u> Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p>	01.02, 02.02, 05.01		02.06	
<p><u>SL.9-10.1b</u> Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.</p> <p><u>SL.11-12.1b</u> Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.</p>	01.02, 02.02, 05.01		02.06	
<p><u>SL.9-10.1c</u> Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.</p> <p><u>SL.11-12.1c</u> Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.</p>	01.02, 02.02, 05.01			
<p><u>SL.9-10.1d</u> Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.</p> <p><u>SL.11-12.1d</u> Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.</p>	01.02, 02.02, 05.01			

Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Speaking & Listening » Grade 9-12	PATHWAYS			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTION (BC)	COMPUTER AIDED DRAFTING (CADD)
<p><u>SL.9-10.2</u> Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.</p> <p><u>SL.11-12.2</u> Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p>	01.02, 02.02, 02.03, 02.03, 08.04	01.01-01.04, 02.01, 03.01, 03.02, 03.05, 03.08, 05.04, 07.01		01.02-01.04, 03.01, 03.02, 05.01, 05.04, 05.05, 05.11, 05.16, 06.01, 06.02, 08.04, 10.02, 10.03
<p><u>SL.9-10.3</u> Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.</p> <p><u>SL.11-12.3</u> Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.</p>	05.01			
<p><u>SL.9-10.4</u> Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p> <p><u>SL.11-12.4</u> Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>	08.04	03.07		03.01, 03.02, 05.01, 05.04, 05.05, 06.02, 10.03
<p><u>SL.9-10.5</u> Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p> <p><u>SL.11-12.5</u> Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p>	05.02, 06.03, 07.01, 08.04			02.05, 02.07, 05.03, 10.03

<p><u>SL.9-10.6</u> Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 here for specific expectations.)</p> <p><u>SL.11-12.6</u> Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 here for specific expectations.)</p>	08.04			10.02, 10.03
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Science & Technical Subjects Literacy Grade 9-12</p>	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<p><u>RST.9-10.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.</p> <p><u>RST.11-12.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p>	01.01			01.01-01.05
<p><u>RST.9-10.2</u> Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.</p> <p><u>RST.11-12.2</u> Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p>	02.01		01.02, 01.03, 05.01	01.05
<p><u>RST.9-10.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p> <p><u>RST.11-12.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>	02.02, 03.01, 03.02, 03.11-03.14	01.01,	02.01-02.03, 02.08- 02.10, 03.03, 06.03, 10.04, 11.03, 11.04	02.03-02.08
<p><u>RST.9-10.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.</p>	02.01, 02.02	01.01, 01.02	02.01, 02.02, 08.03, 08.04, 10.04, 11.03, 11.04	

<u>RST.11-12.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.				
<u>RST.9-10.5</u> Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). <u>RST.11-12.5</u> Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.		02.01, 02.02, 02.04, 03.01, 03.04-03.06,	05.05, 08.03, 08.04, 08.07-08.09, 09.01, 09.02-09.05, 10.01- 10.03, 10.05-10.09, 11.01, 11.02, 11.05- 11.07	01.01-01.05,
<u>RST.9-10.6</u> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. <u>RST.11-12.6</u> Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.				01.01-01.05
<u>RST.9-10.7</u> Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. <u>RST.11-12.7</u> Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	01.01, 03.01, 03.15, 05.01			01.01-01.05
<u>RST.9-10.8</u> Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem. <u>RST.11-12.8</u> Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.				01.01-01.05
<u>RST.9-10.9</u> Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. <u>RST.11-12.9</u> Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a	01.01	02.03		01.01-01.05

process, phenomenon, or concept, resolving conflicting information when possible.				
<u>RST.9-10.10</u> By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. <u>RST.11-12.10</u> By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.				01.01-01.05, 02.01-02.08
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<u>WHST.9-12.1</u> Write arguments focused on discipline-specific content.				
<u>WHST.9-10.1a</u> Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. <u>WHST.11-12.1a</u> Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.	01.02, 05.05, 05.06			01.05
<u>WHST.9-10.1b</u> Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns. <u>WHST.11-12.1b</u> Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases.				01.05
<u>WHST.9-10.1c</u> Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships	01.02			01.05

<p>between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p> <p><u>WHST.11-12.1c</u> Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.</p>				
<p><u>WHST.9-10.1d</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p> <p><u>WHST.11-12.1d</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.</p>	01.01, 01.02, 03.07, 03.09			01.05
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST</p>	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<p><u>WHST.9-10.1e</u> Provide a concluding statement or section that follows from or supports the argument presented.</p> <p><u>WHST.11-12.1e</u> Provide a concluding statement or section that follows from or supports the argument presented.</p>	01.02, 05.05, 05.06			01.05
<p><u>WHST.9-10.2</u> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p><u>WHST.11-12.2</u> Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p>	03.07, 03.09			
<p><u>WHST.9-10.2a</u> Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p><u>WHST.11-12.2a</u> Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g.,</p>	01.02, 03.02, 03.15, 04.01, 04.03, 04.04, 05.06	02.01, 02.02, 02.04, 03.01, 03.04-03.06	01.01, 01.04, 01.05, 02.09, 02.12, 03.03, 04.01, 04.04, 04.05, 05.02, 05.05, 06.01, 06.04-06.06, 08.03, 08.07-08.09, 09.01-09.05, 10.01-10.03,	

headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.			10.05-10.09, 11.01,11.02, 11.05-11.07	
<u>WHST.9-10.2b</u> Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. <u>WHST.11-12.2b</u> Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	01.03, 01.04, 05.02		01.01, 01.04, 03.01, 03.03, 04.01, 04.05, 05.02, 05.05, 06.01, 06.04-06.06	
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<u>WHST.9-10.2c</u> Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. <u>WHST.11-12.2c</u> Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.			05.02	
<u>WHST.9-10.2d</u> Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. <u>WHST.11-12.2d</u> Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.	02.01		01.01, 01.04, 02.10, 03.01, 05.02	
<u>WHST.9-10.2e</u> Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing	02.01, 03.15, 04.01, 04.03, 04.04, 05.06		05.02	

<u>WHST.11-12.2e</u> Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).				
<u>WHST.9-10.2f</u> Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	01.01		05.02	
<u>WHST.9-10.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. <u>WHST.11-12.4</u> Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	03.07, 03.09	01.03	02.10	
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<u>WHST.9-10.5</u> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. <u>WHST.11-12.5</u> Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	03.07, 03.09			01.01, 02.01-02.08
<u>WHST.9-10.6</u> Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically <u>WHST.11-12.6</u> Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information..			02.11	01.01
<u>WHST.9-10.7</u> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate;	01.02-01.04		01.05, 02.06	01.01

<p>synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p><u>WHST.11-12.7</u> Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>				
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST</p>	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<p><u>WHST.9-10.8</u> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.</p> <p><u>WHST.11-12.8</u> Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>	01.02-01.04, 05.04		02.06	01.01, 02.01-02.08
<p><u>WHST.9-10.9</u> Draw evidence from informational texts to support analysis, reflection, and rese</p> <p><u>WHST.11-12.9</u> Draw evidence from informational texts to support analysis, reflection, and rese</p>	01.02-01.04, 05.01		02.06, 02.11, 04.06	01.01
<p><u>WHST.9-10.10</u> Write routinely over extended time frames (time for 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.</p> <p><u>WHST.11-12.10</u> Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day</p>				01.01, 02.01-02.08

or two) for a range of discipline-specific tasks, purposes, and audiences.				
----------------------------------------------------------------------------	--	--	--	--

Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Speaking & Listening » Grade 9-12	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<p><u>SL.9-10.1</u> Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.</p> <p><u>SL.11-12.1</u> Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.</p>	05.01			
<p><u>SL.9-10.1a</u> Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p><u>SL.11-12.1a</u> Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p>	01.03, 01.04			01.05
<p><u>SL.9-10.1b</u> Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.</p> <p><u>SL.11-12.1b</u> Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.</p>				01.05
<p><u>SL.9-10.1c</u> Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.</p> <p><u>SL.11-12.1c</u> Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of</p>	01.04			01.05

positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.				
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Speaking & Listening » Grade 9-12	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<p><u>SL.9-10.1d</u> Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.</p> <p><u>SL.11-12.1d</u> Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.</p>				01.05
<p><u>SL.9-10.2</u> Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.</p> <p><u>SL.11-12.2</u> Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p>			07.01	01.05
<p><u>SL.9-10.3</u> Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.</p> <p><u>SL.11-12.3</u> Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.</p>				01.05
<p><u>SL.9-10.4</u> Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p> <p><u>SL.11-12.4</u> Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow</p>	03.06, 03.11-03.13,		05.03, 07.04	01.05

the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.				
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Speaking & Listening » Grade 9-12	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
<u>SL.9-10.5</u> Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. <u>SL.11-12.5</u> Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	03.03, 03.06, 03.16, 04.06		05.03, 07.03, 07.04	01.05
<u>SL.9-10.6</u> Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 here for specific expectations.) <u>SL.11-12.6</u> Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 here for specific expectations.)	03.08			01.05
Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST	PATHWAY			
	WOOD TECHNOLOGY (WM)			
<u>RST.9-10.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. <u>RST.11-12.1</u> Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	02.02			
<u>RST.9-10.2</u> Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	01.02, 02.02, 02.03, 02.05			

<p><u>RST.11-12.2</u> Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.</p>	
<p><u>RST.9-10.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.</p> <p><u>RST.11-12.3</u> Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>	<p>02.01, 02.04, 02.06, 03.01-03.17, 04.01-04.06, 04.01-04.06, 04.08-04.17, 0601-06.06, 05.04</p>
<p><u>RST.9-10.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.</p> <p><u>RST.11-12.4</u> Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>	<p>02.05, 03.15</p>
<p><u>RST.9-10.5</u> Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).</p> <p><u>RST.11-12.5</u> Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p>	<p>01.02</p>
<p><u>RST.9-10.7</u> Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.</p> <p><u>RST.11-12.7</u> Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>	<p>02.05, 02.06, 03.17, 04.09, 04.12-04.15, 06.03, 06.04</p>
<p><u>RST.9-10.9</u> Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.</p> <p><u>RST.11-12.9</u> Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>	<p>01.02, 02.07, 02.08, 03.17, 04.09, 04.12-04.15, 06.03, 06.04</p>

<p><u>RST.9-10.10</u> By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.</p> <p><u>RST.11-12.10</u> By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.</p>	<p>01.02, 02.07, 02.08, 03.17, 04.09, 04.12-04.15, 06.03, 06.04</p>
<p>Technology Education Grades 9-12 Standards ENGLISH LANGUAGE ARTS Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHST</p>	<p>PATHWAY</p>
	<p>WOOD TECHNOLOGY (WM)</p>
<p><u>WHST.9-10.2d</u> Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.</p> <p><u>WHST.11-12.2d</u> Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>	<p>03.08, 03.09, 03.16, 04.01-04.06, 04.16, 04.17, 09.01</p>
<p>SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>	<p>03.08, 03.09, 03.16, 04.01-04.06, 04.17, 06.01</p>

Appendix II

COMMON CORE STATE STANDARDS MATHEMATICS ALIGNMENT

TECHNOLOGY EDUCATION CCSS MATHEMATICS GRADES 6-8 Standards for Mathematical Practice	PATHWAYS			
	ESSENTIAL KNOWLEDGE AND SKILLS 6-12 Grade (EKS)	NATURE OF TECHNOLOGY (NT)	IMPACT OF TECHNOLOGY (IT)	DESIGN AND DEVELOPMENT (Engineering) (DD)
CCSS.Math.Practice.MP1. Make sense of problems and persevere in solving them.	EKS.03.04, EKS.03.05	NT.02.01		
CCSS.Math.Practice.MP2 Reason abstractly and quantitatively.	EKS.03.05	NT.02.01		
CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others.				
CCSS.Math.Practice.MP4 Model with mathematics.				DD.01.02 DD.02.05
CCSS.Math.Practice.MP5 Use appropriate tools strategically.	EKS.03.02			
CCSS.Math.Practice.MP6 Attend to precision.				
CCSS.Math.Practice.MP7 Look for and make use of structure.				
CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning.				
Number System				
Grade 6 Understand ratio concepts and use ratio reasoning to solve problems.				
CCSS.Math.Content.6.NS.C.7 Understand ordering and absolute value of rational numbers.	EKS.03.01			
Understand ratio concepts and use ratio reasoning to solve problems.				
CCSS.Math.Content.6.RP.A.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	EKS.03.03			
Expressions & Equations				
Grade 6 Reason about and solve one-variable equations and inequalities				

CCSS.Math.Content.6.EE.B.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	EKS.03.01			
Grade 7 Use properties of operations to generate equivalent expressions.				
CCSS.Math.Content.7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	EKS.03.03			
Grade 7 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.				
CCSS.Math.Content.7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically.	EKS.03.02			
Ratios & Proportional Relationships				
Grade 6 Understand ratio concepts and use ratio reasoning to solve problems.				
CCSS.Math.Content.6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	EKS.03.01			
Grade 7 Analyze proportional relationships and use them to solve real-world and mathematical problems.				
CCSS.Math.Content.7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.	EKS.03.01			
<p style="text-align: center;">TECHNOLOGY EDUCATION CCSS MATHEMATICS GRADES 9-12 Standards for Mathematical Practice</p>	PATHWAYS			
	COMMUNICATIONS (AVC)	MANUFACTURING (MAN)	ENGINEERING TECHNOLOGY (ENG)	TRANSPORTATION TECHNOLOGY (TRAN)
CCSS.Math.Practice.MP1. Make sense of problems and persevere in solving them.	03	02.03, 03.05	02.02, 07.01	01.03
CCSS.Math.Practice.MP2 Reason abstractly and quantitatively.	03, 04	03.03	02	01.03
CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others.			02.06	01.03

CCSS.Math.Practice.MP4 Model with mathematics.	04	03	08.02, 08.06	01.03
CCSS.Math.Practice.MP5 Use appropriate tools strategically.		03		
CCSS.Math.Practice.MP6 Attend to precision.	03, 04	03	02, 04, 08, 09, 10, 11	01.03
CCSS.Math.Practice.MP7 Look for and make use of structure.				
CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning.				
High School: Algebra , Creating Equations				
Create equations that describe numbers or relationships				
CCSS.Math.Content.HSA-CED.A.1 Create equations and inequalities in one variable including ones with absolute value and use them to solve problems in and out of context, including equations arising from linear functions.		01.02	02, 03.01, 03.02, 03.04, 11.01	
CCSS.Math.Content.HSA-CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		03, 01.02		
CCSS.Math.Content.HSA-CED.A.3 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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.		01		
CCSS.Math.Content.HSA-CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .		02, 03,	02, 03.03, 05.02	
High School: Algebra, Reasoning with Equations & Inequalities				
Understand solving equations as a process of reasoning and explain the reasoning.				
CCSS.Math.Content.HSA-REI.A.1 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.		05, 06, 07		01.02-01.05

CCSS.Math.Content.HSA-REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		02, 03		01.02-01.05
Solve equations and inequalities in one variable.				
CCSS.Math.Content.HSA-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.				0.2
CCSS.Math.Content.HSA-REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.		03.02, 03.03		
CCSS.Math.Content.HSA-REI.C.9 (+) 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).		03.02, 03.03		
Represent and solve equations and inequalities graphically				
CCSS.Math.Content.HSA-REI.D.10 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).				
High School: Functions, Interpreting Functions				
Understand the concept of a function and use function notation.				
CCSS.Math.Content.HSF-IF.A.1 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 $y = f(x)$.		03		01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSF-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.		03.03		01.02-01.05, 02.02, 02.03
Interpret functions that arise in applications in terms of the context.				
CCSS.Math.Content.HSF-IF.B.4 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		01.02, 02, 03.03,		01.02-01.05, 02

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				
CCSS.Math.Content.HSF-IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.				01.02-01.05
CCSS.Math.Content.HSF-IF.B.6 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.				01.02-01.05
Analyze functions using different representations.				
CCSS.Math.Content.HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. <ul style="list-style-type: none"> a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 				01.02-01.05
CCSS.Math.Content.HSF-IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. <ul style="list-style-type: none"> a. 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. b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y =$ 				

(1.02) ^t , $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.				
CCSS.Math.Content.HSF-IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.				01.02-01.05

High School: Functions , Building Functions					
Build a function that models a relationship between two quantities.					
<p>CCSS.Math.Content.HSF-BF.A.1 Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.</p> <p>c. (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.</p>				01.02-01.05, 02.03-02.05	
<p>CCSS.Math.Content.HSF-BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.</p>					01.02-01.05, 02.03-02.05
Build new functions from existing functions.					
<p>CCSS.Math.Content.HSF-BF.B.3 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.</p>					01.02-01.05, 02.03-02.05
High School: Functions , Linear, Quadratic, & Exponential Models					
Construct and compare linear, quadratic, and exponential models and solve problems.					
<p>CCSS.Math.Content.HSF-LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p>					02.03-02.05

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.				
CCSS.Math.Content.HSF-LE.A.2 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).				02.03-02.05
CCSS.Math.Content.HSF-LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.				02.03-02.05
CCSS.Math.Content.HSF-LE.A.4 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.				02.03-02.05
Interpret expressions for functions in terms of the situation they model.				
CCSS.Math.Content.HSF-LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context.				02.03-02.05
High School: Functions, Trigonometric Functions				
Extend the domain of trigonometric functions using the unit circle				
CCSS.Math.Content.HSF-TF.A.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.			10.01-10.09, 11.02, 11.07	
High School: Geometry, Circles				
Understand and apply theorems about circles				
CCSS.Math.Content.HSG-C.A.1 Prove that all circles are similar		01.02, 03.03	02.01, 02.12, 05.01, 05.02	
Find arc lengths and areas of sectors of circles				
CCSS.Math.Content.HSG-C.B.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.			02.01, 02.12, 05.01, 05.02	
High School: Geometry, Congruence				
Experiment with transformations in the plane				
CCSS.Math.Content.HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.		01.02, 03		01.02-01.05,

CCSS.Math.Content.HSG-CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).		01.02, 03		02.03-02.05
CCSS.Math.Content.HSG-CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.				01.02-01.05,
CCSS.Math.Content.HSG-CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.				02.03-02.05
CCSS.Math.Content.HSG-CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.		01.02, 03		01.02-01.05,
Prove geometric theorems				
CCSS.Math.Content.HSG-CO.C.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.				01.02-01.05,
CCSS.Math.Content.HSG-CO.C.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.				02.03-02.05
CCSS.Math.Content.HSG-CO.C.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.				01.02-01.05,
Make geometric constructions				
CCSS.Math.Content.HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing		01.02, 03		01.02-01.05, 02.03-02.05

perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.				
High School: Geometry, Geometric Measurement & Dimension				
Explain volume formulas and use them to solve problems				
CCSS.Math.Content.HSG-GMD.A.1 Give an informal argument for the formulas for the circumference of a Circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.			03.02, 03.04, 10.01-10.09, 11.01, 11.02, 11.06	
CCSS.Math.Content.HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems				
Visualize relationships between two-dimensional and three-dimensional objects			03.02, 03.04, 10.01-10.09	
CCSS.Math.Content.HSG-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three dimensional objects generated by rotations of two-dimensional objects.			03.02, 03.04, 10.01-10.09, 11.01, 11.02, 11.06	
High School: Geometry, Expressing Geometric Properties with Equations				
Use coordinates to prove simple geometric theorems algebraically				
CCSS.Math.Content.HSG-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point $(0, 2)$.			02.01, 02.12	
CCSS.Math.Content.HSG-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).			10.01-10.09	
CCSS.Math.Content.HSG-GPE.B.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.			02.01, 02.12, 03.02, 03.04, 10.01-10.09	
High School: Geometry, Modeling with Geometry				
Apply geometric concepts in modeling situations				

CCSS.Math.Content.HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).			03.02, 03.04	
CCSS.Math.Content.HSG-MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).			03.02, 03.04	
CCSS.Math.Content.HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)			03.02, 03.04	

High School: Geometry, Similarity, Right Triangles, & Trigonometry				
Define trigonometric ratios and solve problems involving right triangles				
CCSS.Math.Content.HSG-SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.				
High School: Number and Quantity, Quantities				
Reason quantitatively and use units to solve problems.				
CCSS.Math.Content.HSN-Q.A.1 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.		01.02, 03.02, 03.03	03.02, 03.04	
CCSS.Math.Content.HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.		01.02	03.02, 03.04	
CCSS.Math.Content.HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.		01.02	03.02, 03.04	
High School: Number and Quantity, Vector & Matrix Quantities				
Represent and model with vector quantities				
CCSS.Math.Content.HSN-VM.A.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $ v $, $\ v\ $, v).				
CCSS.Math.Content.HSN-VM.A.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.				

CCSS.Math.Content.HSN-VM.A.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.				
Perform operations on vectors				
<p>CCSS.Math.Content.HSN-VM.B.4 (+) Add and subtract vectors.</p> <p>HSN-VM.B.4a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.</p> <p>HSN-VM.B.4b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.</p> <p>HSN-VM.B.4c. Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.</p>				

CCSS.Math.Content.HSN-VM.B.5 (+) Multiply a vector by a scalar. HSN-VM.B.5a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. HSN-VM.B.5b. Compute the magnitude of a scalar multiple cv using $\ cv\ = c v$. Compute the direction of cv knowing that when $ c > 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).				
Perform operations on matrices and use matrices in applications.				
CCSS.Math.Content.HSN-VM.C.6 (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.				01.02-01.05,
CCSS.Math.Content.HSN-VM.C.7 (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.				02.03-02.05
CCSS.Math.Content.HSN-VM.C.8 (+) Add, subtract, and multiply matrices of appropriate dimensions.				01.02-01.05,
CCSS.Math.Content.HSN-VM.C.9 (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.				02.03-02.05
CCSS.Math.Content.HSN-VM.C.10 (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.				01.02-01.05,
CCSS.Math.Content.HSN-VM.C.11 (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.				02.03-02.05
CCSS.Math.Content.HSN-VM.C.12 (+) Work with 2×2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.				01.02-01.05,
High School: Statistics & Probability, Making Inferences & Justifying Conclusions				
Understand and evaluate random processes underlying statistical experiments				

CCSS.Math.Content.HSS-IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.		01.01		01.02-01.05, 02.03-02.05
CCSS.Math.Content.HSS-IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?		01.01		
Make inferences and justify conclusions from sample surveys, experiments, and observational studies				
CCSS.Math.Content.HSS-IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.		03		01.02-01.05, 02.03-02.05
CCSS.Math.Content.HSS-IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.				01.02-01.05, 02.03-02.05
CCSS.Math.Content.HSS-IC.B.6 Evaluate reports based on data.		03		01.02-01.05, 02
High School: Statistics & Probability, Interpreting Categorical & Quantitative Data				
Summarize, represent, and interpret data on a single count or measurement variable				
CCSS.Math.Content.HSS-ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).		01.02, 03		01.02-01.05, 02.03-02.05
Summarize, represent, and interpret data on two categorical and quantitative variables				
CCSS.Math.Content.HSS-ID.B.5 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.		03.02		01.02-01.05, 02.03-02.05

CCSS.Math.Content.HSS-ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. 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. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.				01.02-01.05, 02.03-02.05
Interpret linear models				
CCSS.Math.Content.HSS-ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.				01.02-01.05, 02.03-02.05
CCSS.Math.Content.HSS-ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.				01.02-01.05, 02.03-02.05
CCSS.Math.Content.HSS-ID.C.9 Distinguish between correlation and causation.				01.02-01.05, 02.03-02.05
High School: Statistics & Probability, Conditional Probability & the Rules of Probability				
Understand independence and conditional probability and use them to interpret data				
CCSS.Math.Content.HSS-CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.				01.02-01.05, 02.02, 02.03

CCSS.Math.Content.HSS-CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.				01.02-01.05, 02.02, 02.03
Use the rules of probability to compute probabilities of compound events				
CCSS.Math.Content.HSS-CP.B.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-CP.B.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.				01.02-01.05, 02.02, 02.03
High School: Statistics & Probability, Using Probability to Make Decisions				
Calculate expected values and use them to solve problems				
CCSS.Math.Content.HSS-MD.A.1 (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-MD.A.2 (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-MD.A.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.				01.02-01.05, 02.02, 02.03
CCSS.Math.Content.HSS-MD.A.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?				01.02-01.05, 02.02, 02.03
Use probability to evaluate outcomes of decisions				

<p>CCSS.Math.Content.HSS-MD.B.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.</p> <p>a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.</p> <p>b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.</p>				01.02-01.05, 02.03-02.05
<p>CCSS.Math.Content.HSS-MD.B.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).</p>				01.02-01.05, 02.02, 02.03
<p>CCSS.Math.Content.HSS-MD.B.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).</p>				01.02-01.05, 02.02, 02.03
<p style="text-align: center;">TECHNOLOGY EDUCATION CCSS MATHEMATICS GRADES 9-12 Standards for Mathematical Practice</p>	PATHWAY			
	ARCHITECTURE TECNOLOGY (ARCH)	AUTOMOTVE TECHNOLOGY (AUTO)	BUILDING CONSTRUCTIO N (BC)	COMPUTER AIDED DRAFTING (CADD)
<p>CCSS.Math.Practice.MP1. Make sense of problems and persevere in solving them.</p>	01	01		
<p>CCSS.Math.Practice.MP2 Reason abstractly and quantitatively.</p>	06			
<p>CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others.</p>				
<p>CCSS.Math.Practice.MP4 Model with mathematics.</p>				
<p>CCSS.Math.Practice.MP5 Use appropriate tools strategically.</p>				
<p>CCSS.Math.Practice.MP6 Attend to precision.</p>				
<p>CCSS.Math.Practice.MP7 Look for and make use of structure.</p>				

CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning.				
High School: Algebra, Seeing Structure in Expressions				
CCSS.Math.Content.HSA-SSE.A.1 Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P .		12		
CCSS.Math.Content.HSA-SSE.A.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.		12		
Write expressions in equivalent forms to solve problems.				
CCSS.Math.Content.HSA-SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15t$ can be rewritten as $(1.151/12)^{12t}$ $1.01212t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.		12		
CCSS.Math.Content.HSA-SSE.B.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.		12		
High School: Algebra , Creating Equations				
Create equations that describe numbers or relationships				

CCSS.Math.Content.HSA-CED.A.1 Create equations and inequalities in one variable including ones with absolute value and use them to solve problems in and out of context, including equations arising from linear functions.	06.01, 06.02	09, 10, 11	C6.0	D2.0
CCSS.Math.Content.HSA-CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		09, 10, 11		
CCSS.Math.Content.HSA-CED.A.3 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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.		09, 10, 11		
CCSS.Math.Content.HSA-CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .		01.04, .06, 09, 10, 11,	C3.0, C4.0, C9.0	D2.0
High School: Algebra, Reasoning with Equations & Inequalities				
Understand solving equations as a process of reasoning and explain the reasoning.				
CCSS.Math.Content.HSA-REI.A.1 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.				
CCSS.Math.Content.HSA-REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.		03, 05, 06, 07		
Solve equations and inequalities in one variable.				
CCSS.Math.Content.HSA-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.		03, 04, 10, 11		
High School: Functions, Interpreting Functions				
Understand the concept of a function and use function notation.				

CCSS.Math.Content.HSF-IF.A.1 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 $y = f(x)$.		02		
CCSS.Math.Content.HSF-IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.		02		
CCSS.Math.Content.HSF-IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.		02		
Interpret functions that arise in applications in terms of the context.				
CCSS.Math.Content.HSF-IF.B.4 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		02		
CCSS.Math.Content.HSF-IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.		02		
CCSS.Math.Content.HSF-IF.B.6 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.		02, 06, 07		
Analyze functions using different representations.				
CCSS.Math.Content.HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.		02		

<p>b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p> <p>c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p> <p>d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.</p> <p>e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p>				
<p>CCSS.Math.Content.HSF-IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>a. 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.</p> <p>b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.</p>		02		
<p>CCSS.Math.Content.HSF-IF.C.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</p>		02		
<p>High School: Functions , Building Functions</p>				
<p>Build a function that models a relationship between two quantities.</p>				
<p>CCSS.Math.Content.HSF-BF.A.1 Write a function that describes a relationship between two quantities.</p> <p>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.</p> <p>b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by</p>		02		

<p>adding a constant function to a decaying exponential, and relate these functions to the model.</p> <p>c. (+) Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.</p>				
<p>CCSS.Math.Content.HSF-BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.</p>		02		
<p>Build new functions from existing functions.</p>				
<p>CCSS.Math.Content.HSF-BF.B.3 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.</p>		02		
<p>High School: Functions , Linear, Quadratic, & Exponential Models</p>				
<p>Construct and compare linear, quadratic, and exponential models and solve problems.</p>				
<p>CCSS.Math.Content.HSF-LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p> <p>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.</p> <p>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.</p>		02		
<p>CCSS.Math.Content.HSF-LE.A.2 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).</p>		02		

CCSS.Math.Content.HSF-LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.		02		
CCSS.Math.Content.HSF-LE.A.4 For exponential models, express as a logarithm the solution to $ab^t = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.		02		
Interpret expressions for functions in terms of the situation they model.				
CCSS.Math.Content.HSF-LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context.		02		
High School: Functions, Trigonometric Functions				
Extend the domain of trigonometric functions using the unit circle				
CCSS.Math.Content.HSF-TF.A.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	06.02			D 5.0, D7.0
High School: Geometry, Congruence				
Experiment with transformations in the plane				
CCSS.Math.Content.HSG-CO.A.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.		02		
CCSS.Math.Content.HSG-CO.A.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).		02		
CCSS.Math.Content.HSG-CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.		02		
CCSS.Math.Content.HSG-CO.A.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.		02		
CCSS.Math.Content.HSG-CO.A.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper,		02		

tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.				
Prove geometric theorems				
CCSS.Math.Content.HSG-CO.C.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.		02		
CCSS.Math.Content.HSG-CO.C.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.		02		
CCSS.Math.Content.HSG-CO.C.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.		02		
Make geometric constructions				
CCSS.Math.Content.HSG-CO.D.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.		02		
High School: Geometry, Circles				
Understand and apply theorems about circles				
CCSS.Math.Content.HSG-C.A.1 Prove that all circles are similar	07.01, 07.02			D2.0, D3.0, D5.0, D6.0, D7.0, D8.0
Find arc lengths and areas of sectors of circles				
CCSS.Math.Content.HSG-C.B.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the	07.01, 07.02	B2.0, B8.0		D3.0

radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.				
High School: Geometry, Geometric Measurement & Dimension				
Explain volume formulas and use them to solve problems				
CCSS.Math.Content.HSG-GMD.A.1 Give an informal argument for the formulas for the circumference of a Circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	02.03, 06.02, 04.01, 04.02, 04.03	B7.0	C12.0	D4.0, D5.0, D7.0, D8.0, D10.0, D11.0
CCSS.Math.Content.HSG-GMD.A.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems	02.03, 06.02, 04.01, 04.02, 04.03			
Visualize relationships between two-dimensional and three-dimensional objects				
CCSS.Math.Content.HSG-GMD.B.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three dimensional objects generated by rotations of two-dimensional objects.	02.03, 06.02, 04.01, 04.02, 04.03	B2.0, B7.0		
High School: Geometry, Expressing Geometric Properties with Equations				
Use coordinates to prove simple geometric theorems algebraically				
CCSS.Math.Content.HSG-GPE.B.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, -3)$ lies on the circle centered at the origin and containing the point $(0, 2)$.	02.03, 06.02, 04.01, 04.02, 04.03			D2.0, D3.0, D11.0
CCSS.Math.Content.HSG-GPE.B.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	02.03, 07.02	B2.0, B8.0		D4.0, D5.0, D6.0, D7.0, D8.0
CCSS.Math.Content.HSG-GPE.B.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	04.01, 04.02, 04.03, 05.02	B7.0	C6.0	D2.0, D3.0, D5.0, D6.0, D7.0, D10.0
High School: Geometry, Modeling with Geometry				

Apply geometric concepts in modeling situations				
CCSS.Math.Content.HSG-MG.A.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).	05, 06	B7.0		
CCSS.Math.Content.HSG-MG.A.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	05, 06	B4.0, B7.0		
CCSS.Math.Content.HSG-MG.A.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)	05, 06	B2.0, B4.0, B7.0, B8.0		
High School: Geometry, Similarity, Right Triangles, & Trigonometry				
Define trigonometric ratios and solve problems involving right triangles				
CCSS.Math.Content.HSG-SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	05, 06			D3.0, D4.0, D5.0
High School: Number and Quantity, Quantities				
Reason quantitatively and use units to solve problems.				
CCSS.Math.Content.HSN-Q.A.1 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.		B7.0		
CCSS.Math.Content.HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.		B2.0, B7.0		
CCSS.Math.Content.HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.		B7.0	C6.0	
High School: Number and Quantity, Vector & Matrix Quantities				
Represent and model with vector quantities				
CCSS.Math.Content.HSN-VM.A.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line	05, 06			D4.0, D6.0

segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $ v $, $\ v\ $, v).				
CCSS.Math.Content.HSN-VM.A.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	05, 06			D4.0, D6.0
CCSS.Math.Content.HSN-VM.A.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.	05, 06			D4.0, D6.0
Perform operations on vectors				
CCSS.Math.Content.HSN-VM.B.4 (+) Add and subtract vectors. HSN-VM.B.4a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. HSN-VM.B.4b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. HSN-VM.B.4c. Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise	05, 06			D4.0, D6.0
CCSS.Math.Content.HSN-VM.B.5 (+) Multiply a vector by a scalar. HSN-VM.B.5a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. HSN-VM.B.5b. Compute the magnitude of a scalar multiple cv using $\ cv\ = c v\ $. Compute the direction of cv knowing that when $ c > 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).	05, 06			D4.0, D6.0
Perform operations on matrices and use matrices in application				
CCSS.Math.Content.HSN-VM.C.6 (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.		02		
CCSS.Math.Content.HSN-VM.C.7 (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.		02		
CCSS.Math.Content.HSN-VM.C.8 (+) Add, subtract, and multiply matrices of appropriate dimensions.				

CCSS.Math.Content.HSN-VM.C.9 (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.		02		
CCSS.Math.Content.HSN-VM.C.10 (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.		02		
CCSS.Math.Content.HSN-VM.C.11 (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.		02		
CCSS.Math.Content.HSN-VM.C.12 (+) Work with 2×2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area.		02		
High School: Statistics & Probability, Making Inferences & Justifying Conclusions				
Understand and evaluate random processes underlying statistical experiments				
CCSS.Math.Content.HSS-IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.		02		
CCSS.Math.Content.HSS-IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?		02		
Make inferences and justify conclusions from sample surveys, experiments, and observational studies				
CCSS.Math.Content.HSS-IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.		02		
CCSS.Math.Content.HSS-IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.		02		
CCSS.Math.Content.HSS-IC.B.6 Evaluate reports based on data.		02		
High School: Statistics & Probability, Interpreting Categorical & Quantitative Data				

Summarize, represent, and interpret data on a single count or measurement variable				
CCSS.Math.Content.HSS-ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).		02		
Summarize, represent, and interpret data on two categorical and quantitative variables				
CCSS.Math.Content.HSS-ID.B.5 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.		02		
CCSS.Math.Content.HSS-ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. 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 b. Informally assess the fit of a function by plotting and analyzing residuals c. Fit a linear function for a scatter plot that suggests a linear association.		02		
Interpret linear models				
CCSS.Math.Content.HSS-ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data		02		
CCSS.Math.Content.HSS-ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.		02		
CCSS.Math.Content.HSS-ID.C.9 Distinguish between correlation and causation.		02		
High School: Statistics & Probability, Conditional Probability & the Rules of Probability				
Understand independence and conditional probability and use them to interpret data				
CCSS.Math.Content.HSS-CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).		02		

CCSS.Math.Content.HSS-CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.		02		
CCSS.Math.Content.HSS-CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.		02		
CCSS.Math.Content.HSS-CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.		02		
Use the rules of probability to compute probabilities of compound events				
CCSS.Math.Content.HSS-CP.B.6 Find the conditional probability of A given as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.		02		
CCSS.Math.Content.HSS-CP.B.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.		02		
High School: Statistics & Probability, Using probability to Make Decisions				
Calculate expected values and use them to solve problems				
CCSS.Math.Content.HSS-MD.A.1 (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.		02		
CCSS.Math.Content.HSS-MD.A.2 (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution		02		
CCSS.Math.Content.HSS-MD.A.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.		02		

CCSS.Math.Content.HSS-MD.A.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?		02		
Use probability to evaluate outcomes of decisions				
CCSS.Math.Content.HSS-MD.B.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant. b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.		02		
CCSS.Math.Content.HSS-MD.B.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).		02		
CCSS.Math.Content.HSS-MD.B.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).		02		
TECHNOLOGY EDUCATION CCSS MATHEMATICS GRADES 9-12 Standards for Mathematical Practice	PATHWAY Wood Technology WM			
Standards for Mathematical Practice				
CCSS.Math.Practice.MP1. Make sense of problems and persevere in solving them.	03, 04			
CCSS.Math.Practice.MP2 Reason abstractly and quantitatively.				
CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others.				
CCSS.Math.Practice.MP4 Model with mathematics.	03, 04			
CCSS.Math.Practice.MP5 Use appropriate tools strategically.	03, 04			
CCSS.Math.Practice.MP6 Attend to precision.				

CCSS.Math.Practice.MP7 Look for and make use of structure.	
CCSS.Math.Practice.MP8 Look for and express regularity in repeated reasoning.	
Algebra – A-CED – Creating Equations	
Create equations that describe numbers or relationships	
1. Create equations and inequalities in one variable including ones with absolute value and use them to solve problems in and out of context, including equations arising from linear functions. 1.1 Judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step. (CA Standard Algebra II - 11.2)	02, 03.01, 04.03, 04.05, 04.07, 05.03, 05.04, 06.04, 06.05, 06.06
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .	02, 03.01, 04.03, 04.05, 04.07, 06.04, 06.05, 06.06
Algebra – A-REI – Reasoning with Equations and Inequalities	
Represent and solve equations and inequalities graphically	
10. 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).	05.04, 06.04, 06.04, 06.06
Functions – F-TF – Trigonometric Functions	
Extend the domain of trigonometric functions using the unit circle	
1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. 1.1 Understand the notion of angle and how to measure it, in both degrees and radians. Convert between degrees and radians. (CA Standard Trigonometry - 1.0)	03.02-03.07, 04, 05
Geometry – G-C – Circles	
Understand and apply theorems about circles	
1. Prove that all circles are similar.	03, 04
Find arc lengths and areas of sectors of circles	
5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	04.01, 04.02, 04.04, 04.08-04.11, 04.13, 04.14, 05

Geometry – G-GMD – Geometric Measurement and Dimensions	
Explain volume formulas and use them to solve problems	
1. Give an informal argument for the formulas for the circumference of a Circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri’s principle, and informal limit arguments.	03, 04.12, 05.04, 06.04, 06.05, 06.06
Visualize relationships between two-dimensional and three-dimensional objects	
4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three dimensional objects generated by rotations of two-dimensional objects.	03, 04.12, 05.04, 06.04, 06.05, 06.06
5. Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.	03, 04.12, 05.04, 06.04, 06.05, 06.06
Geometry – G-GPE – Expressing Geometric Properties with Equations	
Use coordinates to prove simple geometric theorems algebraically	
4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, 3) lies on the circle centered at the origin and containing the point (0, 2).x	03, 04
5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	04.08-04.11, 04.13, 04.14, 05
7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.	03, 04.01,-04.07, 04.12, 05.02, 05.03,
Geometry – G-MG – Modeling with Geometry	
Apply geometric concepts in modeling situations	
1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder.	06.02, 06.04, 06.05, 06.06
2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).	06.02, 06.04, 06.05, 06.06
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)	06.02, 06.04, 06.05, 06.06
Geometry – G-SRT – Similarity, Right Triangles, and Trigonometry	

Define trigonometric ratios and solve problems involving right triangles	
8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. 8.1 Know and use angle and side relationships in problems with special right triangles. such as, 30° , 60° , and 90° triangles and 45° , 45° , and 90° triangles. (CA Standard Geometry - 20.0)	06.02, 06.04, 06.05, 06.06
Number and Quantity – N-Q – Quantities	
Reason quantitatively and use units to solve problems.	
1. 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.	06.02, 06.04, 06.05, 06.06
2. Define appropriate quantities for the purpose of descriptive modeling.	
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	06.02, 06.04, 06.05, 06.06
Number and Quantity – N-VM – Vector and Matrix Quantities	
Represent and model with vector quantities	
1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v , $ v $, $\ v\ $, v).	03, 04
2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	03, 04
3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.	03, 04
Perform operations on vectors	
4. (+) Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w , with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by	03, 04

<p>connecting the tips in the appropriate order, and perform vector subtraction component-wise.</p>	
<p>5. (+) Multiply a vector by a scalar.</p> <p>a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.</p> <p>b. Compute the magnitude of a scalar multiple cv using $\ cv\ = c v$. Compute the direction of cv knowing that when $c = 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).</p>	<p>03, 04</p>

Appendix III

COMMON CORE STATES STANDARDS ENGLISH/LANGUAGE ARTS

College and Career Readiness Anchor Standards for Reading

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

Responding to Literature

Note on range and content of student reading

To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students' own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts.

11. Respond to literature by employing knowledge of literary language, textual features, and forms to read and comprehend, reflect upon, and interpret literary texts from a variety of genres and a wide spectrum of American and world cultures.

*Please see “Research to Build Knowledge” in Writing and “Comprehension and Collaboration” in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Reading Standards for Literature 6–12

[RL]

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2. Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.	2. 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.
3. Describe how a particular story’s or drama’s plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.	3. Analyze how particular elements of a story or drama interact (e.g., how setting shapes the characters or plot).	3. 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		
4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.	4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.	4. 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.
5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.	5. Analyze how a drama’s or poem’s form or structure (e.g., soliloquy, sonnet) contributes to its meaning.	5. 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.
6. Explain how an author develops the point of view of the narrator or speaker in a text. a. Explain how an author’s geographic location or culture affects his or her perspective.	6. Analyze how an author develops and contrasts the points of view of different characters or narrators in a text. a. Analyze stories, drama, or poems by authors who represent diverse world cultures.	6. 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. a. Analyze full-length novels, short stories, poems, and other genres by authors who represent diverse world cultures.
Integration of Knowledge and Ideas		

Grade 6 students:	Grade 7 students:	Grade 8 students:
7. Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they “see” and “hear” when reading the text to what they perceive when they listen or watch.	7. Compare and contrast a written story, drama, or poem to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, or camera focus and angles in a film).	7. 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.
8. (Not applicable to literature)	8. (Not applicable to literature)	8. (Not applicable to literature)

Grade 6 students:

Grade 7 students:

Grade 8 students:

Integration of Knowledge and Ideas

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9. Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.</p> | <p>9. Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history.</p> | <p>9. 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.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Range of Reading and Level of Text Complexity

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> | <p>10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p> | <p>10. 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.</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Responding to Literature

11. Recognize, interpret, and make connections in narratives, poetry, and drama, ethically and artistically to other texts, ideas, cultural perspectives, eras, personal events, and situations.
- a. Self-select text based on personal preferences.
 - b. Use established criteria to classify, select, and evaluate texts to make informed judgments about the quality of the pieces.

Responding to Literature

11. Recognize, interpret, and make connections in narratives, poetry, and drama, ethically and artistically to other texts, ideas, cultural perspectives, eras, personal events, and situations.
- a. Self-select text based on personal preferences.
 - b. Use established criteria to classify, select, and evaluate texts to make informed judgments about the quality of the pieces.

Responding to Literature

11. Interpret, analyze, and evaluate narratives, poetry, and drama, artistically and ethically by making connections to: other texts, ideas, cultural perspectives, eras, personal events, and situations.
- a. Self-select text to develop personal preferences.
 - b. Establish and use criteria to classify, select, and evaluate texts to make informed judgments about the quality of the pieces.

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:

Grades 11–12 students:

<i>Key Ideas and Details</i>	
1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
2. Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.	2. Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.
3. Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	3. Analyze the impact of the author’s choices regarding how to develop and relate elements of a story or drama (e.g., where a story is set, how the action is ordered, how the characters are introduced and developed).
<i>Craft and Structure</i>	
4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language evokes a sense of time and place; how it sets a formal or informal tone).	4. Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)
5. Analyze how an author’s choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise.	5. Analyze how an author’s choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.
6. Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.	6. Analyze a case in which grasping point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).
<i>Integration of Knowledge and Ideas</i>	
7. Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment (e.g., Auden’s “Musée des Beaux Arts” and Breughel’s <i>Landscape with the Fall of Icarus</i>). a. Analyze works by authors or artists who represent diverse world cultures.	7. Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text. (Include at least one play by Shakespeare and one play by an American dramatist.) a. Analyze multiple interpretations of full-length works by authors who represent diverse world cultures.
8. (Not applicable to literature)	8. (Not applicable to literature)

Grades 9–10 students:

9. Analyze how an author draws on and transforms source material in a specific work (e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare).

Range of Reading and Level of Text Complexity

10. By the end of grade 9, read and comprehend literature, including stories, dramas, and poems, in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.

By the end of grade 10, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 9–10 text complexity band independently and proficiently.

Responding to Literature

11. Interpret, analyze, and evaluate narratives, poetry, and drama, aesthetically and ethically by making connections to: other texts, ideas, cultural perspectives, eras, personal events and situations.
 - a. Self-select text to respond and develop innovative perspectives.
 - b. Establish and use criteria to classify, select, and evaluate texts to make informed judgments about the quality of the pieces.

Grades 11–12 students:

9. Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics.

10. By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.

By the end of grade 12, read and comprehend literature, including stories, dramas, and poems,
at the high end of the grades 11–CCR text complexity band independently and proficiently.

Responding to Literature

11. Interpret, analyze, and evaluate narratives, poetry, and drama, aesthetically and philosophically by making connections to: other texts, ideas, cultural perspectives, eras, personal events, and situations.
 - a. Self-select text to respond and develop innovative perspectives.
 - b. Establish and use criteria to classify, select, and evaluate texts to make informed judgments about the quality of the pieces.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Key Ideas and Details		
1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.	2. 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.
3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).	3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.	4. 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.
5. Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.	5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas.	5. 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.
6. Determine an author’s point of view or purpose in a text and explain how it is conveyed in the text.	6. Determine an author’s point of view or purpose in a text and analyze how the author distinguishes his or her position from that of others.	6. 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		
7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	7. Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium’s portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).	7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are	8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning	8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is

supported by reasons and evidence from claims that are not.	is sound and the evidence is relevant and sufficient to support the claims.	sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
<p>9. Compare and contrast one author’s presentation of events with that of another (e.g., a memoir written by and a biography on the same person).</p> <p>a. Use their experience and their knowledge of language and logic, as well as culture, to think analytically, address problems creatively, and advocate persuasively.</p>	<p>9. Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.</p> <p>a. Use their experience and their knowledge of language and logic, as well as culture, to think analytically, address problems creatively, and advocate persuasively.</p>	<p>9. 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.</p> <p>a. Use their experience and their knowledge of language and logic, as well as culture, to think analytically, address problems creatively, and advocate persuasively.</p>

Reading Standards for Informational Text 6–12

[RI]

Grade 6 students:	Grade 7 students:	Grade 8 students:
<i>Range of Reading and Level of Text Complexity</i>		
<p>10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p>	<p>10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.</p>	<p>10. 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.</p>

Reading Standards for Informational Text 6–12

[RI]

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:

Grades 11–12 students:

Key Ideas and Details

1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
 - a. Develop factual, interpretive, and evaluative questions for further exploration of the topic(s).
2. Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
3. Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.

1. Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
 - a. Develop factual, interpretive, and evaluative questions for further exploration of the topic(s).
2. Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
3. Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

Craft and Structure

4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
5. Analyze in detail how an author’s ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).
6. Determine an author’s point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.

4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines *faction* in *Federalist* No. 10).
5. Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
6. Determine an author’s point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

Integration of Knowledge and Ideas

7. Analyze various accounts of a subject told in different mediums (e.g., a person’s life story in both print and multimedia), determining which details are emphasized in each account.
8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

7. Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
8. Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning (e.g., in U.S. Supreme Court majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., *The Federalist*, presidential addresses).

Grades 9–10 students:

9. Analyze seminal U.S. documents of historical and literary significance (e.g., Washington’s Farewell Address, the Gettysburg Address, Roosevelt’s Four Freedoms speech, King’s “Letter from Birmingham Jail”), including how they address related themes and concepts.
- a. Read, annotate, and analyze informational texts on topics related to diverse and non-traditional cultures and viewpoints.

Grades 11–12 students:

9. Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including The Declaration of Independence, the Preamble to the Constitution, the Bill of Rights, and Lincoln’s Second Inaugural Address) for their themes, purposes, and rhetorical features.
- a. Read, annotate, and analyze informational texts on topics related to diverse and non-traditional cultures and viewpoints.

Range of Reading and Level of Text Complexity

10. By the end of grade 9, read and comprehend literary nonfiction in the grades 9–10 text complexity band proficiently, with scaffolding as needed at the high end of the range.
- By the end of grade 10, read and comprehend literary nonfiction at the high end of the grades 9–10 text complexity band independently and proficiently.

10. By the end of grade 11, read and comprehend literary nonfiction in the grades 11–CCR text complexity band proficiently, with scaffolding as needed at the high end of the range.
- By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11–CCR text complexity band independently and proficiently.
-

College and Career Readiness Anchor Standards for Writing

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

*Text Types and Purposes**

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. 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 tasks, purposes, and audiences.

Responding to Literature

11. Develop personal, cultural, textual, and thematic connections within and across genres as they respond to texts through written, digital, and oral presentations, employing a variety of media and genres.

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career- ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within argument and explanation within narrative—to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.

*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

Writing Standards 6–12

[W]

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Text Types and Purposes		
<p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ul style="list-style-type: none">a. Introduce claim(s) and organize the reasons and evidence clearly.b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.d. Establish and maintain a formal style.e. Provide a concluding statement or section that follows from the argument presented.	<p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ul style="list-style-type: none">a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.d. Establish and maintain a formal style.e. Provide a concluding statement or section that follows from and supports the argument presented.	<p>1. Write arguments to support claims with clear reasons and relevant evidence.</p> <ul style="list-style-type: none">a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.d. Establish and maintain a formal style.e. Provide a concluding statement or section that follows from and supports the argument presented.
<p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ul style="list-style-type: none">a. Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	<p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ul style="list-style-type: none">a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	<p>2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.</p> <ul style="list-style-type: none">a. 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.

Grade 6 students:	Grade 7 students:	Grade 8 students:
<ul style="list-style-type: none"> b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from the information or explanation presented. 	<ul style="list-style-type: none"> b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented. 	<ul style="list-style-type: none"> b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.

Writing Standards 6–12

[W]

Grade 6 students:	Grade 7 students:	Grade 8 students:
<i>Text Types and Purposes (continued)</i>		
<p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events. e. Provide a conclusion that follows from the narrated experiences or events. 	<p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. 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. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. 	<p>3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. 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. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. c. 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. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.

Grade 6 students:**Grade 7 students:****Grade 8 students:**

- e. Provide a conclusion that follows from and reflects on the narrated experiences or events.

- e. Provide a conclusion that follows from and reflects on the narrated experiences or events.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
a. Produce text (print or nonprint) that explores a variety of cultures and perspectives.

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
a. Produce text (print or nonprint) that explores a variety of cultures and perspectives.

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
a. Produce text (print or nonprint) that explores a variety of cultures and perspectives.

5. 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. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 66.)

5. 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. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 7 on page 66.)

5. 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. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 8 on page 66.)

6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.

6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.

6. 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.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Research to Build and Present Knowledge		
<p>7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.</p>	<p>7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.</p>	<p>7. 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.</p>
<p>8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.</p>	<p>8. 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.</p>	<p>8. 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.</p>
<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 6 Reading standards</i> to literature (e.g., “Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics”).</p> <p>b. Apply <i>grade 6 Reading standards</i> to literary nonfiction (e.g., “Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not”).</p>	<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 7 Reading standards</i> to literature (e.g., “Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history”).</p> <p>b. Apply <i>grade 7 Reading standards</i> to literary nonfiction (e.g., “Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims”).</p>	<p>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</p> <p>a. Apply <i>grade 8 Reading standards</i> 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”).</p> <p>b. Apply <i>grade 8 Reading standards</i> 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”).</p>
Range of Writing		
<p>10. 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.</p>	<p>10. 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.</p>	<p>10. 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.</p>

Responding to Literature

11. Create and present a text or art work in response to a literary work.
- Develop a perspective or theme supported by relevant details.
 - Recognize and illustrate social, historical, and cultural features in the presentation of literary texts.
 - Create poetry, stories, plays, and other literary forms (e.g. videos, art work).

audiences.

Responding to Literature

11. Create a presentation, art work, or text in response to a literary work with a commentary that identifies connections.
- Make deliberate, personal, cultural, textual, and thematic connections across genres.
 - Create poetry, stories, plays, and other literary forms (e.g. videos, art work).

Responding to Literature

11. Create a presentation, art work, or text in response to a literary work with a commentary that identifies connections and explains divergences from the original.
- Make well-supported personal, cultural, textual, and thematic connections across genres.
 - Create poetry, stories, plays, and other literary forms (e.g. videos, art work).

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:**Grades 11–12 students:*****Text Types and Purposes***

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Explore and inquire into areas of interest to formulate an argument. <ol style="list-style-type: none"> a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
 2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. <ol style="list-style-type: none"> a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. | <ol style="list-style-type: none"> 1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Explore and inquire into areas of interest to formulate an argument. <ol style="list-style-type: none"> a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
 2. Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. <ol style="list-style-type: none"> a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Grades 9–10 students:

- d. Use precise language and domain-specific vocabulary to manage the complexity of the topic.
- e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

Grades 11–12 students:

- d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
 - e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
-

Grades 9–10 students:**Grades 11–12 students:*****Text Types and Purposes (continued)***

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative. f. Adapt voice, awareness of audience, and use of language to accommodate a variety of cultural contexts. | <p>3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.</p> <ul style="list-style-type: none"> a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative. f. Adapt voice, awareness of audience, and use of language to accommodate a variety of cultural contexts. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Production and Distribution of Writing

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> | <p>4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)</p> |
| <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 68.)</p> | <p>5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12 on page 68.)</p> |
| <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.</p> | <p>6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p> |

Grades 9–10 students:**Grades 11–12 students:****Research to Build and Present Knowledge**

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
 - a. Explore topics dealing with different cultures and world viewpoints.
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
 - a. Explore topics dealing with different cultures and world viewpoints.
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

Writing Standards 6–12

[W]

Grades 9–10 students:**Grades 11–12 students:****Research to Build and Present Knowledge (continued)**

9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
 - a. Apply *grades 9–10 Reading standards* to literature (e.g., “Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]”).
 - b. Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., “Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning”).

9. Draw evidence from literary or informational texts to support analysis, reflection, and research.
 - a. Apply *grades 11–12 Reading standards* to literature (e.g., “Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics”).
 - b. Apply *grades 11–12 Reading standards* to literary nonfiction (e.g., “Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]”).

Range of Writing

10. 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 tasks, purposes, and audiences.

10. 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 tasks, purposes, and audiences.

Responding to Literature**Responding to Literature**

-
- 11.** Create literary texts that demonstrate knowledge and understanding of a wide variety of texts of recognized literary merit.
- a. Engage in a wide range of prewriting experiences, such as using a variety of visual representations, to express personal, social, and cultural connections and insights.
 - b. Identify, analyze, and use elements and techniques of various genres of literature.
 - c. Develop critical and interpretive texts from more than one perspective, including historical and cultural.
 - d. Create poetry, stories, plays, and other literary forms (e.g. videos, art work).

- 11.** Create interpretive and responsive texts to demonstrate knowledge and a sophisticated understanding of the connections between life and the literary work.
- a. Engage in using a wide range of prewriting strategies, such as visual representations and the creation of factual and interpretive questions, to express personal, social and cultural connections and insights.
 - b. Identify, analyze, and use elements and techniques of various genres of literature, such as allegory, stream of consciousness, irony, and ambiguity, to affect meaning.
 - c. Develop innovative perspectives on texts, including historical, cultural, sociological, and psychological contexts.
 - d. Create poetry, stories, plays, and other literary forms (e.g. videos, art work).

College and Career Readiness Anchor Standards for Speaking and Listening

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Comprehension and Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Note on range and content of student speaking and listening

To become college and career ready, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains. They must be able to contribute appropriately to these conversations, to make comparisons and contrasts, and to analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline. Whatever their intended major or profession, high school graduates will depend heavily on their ability to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.

New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. The Internet has accelerated the speed at which connections between speaking, listening, reading, and writing can be made, requiring that students be ready to use these modalities nearly simultaneously. Technology itself is changing quickly, creating a new urgency for students to be adaptable in response to change.

Speaking and Listening Standards 6–12

[SL]

The following standards for grades 6–12 offer a focus for instruction in each year to help ensure that students gain adequate mastery of a range of skills and applications.

Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Grade 6 students:

Grade 7 students:

Grade 8 students:

Comprehension and Collaboration

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 6 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <ol style="list-style-type: none">Come to discussions prepared, having read or studied required material; 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, set specific goals and deadlines, and define individual roles as needed.Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.Seek to understand and communicate with individuals from different perspectives and cultural backgrounds. | <p>1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 7 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <ol style="list-style-type: none">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, track progress toward specific goals and deadlines, and define individual roles as needed.Pose questions that elicit elaboration and respond to others’ questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.Acknowledge new information expressed by others and, when warranted, modify their own views.Seek to understand other perspectives and cultures and communicate effectively with audiences or individuals from varied backgrounds. | <p>1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 8 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly.</p> <ol style="list-style-type: none">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.Seek to understand other perspectives and cultures and communicate effectively with audiences or individuals from varied backgrounds. |
| <p>2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.</p> <ol style="list-style-type: none">Use their experience and their knowledge of language and logic, as well as culture, to think | <p>2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.</p> <ol style="list-style-type: none">Use their experience and their knowledge of language and logic, as well as culture, to think | <p>2. 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.</p> |

Grade 6 students:	Grade 7 students:	Grade 8 students:
analytically, address problems creatively, and advocate persuasively	analytically, address problems creatively, and advocate persuasively	a. Use their experience and their knowledge of language and logic, as well as culture, to think analytically, address problems creatively, and advocate persuasively.
3. Delineate a speaker’s argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.	3. Delineate a speaker’s argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.	3. 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.
<i>Presentation of Knowledge and Ideas</i>		
4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.	4. 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. 5.
5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.	5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 66 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 on page 66 for specific expectations.)	6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 66 for specific expectations.)

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:**Grades 11–12 students:*****Comprehension and Collaboration***

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grades 9–10 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly and persuasively. <ol style="list-style-type: none"> a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. e. Seek to understand other perspectives and cultures and communicate effectively with audiences or individuals from varied backgrounds. 2. Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. 3. Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. | <ol style="list-style-type: none"> 1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grades 11–12 topics, texts, and issues</i>, building on others’ ideas and expressing their own clearly and persuasively. <ol style="list-style-type: none"> a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task. e. Seek to understand other perspectives and cultures and communicate effectively with audiences or individuals from varied backgrounds. 2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. 3. Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Presentation of Knowledge and Ideas

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 4. Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the | <ol style="list-style-type: none"> 4. Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<p>organization, development, substance, and style are appropriate to purpose, audience, and task.</p>	<p>alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
<p>5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p>	<p>5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p>
<p>6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on pages 68 for specific expectations.)</p>	<p>6. Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 68 for specific expectations.)</p>

College and Career Readiness Anchor Standards for Language

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Conventions of Standard English

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Knowledge of Language

3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Note on range and content of student language use

To be college and career ready in language, students must have firm control over the conventions of standard English. At the same time, they must come to appreciate that language is as at least as much a matter of craft as of rules and be able to choose words, syntax, and punctuation to express themselves and achieve particular functions and rhetorical effects. They must also have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content. They need to become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them. They must learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.

Language Standards 6–12

[L]

The following standards for grades 6–12 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year’s grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 57 for a complete listing and Appendix A for an example of how these skills develop in sophistication.

Grade 6 students:	Grade 7 students:	Grade 8 students:
Conventions of Standard English		
<ol style="list-style-type: none">1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<ol style="list-style-type: none">a. Ensure that pronouns are in the proper case (subjective, objective, possessive).b. Use intensive pronouns (e.g., <i>myself</i>, <i>ourselves</i>).c. Recognize and correct inappropriate shifts in pronoun number and person.*d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).*e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.*	<ol style="list-style-type: none">1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<ol style="list-style-type: none">a. Explain the function of phrases and clauses in general and their function in specific sentences.b. Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.*	<ol style="list-style-type: none">1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<ol style="list-style-type: none">a. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences.b. Form and use verbs in the active and passive voice.c. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood.d. Recognize and correct inappropriate shifts in verb voice and mood.*
<ol style="list-style-type: none">2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<ol style="list-style-type: none">a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.*b. Spell correctly.	<ol style="list-style-type: none">2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<ol style="list-style-type: none">a. Use a comma to separate coordinate adjectives (e.g., <i>It was a fascinating, enjoyable movie</i> but not <i>He wore an old[,] green shirt</i>).b. Spell correctly.	<ol style="list-style-type: none">2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<ol style="list-style-type: none">a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break.b. Use an ellipsis to indicate an omission.c. Spell correctly.
Knowledge of Language		
<ol style="list-style-type: none">3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<ol style="list-style-type: none">a. Vary sentence patterns for meaning, reader/listener interest, and style.*	<ol style="list-style-type: none">3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.	<ol style="list-style-type: none">3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.

b. Maintain consistency in style and tone.*

a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.*

a. 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).

Grade 6 students:

Grade 7 students:

Grade 8 students:

Vocabulary Acquisition and Use

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 6 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> 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., <i>audience, auditory, audible</i>). Consult 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). | <p>4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grade 7 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> 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., <i>belligerent, bellicose, rebel</i>). 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). | <p>4. Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on <i>grade 8 reading and content</i>, choosing flexibly from a range of strategies.</p> <ol style="list-style-type: none"> 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., <i>precede, recede, secede</i>). 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). |
| <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figures of speech (e.g., personification) in context. Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words. Distinguish among the connotations (associations) of words with similar | <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> Interpret figures of speech (e.g., literary, biblical, and mythological allusions) in context. Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., <i>refined, respectful, polite, diplomatic, condescending</i>). | <p>5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.</p> <ol style="list-style-type: none"> 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., <i>bullheaded, willful, firm, persistent, resolute</i>). |

denotations (definitions) (e.g., *stingy*, *scrimping*, *economical*, *unwasteful*, *thrifty*).

6. 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.

6. 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.

6. 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.

The CCR anchor standards and high school grade-specific standards work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 9–10 students:**Grades 11–12 students:****Conventions of Standard English**

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. <ol style="list-style-type: none"> a. Use parallel structure.* b. Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations. 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. <ol style="list-style-type: none"> a. Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses. b. Use a colon to introduce a list or quotation. c. Spell correctly. | <ol style="list-style-type: none"> 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. <ol style="list-style-type: none"> a. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested. b. Resolve issues of complex or contested usage, consulting references (e.g., <i>Merriam-Webster's Dictionary of English Usage</i>, <i>Garner's Modern American Usage</i>) as needed. 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. <ol style="list-style-type: none"> a. Observe hyphenation conventions. b. Spell correctly. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Knowledge of Language

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. <ol style="list-style-type: none"> a. Write and edit work so that it conforms to the guidelines in a style manual (e.g., <i>MLA Handbook</i>, <i>Turabian's Manual for Writers</i>) appropriate for the discipline and writing type. | <ol style="list-style-type: none"> 3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening. <ol style="list-style-type: none"> a. Vary syntax for effect, consulting references (e.g., <i>Tufte's Artful Sentences</i>) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Vocabulary Acquisition and Use

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grades 9–10 reading and content</i>, choosing flexibly from a range of strategies. <ol style="list-style-type: none"> a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., <i>analyze, analysis, analytical; advocate, advocacy</i>). b. 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, its part of speech, or its etymology. | <ol style="list-style-type: none"> 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on <i>grades 11–12 reading and content</i>, choosing flexibly from a range of strategies. <ol style="list-style-type: none"> a. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase. b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., <i>conceive, conception, conceivable</i>). c. 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, its part of speech, its etymology, or its standard usage. d. 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). |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- c. 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).
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text.
 - Analyze nuances in the meaning of words with similar denotations.
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.
 - Analyze nuances in the meaning of words with similar denotations.
6. Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Language Progressive Skills, by Grade

The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.

Standard	Grade(s)							
	3	4	5	6	7	8	9–10	11–12
L.3.1f. Ensure subject-verb and pronoun-antecedent agreement.								
L.3.3a. Choose words and phrases for effect.								
L.4.1f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.								
L.4.1g. Correctly use frequently confused words (e.g., <i>to/too/two</i> ; <i>there/their</i>).								
L.4.3a. Choose words and phrases to convey ideas precisely.*								
L.4.3b. Choose punctuation for effect.								
L.5.1d. Recognize and correct inappropriate shifts in verb tense.								
L.5.2a. Use punctuation to separate items in a series.†								
L.6.1c. Recognize and correct inappropriate shifts in pronoun number and person.								

L.6.1d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).								
L.6.1e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.								
L.6.2a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.								
L.6.3a. Vary sentence patterns for meaning, reader/listener interest, and style.‡								
L.6.3b. Maintain consistency in style and tone.								
L.7.1c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.								
L.7.3a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.								
L.8.1d. Recognize and correct inappropriate shifts in verb voice and mood.								
L.9–10.1a. Use parallel structure.								

* Subsumed by L.7.3a

† Subsumed by L.9–10.1a

‡ Subsumed by L.11–12.3a

Standard 10: Range, Quality, and Complexity of Student Reading 6–12

Measuring Text Complexity: Three Factors



Qualitative evaluation of the text: Levels of meaning, structure, language conventionality and clarity, and knowledge demands

Quantitative evaluation of the text: Readability measures and other scores of text complexity

Matching reader to text and task: Reader variables (such as motivation, knowledge, and experiences) and task variables (such as purpose and the complexity generated by the task assigned and the questions posed)

Note: More detailed information on text complexity and how it is measured is contained in Appendix A.

Range of Text Types for 6–12

Students in grades 6–12 apply the Reading standards to the following range of text types, with texts selected from a broad range of cultures and periods.

Literature			Informational Text
Stories	Drama	Poetry	Literary Nonfiction
Includes the subgenres of adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, and graphic novels	Includes one-act and multi-act plays, both in written form and on film	Includes the subgenres of narrative poems, lyrical poems, free verse poems, sonnets, odes, ballads, and epics	Includes the subgenres of exposition, argument, and functional text in the form of personal essays, speeches, opinion pieces, essays about art or literature, biographies, memoirs, journalism, and historical, scientific, technical, or economic accounts (including digital sources) written for a broad audience

Texts Illustrating the Complexity, Quality, and Range of Student Reading 6–12

Literature: Stories, Dramas, Poetry	Informational Texts: Literary Nonfiction
6–8	
6–8	
9–10	
9–10	
11– CCR	
11– CCR	

Note: Given space limitations, the illustrative texts listed above are meant only to show individual titles that are representative of a range of topics and genres. (See Appendix B for excerpts of these and other texts illustrative of grades 6–12 text complexity, quality, and range.) At a curricular or instructional level, within and across grade levels, texts need to be selected around topics or themes that generate knowledge and allow students to study those topics or themes in depth.

Appendix IV

CCSS FOR LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS

College and Career Readiness Anchor Standards for Reading

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

Key Ideas and Details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

Note on range and content of student reading

Reading is critical to building knowledge in history/social studies as well as in science and technical subjects. College and career ready reading in these fields requires an appreciation of the norms and conventions of each discipline, such as the kinds of evidence used in history and science; an understanding of domain-specific words and phrases; an attention to precise details; and the capacity to evaluate intricate arguments, synthesize complex information, and follow detailed descriptions of events and concepts. In history/social studies, for example, students need to be able to analyze, evaluate, and differentiate primary and secondary sources. When reading scientific and technical texts, students need to be able to gain knowledge from challenging texts that often make extensive use of elaborate diagrams and data to convey information and illustrate concepts. Students must be able to read complex informational texts in these fields with independence and confidence because the vast majority of reading in college and workforce training programs will be sophisticated nonfiction. It is important to note that these Reading standards are meant to complement the specific content demands of the disciplines, not replace them.

Range of Reading and Level of Text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see “Research to Build and Present Knowledge” in Writing for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

Reading Standards for Literacy in History/Social Studies 6–12

[RH]

The standards below begin at grade 6; standards for K–5 reading in history/social studies, science, and technical subjects are integrated into the K–5 Reading standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of primary and secondary sources.	1. Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.	1. Cite specific textual evidence to support analysis of primary and secondary sources, connecting insights gained from specific details to an understanding of the text as a whole.
2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.	2. Determine the central ideas or information of a primary or secondary source; provide an accurate summary that makes clear the relationships among the key details and ideas.
3. Identify key steps in a text’s description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).	3. Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.	3. Evaluate various explanations for actions or events and determine which explanation best accords with textual evidence, acknowledging where the text leaves matters uncertain.
Craft and Structure		
4. Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social studies.	4. Determine the meaning of words and phrases as they are used in a text, including analyzing how an author uses and refines the meaning of a key term over the course of a text (e.g., how Madison defines <i>faction</i> in <i>Federalist</i> No. 10).
5. Describe how a text presents information (e.g., sequentially, comparatively, causally).	5. Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.	5. Analyze in detail how a complex primary source is structured, including how key sentences, paragraphs, and larger portions of the text contribute to the whole.
6. Identify aspects of a text that reveal an author’s point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).	6. Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.	6. Evaluate authors’ differing points of view on the same historical event or issue by assessing the authors’ claims, reasoning, and evidence.
Integration of Knowledge and Ideas		

7. Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	7. Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.	7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
8. Distinguish among fact, opinion, and reasoned judgment in a text.	8. Assess the extent to which the reasoning and evidence in a text support the author's claims.	8. Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.
9. Analyze the relationship between a primary and secondary source on the same topic.	9. Compare and contrast treatments of the same topic in several primary and secondary sources.	9. Integrate information from diverse sources, both primary and secondary, into a coherent understanding of an idea or event, noting discrepancies among sources.

Range of Reading and Level of Text Complexity

10. By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend history/social studies texts in the grades 11-CCR text complexity band independently and proficiently.
----------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------

Reading Standards for Literacy in Science and Technical Subjects 6–12

[RST]

Grades 6–8 students:

Grades 9–10 students:

Grades 11–12 students:

Key Ideas and Details

1. Cite specific textual evidence to support analysis of science and technical texts.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
2. Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.	2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Craft and Structure

4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6–8 texts and topics</i> .	4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9–10 texts and topics</i> .	4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i> .
5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., <i>force, friction, reaction force, energy</i>).	5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. | 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. | 6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. |
|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Integration of Knowledge and Ideas

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). | 7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. | 7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. |
| 8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. | 8. Assess the extent to which the reasoning and evidence in a text support the author’s claim or a recommendation for solving a scientific or technical problem. | 8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. |
| 9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. | 9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. | 9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. |

Range of Reading and Level of Text Complexity

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently. | 10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. | 10. By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently. |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|

College and Career Readiness Anchor Standards for Writing

The grades 6–12 standards on the following pages define what students should understand and be able to do by the end of each grade span. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

*Text Types and Purposes**

1. Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Range of Writing

10. 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 tasks, purposes, and audiences.

*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

Note on range and content of student writing

For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college and career ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline and the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and long time frames throughout the year.

The standards below begin at grade 6; standards for K–5 writing in history/social studies, science, and technical subjects are integrated into the K–5 Writing standards. The CCR anchor standards and high school standards in literacy work in tandem to define college and career readiness expectations—the former providing broad standards, the latter providing additional specificity.

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Text Types and Purposes		
<p>1. Write arguments focused on <i>discipline-specific content</i>.</p> <ol style="list-style-type: none"> Introduce claim(s) about a topic or issue, 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, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. 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. 	<p>1. Write arguments focused on <i>discipline-specific content</i>.</p> <ol style="list-style-type: none"> Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. Provide a concluding statement or section that follows from or supports the argument presented. 	<p>1. Write arguments focused on <i>discipline-specific content</i>.</p> <ol style="list-style-type: none"> Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience’s knowledge level, concerns, values, and possible biases. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. Provide a concluding statement or section that follows from or supports the argument presented.

Grades 6–8 students:

Grades 9–10 students:

Grades 11–12 students:

Text Types and Purposes (continued)

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <ul style="list-style-type: none"> a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style and objective tone. | <p>2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <ul style="list-style-type: none"> a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. | <p>2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <ul style="list-style-type: none"> a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary and techniques such as |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).
3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)	3. (See note; not applicable as a separate requirement)

Note: Students’ narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6–12

[WHST]

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
<i>Production and Distribution of Writing</i>		

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. 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.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.	5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Research to Build and Present Knowledge

7. 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.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
8. 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.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism

and overreliance on any one source and following a standard format for citation.

9. Draw evidence from informational texts to support analysis, reflection, and research.

9. Draw evidence from informational texts to support analysis, reflection, and research.

9. Draw evidence from informational texts to support analysis, reflection, and research.

Range of Writing

10. Write routinely over extended time frames (time for 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.

10. Write routinely over extended time frames (time for 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.

10. Write routinely over extended time frames (time for 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.

Appendix V

COMMON CORE STATES STANDARDS FOR MATHEMATICS

The Common Core State Standards Initiative is a state-led effort coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The standards were developed in collaboration with teachers, school administrators, and experts, to provide a clear and consistent framework to prepare our children for college and the workforce.

The NGA Center and CCSSO received initial feedback on the draft standards from national organizations representing, but not limited to, teachers, postsecondary educators (including community colleges), civil rights groups, English language learners, and students with disabilities. Following the initial round of feedback, the draft standards were opened for public comment, receiving nearly 10,000 responses.

The standards are informed by the highest, most effective models from states across the country and countries around the world, and provide teachers and parents with a common understanding of what students are expected to learn. Consistent standards will provide appropriate benchmarks for all students, regardless of where they live.

These standards define the knowledge and skills students should have within their K-12 education careers so that they will graduate high school able to succeed in entry-level, credit-bearing academic college courses and in workforce training programs. The standards:

- Are aligned with college and work expectations;
- Are clear, understandable and consistent;
- Include rigorous content and application of knowledge through high order skills;
- Build upon strengths and lessons of current state standards;
- Are informed by other top performing countries, so that all students are prepared to succeed in our global economy and society; and
- Are evidence based.

Grade High School Standards for Mathematical Practice (SMP)

The K.12 Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. This page gives examples of what the practice standards look like at the specified grade level.

<i>Standards</i>	<i>Explanations and Examples</i>
Students are expected to: SMP1. Make sense of problems and persevere in solving them.	High school students start to examine problems by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They

	<p>consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. By high school, students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. They check their answers to problems using different methods and continually ask themselves. “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.</p>
<p>Students are expected to: SMP2. Reason abstractly and quantitatively.</p>	<p>High school students seek to make sense of quantities and their relationships in problem situations. They abstract a given situation and represent it symbolically, manipulate the representing symbols, and pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Students use quantitative reasoning to create coherent representations of the problem at hand; consider the units involved; attend to the meaning of quantities, not just how to compute them; and know and flexibly use different properties of operations and objects.</p>
<p>Students are expected to: SMP3. Construct viable arguments and critique the reasoning of others.</p>	<p>High school students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. High school students are also able to compare the effectiveness of</p>

	two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. High school students learn to determine domains, to which an argument applies, listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
<i>Standards</i>	<i>Explanations and Examples</i>
Students are expected to: SMP4. Model with mathematics.	High school students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. High school students making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
Students are expected to: SMP5. Use appropriate tools strategically.	High school students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. High school students should be sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, high school students analyze graphs of functions and solutions generated using a graphing calculator. They

	<p>detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. They are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts</p>
<p>Students are expected to: SMP9. Attend to precision</p>	<p>High school students try to communicate precisely to others by using clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. By the time they reach high school they have learned to examine claims and make explicit use of definitions.</p>

<i>Standards</i>	<i>Explanations and Examples</i>
<p>Students are expected to: SMP7. Look for and make use of structure.</p>	<p>By high school, students look closely to discern a pattern or structure. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y. High school students use these patterns to create equivalent expressions, factor and solve equations, and compose functions, and transform figures.</p>
<p>Students are expected to: SMP8. Look for and express regularity in repeated reasoning.</p>	<p>High school students notice if calculations are repeated, and look both for general methods and for shortcuts. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, derive formulas or make generalizations, high school students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.</p>

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

A.REI.1. 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.

A.REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Solve equations and inequalities in one variable.

A.REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.REI.4. 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.

A.REI.5. 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.

A.REI.9. Solve systems of linear equations exactly and approximately (e.g. with graphs), focusing on pairs of linear equations in two variables.

A.REI.7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.

A.REI.8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.

A.REI.9. (+) 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.

A.REI.10. 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).

A.REI.11. 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.

A.REI.12. 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.

Understand the concept of a function and use function notation.

F.IF.1. 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 $y = f(x)$.

F.IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$. $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

Interpret functions that arise in applications in terms of the context.

F.IF.4. 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.

F.IF.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.9. 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.

F.IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

F.IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. 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.

b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, and classify them as representing exponential growth or decay.

F.IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

Experiment with transformations in the plane

G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

G.CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g. translation versus horizontal stretch).

G.CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

G.CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions

G.CO.9. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

G.CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

G.CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems

G.CO.9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

G.CO.10. Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° ; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

G.CO.11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

Make geometric constructions

G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

G.CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

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

S.ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.2. 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.

S.ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S.ID.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

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

S.ID.5. 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.

S.ID.9. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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.

b. Informally assess the fit of a function by plotting and analyzing residuals.

c. Fit a linear function for a scatter plot that suggests a linear association.

Interpret linear models

S.ID.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

S.ID.9. Distinguish b