Mississippi Secondary Curriculum Frameworks in Career and Technical Education,

2020 Business, Marketing, and Finance

Program CIP: 52.0101 – Business/Commerce, General

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Published by:

Office of Career and Technical Education
Mississippi Department of Education
Jackson, MS 39205

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The Research and Curriculum Unit (RCU), located in Starkville, as part of Mississippi State University (MSU), was established to foster educational enhancements and innovations. In keeping with the land-grant mission of MSU, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Acknowledgments

The business, marketing, and finance curriculum is being presented to the Mississippi State Board of Education on October 10, 2019. The following persons are serving on the State Board at this time:

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The following MDE and RCU managers and specialists assisted in the development of the business, marketing, and finance curriculum:

Wendy Clemons, associate superintendent of education for the Office of Career and Technical Education (CTE) and Workforce Development at the Mississippi Department of Education (MDE), supported the RCU and the teachers throughout the development of the precision machining framework and supporting materials.
Dr. Aimee Brown, bureau director for the Office of Career and Technical Education, supported the developmental and implementation process of the curriculum framework and supporting materials.

Kenny Langley, instructional design specialist for the RCU at MSU, researched and co-authored this framework. kenny.langley@rcu.msstate.edu

Sam Watts, instructional design specialist for the RCU at MSU, researched and co-authored this framework. sam.watts@rcu.msstate.edu

Appreciation is expressed to the following professionals, who provided guidance and insight throughout the development process:

Betsey Smith, director for the RCU at MSU
Brad Skelton, curriculum manager for the RCU at MSU
Melissa Luckett, instructional design specialist for the RCU at MSU

Also, special thanks are extended to the task force members, consisting of teachers, professors, agency members, and industry professionals who contributed teaching, assessment, and supporting materials that are included in the framework:

Sarah Belton, instructor at Crystal Springs High School, Crystal Springs
Keely Followay, instructor at Northeast Lauderdale High School, Meridian
Gay McElroy, instructor at Lawrence County Technical and Career Center, Monticello
Brookes Prince, instructor at Tupelo High School, Tupelo
Kate Scott, instructor at Forrest County Agricultural High School, Brooklyn
Vicki Sullivan, instructor at Olive Branch High School, Olive Branch
Debbie Wilson, instructor at Harrison County Career and Technical Center, Gulfport
Julie Williamson, instructor at Harrison County Career and Technical Center, Gulfport
Geanell Adams, MBA district coordinator at Hinds Community College, Raymond
Ron Aldridge, state director for the National Federation of Independent Business, Jackson
Rosalyn Campbell, career counselor coordinator at North Mississippi Medical Center, Tupelo
Joel Collier, professor in the College of Business, Mississippi State University, Starkville
Diane Fisher, associate dean for the College of Education and Psychology and program coordinator for the Business Technology Education program, University of Southern Mississippi, Hattiesburg
Kirk Hardy, plant controller at Yokohama Tire, West Point
Brittany Hill, vice president of BancorpSouth, Tupelo
Eric Hill, director for the Center for Entrepreneurship and Outreach, Mississippi State University, Starkville
Danny Holt, associate professor in Management and Information Systems, Mississippi State University, Starkville
Allie Hudson, vice president for the Mississippi Council on Economic Education, Jackson
Denise Jones, director of talent management for Ingalls Shipbuilding, Biloxi
Daniel Mortimer, manager of corporate recruitment for Blue Cross & Blue Shield of Mississippi, Jackson
Charlotte Pratt, vice president and diversity and inclusion officer for BancorpSouth, Tupelo
Pam Scott-Bracey, associate professor in Instructional Systems and Workforce Development, Mississippi State University, Starkville
James Wilcox, director of the Center for Economic and Entrepreneurship Education, University of Southern Mississippi, Hattiesburg
Carol Warren, payroll supervisor at BancorpSouth, Tupelo Standards

Standards

Standards and alignment crosswalks are referenced in the appendices. Mississippi's CTE business, marketing, and finance curriculum is aligned to the following standards:

National Business Education Association (NBEA) Standards
The National Business Education Association (NBEA) is the nation's leading professional organization, which recognizes that business education is essential for every student in today's rapidly changing society. Therefore, the NBEA strives to serve individuals and organizations involved in the instruction, administration, and deliverance of business education, standards, and materials. The Mississippi 2018 business, marketing, and finance curriculum is aligned to the NBEA's standards for business education in the areas of accounting, business law, career development, communication, computation, economics, personal finance, entrepreneurship, information technology, international business, management, and marketing. The NBEA recognizes that all students will take part in the economic system, encounter a diverse business environment, and use technology to manage information in some fashion during their lifetime. Thus, a curriculum focused on enabling students to become responsible citizens, capable of making wise economic decisions, will positively impact their personal and professional lives. NBEA [2007]. National Standards for Business Education. Retrieved from nbea.org/newsite/curriculum/standards/index

Entrepreneurship and Small Business (ESB) Credential
The Entrepreneurship and Small Business (ESB) Credential is the first of many certifications through the Certiport Business Fundamentals Certification Program by Pearson VUE. The objective of this exam is to ensure the mastery of key conceptual information crucial to success in the business field and entrepreneurship. The elements covered on this exam include items in opportunity recognition, entrepreneurship, starting a business, business operations, marketing, sales, and financial management. The ESB exam's objectives were referenced and reprinted with permission from Certiport 2018. Retrieved from certiport.pearsonvue.com/Certifications/ESB/Certification/Overview

College- and Career-Ready Standards
College- and career-readiness standards emphasize critical thinking, teamwork, and problem-solving skills. Students will learn the skills and abilities demanded by the workforce of today and the future. Mississippi adopted the *Mississippi College and Career Ready Standards* (*MS CCRS*) to provide a consistent, clear understanding of what students are expected to learn and so teachers and parents know what they need to do to help them. mde.k12.ms.us/MCCRS

International Society for Technology in Education Standards (ISTE)
 iste.org

Framework for 21st Century Learning

In defining 21st century learning, the Partnership for 21st Century Skills has embraced key themes and skill areas that represent the essential knowledge for the 21st century: global awareness; financial, economic, business and entrepreneurial literacy; civic literacy; health literacy; environmental literacy; learning and innovation skills; information, media, and technology skills; and life and career skills. *21 Framework Definitions*. Published 2015. p21.org/storage/documents/docs/P21_Framework_Definitions_New_Logo_2015.pdf

Preface

Secondary CTE programs in Mississippi face many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing applied learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments. This document provides information, tools, and solutions that will aid students, teachers, and schools in creating and implementing applied, interactive, and innovative lessons. Through best practices, alignment with national standards and certifications, community partnerships, and an entrepreneurship center concept, educators will be able to truly engage students in meaningful and collaborative learning opportunities.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, *Mississippi Code of 1972*, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, Ch. 487, §14; Laws, 1991, Ch. 423, §1; Laws, 1992, Ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act IV, 2007; and Every Student Succeeds Act, 2015).

Mississippi Teacher Professional Resources

The following are resources for Mississippi teachers:

Curriculum, Assessment, Professional Learning

Program resources can be found at the RCU's website, rcu.msstate.edu.

Learning Management System: An Online Resource

Learning management system information can be found at the RCU's website, under Professional Learning.

Should you need additional instructions, please call 662.325.2510.

Executive Summary

Pathway Description
Business, marketing, and finance is an innovative and advanced secondary CTE curriculum designed to integrate the former, separate programs of business management, finance, and marketing into one creative, challenging, and comprehensive pathway. The course is aligned to the *2018 Mississippi College- and Career-Readiness Standards for Economics*, with various aspects of those standards dispersed throughout the entirety of this two-year pathway. The course of study for the business, marketing, and finance pathway emphasizes hands-on experiences to prepare students in the areas of basic fiscal responsibility, entrepreneurship, career preparation, and/or continuing education in the field of business. This curriculum will also provide students with a strong understanding of what it means to be contributing, responsible, and productive members of society now and as they mature. Instructional strategies and activities implemented throughout the course of study are aligned to the National Business Education Association (NBEA) standards and assist students in meeting requirements for the Entrepreneurship and Small Business (ESB) credential. Integrated with current technology, community partnerships, interactive projects, and 21st century skills, this curriculum gives ample opportunities for educators to innovate and for students to fully engage in their educational experience.

College, Career, and Certifications
The business, marketing, and finance pathway prepares students for a plethora of opportunities through various routes. A solid understanding of economics, financial management, teamwork, and other business-related areas are keys to success in any job field and in life. Many students may choose to either own, operate, or work for a small business during or after their high school years. The ESB credential exam, in this case, would serve as an excellent way to evaluate student mastery of key business concepts. Students may also desire to pursue further education and/or training at the community college level or a four-year institution. Two-year technological programs, such as banking and finance technology, fashion merchandising, marketing management, real estate technology, and others, are available at the community college level. In general, postsecondary, two-year degrees are increasingly relevant and provide a strong return on investment. Students who desire to further their education even more may attend an institution of higher learning, where bachelor's, master's, and doctoral degrees are available in various areas, such as finance, accounting, business administration or management, sports administration, and many more. Finally, students can pursue several well-recognized business certifications, including those in human resource management, professional development and training, Six Sigma processing tools, and more.

Student Prerequisites
For students to experience success in the program, the following student prerequisites are suggested:

1. C or higher in English (the previous year)
2. C or higher in high school-level math (last course taken or the instructor can specify the level of math instruction needed)
3. Instructor approval and TABE reading score (eighth grade or higher)

or

1. TABE reading and math score (eighth grade or higher)
2. Instructor approval

or

1. Instructor approval

Assessment
The latest assessment blueprint for the curriculum can be found at rcu.msstate.edu/Curriculum/CurriculumDownload.

Grade Level and Class Size Recommendations
It is recommended that students enter this program as a 10th grader. Exceptions to this are a district-level decision based on class size, enrollment numbers, and maturity of student. The classroom and lab is designed to accommodate a maximum of 30 students.

Applied Academic Credit
Content of the business, marketing, and finance course is aligned to *Mississippi 2018 College- and Career-Ready Standards for Economics* and the NBEA standards (see above). Students who successfully complete the entire business, marketing, and finance program may be awarded a 0.5 credit in economics to satisfy graduation requirements. Total credit applied toward graduation is 4.0 CTE credits and a 0.5 academic credit for economics. To clarify, students must complete the pathway through either the four 1-credit courses (Fundamentals of Business, Marketing, Finance, and Management) or the two 2-credit courses (Business, Marketing, and Finance I; and Business, Marketing, and Finance II) to be able to receive the economics credit (see next page).

The latest academic credit information can be found at mde.k12.ms.us/ACCRED/AAS.
Once there, click the Mississippi Public School Accountability Standards Year tab.
Review the appendices for graduation options and superscript information regarding specific programs receiving academic credit.

Check this site often as it is updated frequently.

Teacher Licensure
The latest teacher licensure information can be found at mde.k12.ms.us/educator-licensure.

Professional Learning
If you have specific questions about the content of any of training sessions provided, please contact the RCU at 662.325.2510.

Course Outlines

Option 1: Four 1-Carnegie-Unit Courses

This curriculum consists of four 1-credit courses to be completed in the following sequence:

1. Fundamentals of Business and Entrepreneurship—Course Code: ######
2. Marketing—Course Code: ######
3. Management—Course Code: ######
4. Finance—Course Code: ######

Course Description: Fundamentals of Business and Entrepreneurship
This course is an introduction to personal and professional preparation and careers in the field of business, marketing, and finance. Much of this course relates to leadership, ethics, entrepreneurship, personal finance, and basic economics. Students are introduced to various student organizations and other topics as well, including safety in the workplace and personal financial income and decision-making. Participation in a student organization, field experiences, internships, and job shadowing is ongoing. Students will continue to develop skills toward meeting requirements for the ESB credential.

Course Description: Marketing
The majority of hours in this course are spent mastering the fundamentals of marketing, along with market research and analysis. Students will also spend time exploring careers in the business field, while practicing the skills necessary for career readiness. Students will continue to develop skills toward meeting requirements for the ESB credential and heavily participate in student organizations, field experiences, internships, and job shadowing.

Course Description: Management
This course is a continuation of year one, and students will continue to develop educational, career, and professional plans in the area of business. The majority of this course includes topics related to human resource management, strategy, and operations management. Students will also discover how to make wise decisions about personal purchasing and financial institution choices. Students will continue to develop skills toward meeting requirements for the ESB credential and heavily participate in student organizations, field experiences, internships, and job shadowing.

Course Description: Finance
The major topics of this course include financial and managerial accounting, along with budgets and forecasting in finance. Students will develop financial statements and budgets, as well as dive into the vast world of macroeconomics, personal risk management and credit. Further exploration of employment opportunities in business will continue in this course. Students will continue to develop skills toward meeting requirements for the ESB credential and heavily participate in student organizations, field experiences, internships, and job shadowing.

Fundamentals of Business and Entrepreneurship—Course Code: ######

Unit	Unit Name	Hours
1	Orientation, Safety, and Leadership	10
2	Introduction to Economics	20
3	Personal Finance - Decision Making and Income	20
4	Entrepreneurship	30
5	Microeconomics	20
6	Personal Finance: Money Management	25
Total		125

Marketing—Course Code: ######

Unit	Unit Name	Hours
7	Foundations of Marketing	75
8	Market Research and Analysis	25
9	Career Readiness and Exploration	35
Total		135

Management—Course Code: ######

Unit	Unit Name	Hours
10	Review of Workplace Safety and Security	5
11	International Economics	20
12	Personal Finance: Purchasing and Financial Institutions	25
13	Applied Human Resource Management	40
14	Strategic and Operations Management	40
Total		130

Finance—Course Code: ######

Unit	Unit Name	Hours
15	Macroeconomics	20
16	Personal Finance: Credit and Personal Risk Management	20
17	Financial Accounting	30
18	Budgets and Forecasting in Finance	25
19	Managerial Accounting	25
20	Employment Opportunities in Business	20
Total		140

Option 2: Two 2-Carnegie-Unit Courses

This curriculum consists of two 2-credit courses, which should be completed in the following sequence:

1. Business, Marketing, and Finance I—Course Code: ######

2. Business, Marketing, and Finance II—Course Code: ######

Course Description: Business, Marketing, and Finance I
This year-long course covers the fundamentals of business and marketing. It begins with the basics of workplace safety, ethics, and leadership. Students are introduced to business finance, economics, and cover microeconomics as well. Major topics of study in this course are career readiness, foundations of marketing, market research and analysis, and entrepreneurship. Students will learn valuable lessons to enhance their personal financial life with topics on income, decision-making, and personal money management. Various student organizations and resources for career development will be explored throughout the course. Participation in student organizations, field experiences, internships, and job shadowing is ongoing. Students will continue to develop skills toward meeting requirements for the ESB credential.

Course Description: Business, Marketing, and Finance II
This course focuses on finance and management. It begins with a brief review of safety and other topics from the first year. Students will continue their study of economics with topics on international economics and macroeconomics. The majority of this course is spent on financial and managerial accounting, budgets, forecasting in finance, applied human resource management, strategy, and operations management. Personal finance topics on purchasing, financial institutions, credit, and risk management are also covered. Students will develop educational, career, and professional plans in the area of business, marketing, and/or finance as they finish the course by exploring the employment opportunities in business. They will continue to master skills toward meeting requirements for the ESB credential and heavily participate in student organizations, field experiences, internships, and job shadowing.

Business, Marketing, and Finance I—Course Code: ######

Unit	Unit Name	Hours
1	Orientation, Safety, and Leadership	10
2	Introduction to Economics	20
3	Personal Finance: Decision Making and Income	20
4	Entrepreneurship	30
5	Microeconomics	20
6	Personal Finance: Money Management	25
7	Foundations of Marketing	75
8	Market Research and Analysis	25
9	Career Readiness and Exploration	35
Total		260

Business, Marketing, and Finance II—Course Code: ######

Unit	Unit Name	Hours
10	Review of Workplace Safety and Security	5
11	International Economics	20
12	Personal Finance: Purchasing and Financial Institutions	25
13	Applied Human Resource Management	40
14	Strategic and Operations Management	40
15	Macroeconomics	20
16	Personal Finance: Credit and Personal Risk Management	20
17	Financial Accounting	30
18	Budgets and Forecasting in Finance	25
19	Managerial Accounting	25
20	Employment Opportunities in Business	20
Total		270

Research Synopsis

Introduction

According to the NBEA, business education is essential and should be available to all students. Every student partakes and/or will partake in our country's ever-changing economy, make financial decisions, and be involved in a diverse business environment at some point in their life. The business, marketing, and finance curriculum prepares students to be responsible, productive citizens and provides them direction into future careers and/or educational choices. The entire course covers the various fields in business that students need to understand to be successful. These fields include economics, personal finance, business finance, marketing, market research, management, and employability skills. Business careers can take many forms. Broad or general business career categories include general management, financial or personnel management, research and development, marketing, or sales. The specific products or services a business provides can lead to even more specialized careers and educational requirements for those careers. Fortunately, however, many business careers demand some common skills and educational background. Business professionals must have good communication, planning, productivity, and creativity skills. Technology skills are also vital since software tools are used to manage time, finances, projects, and customer relations. Numerous degrees and certifications are available in any of these fields, and the employment projections for careers in business, finance, marketing, and management are showing continued growth from 2014-2024.

Needs of the Future Workforce

Data for this synopsis were compiled from the Mississippi Department of Employment Security (2018). Employment opportunities for each of the occupations listed below are:

Table 1.1: Current and Projected Occupation Report

Description	Current Jobs, 2014	Projected Jobs, 2024	Change (Number)	Change (Percent)	Average Hourly Wage, 2017
Sales manager	1,800	1,870	70	3.9	$48.16
Personal financial adviser	590	650	60	10.2	$45.96
Marketing manager	500	540	40	8	$45.57
Computer and information systems manager	1,010	1,120	110	10.9	$45.44
Industrial production manager	1,650	1,710	60	3.6	$44.67
Purchasing manager	550	570	20	3.6	$42.29
Training and development manager	200	210	10	5	$41.09
Medical and health services manager	2,260	2,410	150	6.6	$40.97
Human resource manager	900	970	70	7.8	$40.53
Management analyst	1,460	1,550	90	6.2	$36.59
Public relations manager	330	350	20	6.1	$35.80
Administrative services manager	2,980	3,170	190	6.4	$32.54

Description	Current Jobs, 2014	Projected Jobs, 2024	Change (Number)	Change (Percent)	Average Hourly Wage, 2017
Compensation and benefits manager	100	110	10	10	$32.14
Advertising and promotions manager	200	210	10	5	$32.06
Loan officer	2,470	2,690	220	8.9	$31.53
Market research analyst	1,230	1,430	200	16.3	$27.59
Accountants and auditor	5,800	6,160	360	6.2	$27.10
Cost estimator	960	990	30	3.1	$26.70
Food service manager	1,230	1,390	160	13	$22.78
Social and community service manager	1,940	2,070	130	6.7	$22.54
Real estate appraiser and assessor	500	540	40	8	$21.78
Lodging manager	410	440	30	7.3	$20.98
Property, real estate, community association manager	1,290	1,400	110	8.5	$19.30
Customer service representative	12,620	13,780	1,160	9.2	$13.91
Retail salesperson	39,840	42,540	2,700	6.8	$12.64

Source: Mississippi Department of Employment Security; www.mdes.ms.gov (accessed April 2, 2018).

Perkins IV Requirements

The business, marketing, and finance curriculum meets Perkins IV requirements by articulating specified courses with a postsecondary institution. This curriculum offers a program of study at the secondary and postsecondary levels that is intended to prepare students for occupations in the fields of business, marketing, and/or finance. The program of study includes the following topics: personal finance, entrepreneurship, decision-making, various fields of economics, marketing, career exploration, and both personal and professional development. The business, marketing, and finance curriculum also focuses on academic skills in English/literacy proficiency, mathematics, and occupational skills. Along with academic and occupational skills, the curriculum focuses on a positive networking relationship with industry. Additionally, the business, marketing, and finance curriculum encourages the use of technology for students and teachers during the implementation of the written curriculum. Students will be assessed using an assessment tool, the Mississippi Career Planning Assessment System 3 (MS-CPAS 3).

Curriculum Content: Summary of Standards
The standards included in the business, marketing, and finance curriculum reflect state and national standards. The curriculum aligns with the NBEA standards, the ESB credential standards, *Standards for Economics, Mathematics and English Language Arts, Framework for 21st Century Learning,* and the standards for the International Society for Technology in Education (ISTE). Aligning the curriculum content to these standards will result in students who are highly skilled, well-rounded, more academically proficient, and more likely to be successful in community colleges, institutions of higher learning, and the workforce.

Academic Infusion
The business, marketing, and finance curriculum is aligned to the *Mississippi College and Career Ready Standards*. The *Mississippi College and Career Ready Standards* are aligned with college and work expectations and include rigorous content and application of knowledge through high-order thinking skills. This applied approach to learning academic skills has long been the practice in career and technical education and brings relevance and enhances and reinforces these academic skills. Throughout the curriculum, students will be required to perform calculations and use strategic and critical-thinking skills to solve real-world problems.
The business, marketing, and finance course also covers the various topics of economics throughout the entire course. Content from the academic economics class has been infused throughout this framework in a way that will relate the material to the students in a real-world setting.

Transition to Postsecondary Education
The latest articulation information for secondary to postsecondary can be found at the Mississippi Community College Board (MCCB) website, mccb.edu.

Best Practices

Innovative Instructional Technologies

Recognizing that today's students are digital learners, the classroom should be equipped with tools that will teach them with very applicable and modern practices. The business, marketing, and finance educator's goal should be to include teaching strategies that incorporate current technology. To make use of the latest online communication tools such as wikis, blogs, and podcasts, the classroom teacher is encouraged to use a learning management system that introduces students to education in an online environment and places more responsibility of learning on the student. The business, marketing and finance program incorporates the theories and applications of the SAMR model by Dr. Ruben Puentedura. This model calls for the use of technology by the student for substitution, augmentation, modification, and redefinition of various educational tasks and assignments.

Differentiated Instruction

Students learn in a variety of ways. Add the student's background, emotional health, and circumstances, and a very unique learner emerges. By providing various teaching and assessment strategies, students with various learning preferences can have more opportunities to succeed.

Career and Technical Education Student Organizations

Teachers should investigate opportunities to sponsor a student organization. There are several here in Mississippi that will foster the types of learning expected from the business, marketing, and finance curriculum. Business Professionals of America (BPA), DECA, and Future Business Leaders of America (FBLA) are examples of student organizations with many outlets for business, marketing, and finance. Student organizations provide participants/members with growth opportunities and competitive events and open the doors to the world of business careers and scholarship opportunities.

Cooperative Learning

Cooperative learning can help students understand topics when independent learning cannot. Therefore, you will see several opportunities in the business, marketing, and finance curriculum for group work. To function in today's workforce, students need to be able to work collaboratively with others and solve problems without excessive conflict. The business, marketing, and finance curriculum provides opportunities for students to work together and help each other complete complex tasks. There are many field experiences within the business, marketing, and finance curriculum that will allow and encourage collaboration with professionals currently in the field of business, marketing, and/or finance.

Field Experience

Field experience is an extension of understanding competencies taught in the business, marketing, and finance classroom. A key component of each of the NBEA and ESB standards is hands-on skills practice. This curriculum is designed in a way that necessitates active involvement by the students in the community around them and the global market. These real-world connections and applications provide a link to all types of students in regard to knowledge, skills, and professional dispositions. Field experiences should encompass ongoing and increasingly more complex involvement with local companies and entrepreneurs. Thus, supervised collaboration and immersion into the business world around the students are keys to students' success, knowledge, and skills development.

Conclusions

The business, marketing, and finance curriculum will prepare students completing the program and graduating from high school to enter the workforce, continue education at a postsecondary institution and then enter the workforce, continue education at a postsecondary institution and then continue at an institution of higher learning (IHL), or continue education at an IHL. Students who choose to enter the workforce after graduation will have the opportunity to gain employment as a self-employed entrepreneur or compete for a wide variety of jobs due to the diverse skills acquired in the course. Students who choose to attend a postsecondary institution may enter a business, marketing, or finance program. After completion of the postsecondary program, students may enter the workforce as administrative assistants, health informatics technicians, sales associates, and much more; however, students may also choose to further their education at an IHL. These students can major in business management, marketing, sales, finance, business information systems, and more. This curriculum provides an excellent foundation and transition into the business, marketing, and finance field.

Professional Organizations

Association of Career and Technical Education
acteonline.org

American Marketing Association
ama.org/Pages/default.aspx

Financial Planning Association
onefpa.org/Pages/default.aspx

International Society for Technology in Education
iste.org

Marketing Educators Association
marketingeducators.org/

Mississippi Business Education Association
(State level of NBEA)
msmbea1950.wordpress.com/

Mississippi Education Computing Association
662.314.MECA
ms-meca.org/

National Association for the Self-Employed
nase.org/home.aspx

National Business Association
nationalbusiness.org/

National Business Education Association
nbea.org/

United States Association for Small Business and Entrepreneurship
usasbe.org/

United States Small Business Administration
sba.gov/

Using This Document

Suggested Time on Task
This section indicates an estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit.

Competencies and Suggested Objectives
A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies. The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.

Integrated Academic Topics, 21st Century Skills and Information and Communication Technology Literacy Standards, ACT College Readiness Standards, and Technology Standards for Students
This section identifies related academic topics as required in the Subject Area Testing Program (SATP) in Algebra I, Biology I, English II, and U.S. History from 1877, which are integrated into the content of the unit. Research-based teaching strategies also incorporate ACT College Readiness standards. This section also identifies the 21st Century Skills and Information and Communication Technology Literacy skills. In addition, national technology standards for students associated with the competencies and suggested objectives for the unit are also identified.

Enrichment Material
Many of the units include a section at the end titled “Enrichment”. This section of the material will not be tested on CPAS, but will greatly enhance the learning experiences for the students. It is suggested to use the enrichment material when needed or desired by the teacher, and if time allows in the class.

Unit 1: Orientation, Safety, and Leadership

Competencies and Suggested Objectives
1. Identify the essential characteristics of a healthy office environment. DOK1 a. Research workplace safety concerns involving equipment, ergonomics and workstation design, and the physical environment of a business. Present and discuss findings.
2. Analyze situations in a workplace that can lead to injury or illness. DOK2 a. Use web-based resources to investigate The National Institute for Occupational Safety and Health (NIOSH) guidelines in the business environment to include the following: • Physical hazards • Task-related hazards • Workspace design hazards • Stress hazards b. Use written and/or verbal communication to explain how the above hazards can result when the demands of a job exceed the capabilities of a worker.
3. Explore security, privacy, and risk management policies and procedures for information technology. DOK1 a. According to research, create a simple plan to assist a business in protecting their information technology systems through the use of: • Acceptable use policies • Terms of service agreements • Firewalls • Encryption
4. Investigate how career and technical student organizations (CTSOs) enhance leadership skills. DOK1 a. Use a teacher-created web-quest to identify ways CTSOs (e.g. BPA, DECA, FBLA, SkillsUSA, TSA) enhance student leadership skills and explain how CTSOs nominate, elect, and evaluate student leaders.
5. Apply basic interpersonal communication skills in personal and professional situations. DOK2 a. In a teacher-led discussion, establish professional communication measures that include the following formats: • Phone • Electronic (email, social media, text) • Written • Verbal and nonverbal

6. Use technology to enhance the effectiveness of communication. DOK2
   a. Investigate various technological means of communication for increasing effectiveness of a business to include:
      - Social media
      - Websites
      - Listservs
      - Emergent technologies

7. Describe the factors that define what is considered ethical and socially responsible business behavior. DOK2
   a. Collect, organize, and interpret ethical and socially responsible practices in business.
   b. In student teams or in a class discussion, brainstorm a list of ethical and socially responsible guidelines to implement within a new business.

8. Analyze the relationship between ethics and the law. DOK3
   a. Using lists created in competency 7.b., research the legality of each item according to the Department of Labor's Equal Employment Opportunity Commission's Youth at Work guidelines to include:
      - Title VII Civil Rights Act of 1964
      - Title I of the Americans with Disabilities Act of 1990
   b. Develop a mock and/or real social media campaign that briefly explains some of the above standards (e.g. hashtag Twitter effort, Facebook page, etc.).

9. Analyze how modern workplace success depends on respect of cultural differences and working effectively with people from a range of social and cultural backgrounds. DOK2
   a. Create a multimedia presentation detailing ethics and/or legal differences between domestic and international businesses that highlights cultural commonalities and differences.

Enrichment:

- Walk your campus and create a map including potential physical, environmental, and safety hazards on your campus.

Unit 2: Introduction to Economics

Competencies and Suggested Objectives
1. Explain the concepts of scarcity, choice, decision-making, and opportunity cost. DOK2 a. Describe how households, firms, or governments use their productive resources (land, labor, capital, and entrepreneurship) to make economic decisions by analyzing common household goods. • Create an infographic that explains how each factor of production was utilized.
2. Explain why societies develop economic systems, identify the basic features of different economic systems and analyze the major features of the U.S. economic system. DOK2 a. Identify the three basic economic questions: • What goods and services will be produced? • How will the goods and services be produced? • For whom will the goods and services be produced? b. Identify the four main economic systems: • Traditional economy • Command economy • Market economy • Mixed economy
3. Illustrate how voluntary exchanges and trade are reflections of negative and positive incentives resulting in gain for both parties. DOK2 a. Create a multimedia presentation that explores how behavior would be affected if minimum wages were increased by $5 per hour. • Include effect on businesses versus households • Positives and negatives on each
4. Analyze the role of price on the market, the buyer, and the seller. DOK3 a. Discuss and evaluate how Adam Smith's theory regarding the "invisible hand" describes how free market economies self-regulate. • Adam Smith: the father of modern economics • *Wealth of Nations*: written by Adam Smith • Economic driver is self-interest • Economic regulator is competition b. Create a graph that evaluates the degree of government involvement in each economic system (command, market, mixed, and traditional) and have student teams debate which economic system is the best for the global economy.

5. Describe different economic systems and how people work individually or collectively to allocate goods and services. DOK2

   a. Using The Organization of Economic Cooperation and Development Better Life Index, utilizing a current civil and/or human rights event, prepare a written report that compares and contrasts the quality of life of one country from each of the four main economic systems concentrating on the following qualities:

      - Housing conditions
      - Education
      - Health
      - Safety

Enrichment:

- To be used with Competency 1: Differentiate between needs and wants as they relate to making choices among scarce resources. Make a list of five needs/wants for modern teenagers versus five needs/wants for teenagers 15 years ago.
- Interview an adult 30 years or older to confirm the information above.
- Develop a class activity that incorporates trade-off principles through exchange of a specified commodity or product (e.g., snacks, school supplies, etc.) and collaborate to come to a win-win solution that minimizes opportunity costs.

Unit 3: Personal Finance—Decision-Making and Income

Competencies and Suggested Objectives
1. Use a rational decision-making process as it applies to the roles of its citizens, workers, and consumers. DOK2 a. Using the PACED decision-making model, outline the five-step process for making decisions. The PACED model is not about finding the correct choice for everybody; it is about making a careful, well-informed decision for yourself. • **P**: Identify the **problem**. Usually, the problem is related to scarcity. • **A:** List **alternatives**–the options you will choose from and evaluate the advantages and disadvantages of each choice. • **C:** Select **criteria**–the things that are important to you in making the decision. • **E: Evaluate** alternatives based on the criteria. • **D:** Make a **decision** and review your decision. b. Using the steps in the PACED decision-making model and the competitive events available within your individual CTSO, create a chart that evaluates three events that you would like to pursue. The last step of reviewing your decision will occur after your individual CTSO competition.
2. Identify various forms of income and analyze factors that affect income as a part of the career decision-making process. DOK2 a. Distinguish between sources of earned income and unearned income. • Earned income (salaries and wages, tips, commissions, etc.) • Unearned income (interest, dividends, gifts, etc.) b. Discuss how income affects a person's career decision-making process.
3. Predict future earnings based on their current plans for education, training, and career options. DOK2 a. Using web-based research tools (e.g., salary.com), compare the average income of a career using the career information from your ePortfolio to a city in Mississippi and a city in another state of your choice. Develop a cost-of-living comparison using salary versus living expenses for each location. Create a multimedia presentation that reflects your research.
4. Evaluate how people can increase their income and job opportunities by acquiring more education, work experience, and job skills. DOK1 a. Research the ways personal income increases with additional education and training. Guest speakers are a great way of showing how education, work experience, and job skills increases a person's income and job opportunities.

5. Determine how income for most people is determined by the market value of their labor, paid as wages and salaries. DOK2 a. Create a multimedia presentation to include analysis of lifelong earning potential of someone with a high school diploma versus someone with advanced schooling and/or training.
6. Identify how income is obtained from other sources, such as interest, dividends, and profits from the selling of stocks. DOK1 a. Create a mind map identifying and describing income from other sources such as interest, dividends, and profits from the selling of stocks.

Unit 4: Entrepreneurship

Competencies and Suggested Objectives
1. Recognize that entrepreneurs possess unique characteristics and evaluate the degree to which one possesses those characteristics. DOK2 a. Complete a free online entrepreneurship assessment and record your results in a discussion board format. Do you agree or disagree with the results? Why or why not? b. Research characteristics of entrepreneurs and create a creative product that showcases the characteristics.
2. Evaluate the opportunities, risks, advantages, and disadvantages of being an entrepreneur. DOK1 a. Complete a free online course that evaluates the opportunities, risks, advantages, and disadvantages of being an entrepreneur b. Communicate results of the online course in written or verbal form to show mastery of course content.
3. Demonstrate ethical practices and social responsibility in business. DOK2 a. Using research on recent business ethics violations, act as a business consultant to produce a plan of improvement to prevent further ethics or social responsibility violations.
4. Identify the purpose and worth of a business plan. DOK1 a. Create a graphic organizer that identifies and describes the following essential components of a business plan: • Executive summary • Business and product description • Market/customer analysis • Operations and management plan • Marketing plan • Financial plan

5. Identify the characteristics of the different legal structures of a business. DOK1

a. Create a chart that details the advantages and disadvantages of the following:

- Sole-proprietorship
- Partnership
- Corporation
- S corporation
- C corporation
- Nonprofit corporation
- Limited liability company

6. Identify sources of start-up funding, with advantages and disadvantages of each. DOK1

a. Create a multimedia presentation identifying the advantages and disadvantages of each of the following:

- Equity (friends/family, angels investors, venture capitalist)
- Debt (banks, credit cards, personal loans, microloans)
- Grants (government, foundation, corporate)
- Alternative funding (crowdfunding, etc.)

7. Define and describe potential exit strategies for business. DOK2

a. Define exit strategies that are available for businesses.

- Employee Stock Ownership Plan (ESOP)
- Harvesting
- Initial Public Offering (IPO)
- Management Buyout

b. Using teacher created scenarios, determine if various businesses should sell their business or liquidate their assets.

Enrichment:

- Analyze how forms of business ownership, government regulations, and business ethics affect entrepreneurial ventures.
- Using the information in the chart created in (5.a), partner with another student to create a role-play to share with the class how different forms of business ownership are affected by government regulations and/or business ethics standards.

Unit 5: Microeconomics

Competencies and Suggested Objectives
1. Analyze the role of markets and prices in the U.S. economy. DOK2 a. Research three well-established businesses and answer the three economic questions for each business. Develop a mock and/or real social media campaign briefly explaining how each economic question was answered by the three well-established businesses (e.g., hashtag Twitter effort, Facebook page, etc.). • What goods and services to produce? • How to produce the goods and services? • For whom to produce the goods and services? b. Define the five economic utilities of goods and services, and then create two Venn Diagrams explaining the likes and differences of any two. You will compare and contrast a total of four of the following (two for each Venn Diagram): • Form utility • Place utility • Time utility • Possession utility • Information utility
2. Analyze the different types of market structures and the effect they have on price and the quantity of the goods and services produced. DOK2 a. After conducting research on the market structures, write a report on the effect that each of the following has on price and the quantity of the goods and services produced: • Perfect competition • Oligopoly • Monopoly
3. Analyze and evaluate the impact that market structures, entrepreneurship, and institutions have on the market economy, competition, and income. DOK2 a. Research a case involving antitrust violations and create a multimedia display or presentation to showcase the findings.

4. Identify markets in which economic decision-makers have participated as a buyer and as a seller, and describe how the interaction of all buyers and sellers influences prices.[DOK2]
   a. Research each of the economic decision-makers and create a graphic organizer that describes each role in the economy and how that role influences prices as buyers and/or sellers.
      - Households as buyers
      - Firms as buyers and sellers
      - Governments as buyers and sellers
      - Rest of the world (global) as buyers and sellers

5. Predict how prices change when there is either a shortage or surplus of the product available. [DOK3]
   a. Participate in a competitive market game in which one group acts as sellers and the other group acts as buyers. In this game, students will see how price is influenced by the interactions between the two groups.

Unit 6: Personal Finance—Money Management

Competencies and Suggested Objectives
1. Evaluate how money makes it easier to trade, borrow, save, invest, and compare the value of goods and services. DOK2 a. Identify the three functions of money (a store of value, a unit of account, and a medium of exchange) to explain how they encourage specialization by decreasing the cost of exchange.
2. Explore how the amount of money in the economy affects the overall price level. DOK1 a. Research how in the long run, inflation results from increases in a nation's money supply that exceed increases in its output of goods and services. Create an infographic or other display to illustrate the relation of the amount of money in the economy to the level of inflation.
3. Develop and evaluate a spending/savings plan. DOK2 a. Determine the essential components of a basic budget (income - expenses = savings or debt), create a budget based on working and living in an individually selected area within the US.
4. Evaluate savings options to meet short- and long-term goals. DOK2 a. Research the difference in short and long-term goals. b. Understand each step of SMART goals to evaluate savings options. • Specific • Measurable • Attainable • Realistic • Time-bound
5. Evaluate investment options to meet short- and long-term goals. DOK1 a. Research various investment options to create a multimedia presentation on two or more of the following types of investments: • Bank products (savings accounts, certificates of deposit, money market accounts) • Stock, bonds, mutual funds (common versus preferred stock; treasury versus government bonds; diversified investments through mutual funds) • Retirement (401(k), IRAs) • Life insurance (whole life, term life)
Enrichment:
• Analyze student-created personal finance goals (one short-term, one long-term) in order to determine if the SMART goals approach was followed.

Unit 7: Foundations of Marketing

Competencies and Suggested Objectives

1. Analyze the marketing mix, their interrelationships, and how they are used in the marketing process. DOK3
   a. Construct a table analyzing three products you've bought in the past to utilize the marketing mix to include:
      - Product
      - Place
      - Price
      - Promotion
   b. Acting as an industry professional (role-play), present a detailed proposal to a small local business that demonstrates the following elements:
      - Defining the target market
      - The role of market segmentation
      - The four Ps of the marketing mix
      - Consumer/customer relations

2. Recognize the customer-oriented nature of marketing and analyze the impact of marketing activities on the individual, business, and society. DOK3
   a. Use presentation software to develop a pictogram that explains marketing to include the following terms:
      - Customer profile (geographics, demographics, and psychographics)
      - Goods
      - Market
      - Market share
      - Marketing
      - Marketing concept
      - Services
      - Target market
      - Utility (form, place, time, possession, and information utilities)
   b. Describe marketing functions and related activities by discussing the seven functions of marketing in interactive discussion groups.
      - Distribution
      - Market Planning
      - Marketing information management
      - Pricing (Include profit analysis: revenue - costs = profit.)
      - Product/service management
      - Promotion
      - Selling

c. Develop a sales campaign for a newly created product and apply various components of the seven functions of marketing.

3. Analyze the characteristics, motivations, and behaviors of consumers. DOK2
   a. Research three products. Based on research, use publication software to develop target market publications to include the following elements:
      - Motive-based (emotional motive, patronage motive, rational motive)
      - Buying decision (extensive buying decisions, limited buying decisions, routine buying decisions, impulse buying decisions)
      - Characteristics of target market (demographic, geographic, psychographic)

4. Recognize how to retain customers and develop relationships with repeat customers. DOK3
   a. Based on research, initiate a student-led discussion on customer retention strategies and the importance of the customer relationship marketing.
   b. Choose a well-known business or company and create a short customer retention plan to include:
      - Brand loyalty
      - Employee customer training
      - Loyalty programs
      - Membership reward points
      - Premiums or incentives through social media

5. Analyze the influence of internal and external factors on marketing. DOK2
   a. Conduct a political, economic, social, technological, legal, and environmental (PESTLE) analysis on a successful or failed global company.
   b. Conduct a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis on the same (as 5.a.) successful or failed company.
   c. Produce a report analyzing internal and external forces on marketing for the selected company and post it in a digital format with a class discussion board.

Enrichment:

- Students conduct a SWOT analysis of themselves.

Unit 8: Market Research and Analysis

Competencies and Suggested Objectives
1. Analyze the role of marketing research in decision making. DOK2 a. In an industry scenario, demonstrate proper use of marketing research in decision-making to include the following steps: • Define the problem • Obtain data (primary and secondary data) • Analyze the data • Recommend solutions to the problem • Apply the result
2. Describe the elements, design, and purposes of a marketing plan. DOK2 a. Discuss the three fundamental steps in developing a marketing plan to include: • Perform customer analysis • Perform market analysis • Develop marketing mix b. Evaluate five businesses from different industries to determine the direct and indirect competitors of each. Participate in a teacher/student discussion on the five businesses. • Are they direct or indirect competitors?
3. Identify and analyze the costs/benefits of finding customers. DOK2 a. Investigate the costs associated with generating new customers by identifying whether or not the new customer is already a customer of a competitor and determining the reasons that potential customers go to a competitor. b. Determine the value of finding new customers by estimating the average amount of gross revenue that is generated by each new customer at an initial purchase. Then estimate the lifetime gross revenue that will be generated by a typical customer. Create a display showcasing the lifetime value of the customer.
4. Explain how changes in the level of competition in different markets can affect price and output levels. DOK3 a. Acting as an entrepreneur, conduct market research to gauge the following: • Ease of entry into the industry • How competition affects price and output levels

Unit 9: Career Readiness and Exploration

Competencies and Suggested Objectives
1. Assess personal skills, abilities, aptitudes, strengths and weaknesses as they relate to career exploration and development. DOK1 a. Using a validated career interest survey (e.g., iCAP, Choices, CareerOneStop's Self-Assessment Survey, etc.) develop a well-organized interest inventory and explore careers using data found in the U.S. Department of Labor Bureau of Labor Statistics' Occupational Outlook Handbook.
2. Apply knowledge gained from individual assessment to a comprehensive set of goals and an individual career plan. DOK2 a. Develop a multimedia presentation (e.g., commercial, digital application, website, etc.) to showcase a career from individual interest inventory results (1.a. above) to include: • Job responsibilities/duties • Work environment • Education and credentials • Pay/salary • Job outlook • State and area data • Similar occupations
3. Utilize career resources to develop a comprehensive class/career portfolio. DOK1 a. Identify and demonstrate proper file storage, sharing, and maintenance techniques. b. Research and initiate a student career information portfolio using ePortfolios including the following basic elements: • Title page • Table of contents (pages numbered or hyperlink to contents) • Introduction/purpose (documenting mastery of each course project) • Valid professional email address • Resume and cover letter • Works cited/references
4. Develop strategies to make an effective transition from school to career. DOK2 a. Add to your ePortfolios the following basic elements: • Designated portfolio assignments (ongoing) • Statement of goals purpose • Return on investment analysis (for training or education)
5. Relate the importance of workplace expectations to career development. DOK3 a. Brainstorm a well-organized list of soft skills required to succeed in any job on a daily basis.

6. Research training and/or licenses/certifications business professionals can obtain to be more competitive in the job market.
   a. Evaluate and report on annual best job ratings provided by reputable sources (e.g., *U.S. News and World Report*).

7. Relate the importance of lifelong learning to career success. DOK3
   a. Considering 21st-century emergent technology (e.g., artificial intelligence, automation, quantum computing, robotics, etc.), develop an oral and/or written report explaining the importance of lifelong learning in maintaining career relevance and career advancement.

Enrichment:

- Conduct practice interviews or answer a list of possible interview questions.

Unit 10: Review of Workplace Safety and Security

Competencies and Suggested Objectives
1. Maintain a healthy workplace environment. DOK2 a. Explore online safety resources and/or trainings (e.g., Youth at Work by Occupational Safety and Health Administration and produce a report of a real-world setting that contains the following elements: • Equipment • Workstation design • Physical environment (i.e., temperature, humidity, light, task design) • Psychological factors (i.e., personal interactions, work pace, job control) • Workplace hazards
2. Examine the design of workplace spaces that allow each employee to work comfortably without needing to overreach, sit or stand too long, or use awkward postures. DOK1 a. Research ergonomic workspace design and identify ergonomic issues from pictures that are presented to students.

Unit 11: International Economics

Competencies and Suggested Objectives
1. Analyze the role of government in economic systems, especially the role of government in the U.S. economy. DOK3 a. Research government's role in the economy to discuss circular flow and how government is one of the three sectors, along with households and businesses, to include: • Taxes • Regulations (laws) • Public services (parks, schools, government employees such as teachers, police, fire, roads, welfare, Medicaid, etc.) • Monetary and nonmonetary incentives b. Based on research/evidence, engage in a structured debate concerning the government's role in raising the minimum wage while focusing on intended and unintended consequences.
2. Examine the role of trade, protectionism, and monetary markets in the global economy. DOK3 a. Based on research/evidence, develop a report analyzing a country that exports products to the US. Use data and statistics to justify an import policy dealing with that particular country. b. Research protectionism and create a multimedia presentation discussing the pros and cons to include barriers to trade (tariffs, quotas, sanctions, and embargoes).
3. Evaluate how growing international economic interdependence causes economic conditions and policies in one nation to be increasingly affected by economic conditions and policies in another nation. DOK3 a. Research a country that the US trades (imports/exports) with and prepare a multimedia presentation that shows why there is an economic interdependence among nations in the global economy.
4. Recognize that voluntary exchange occurs only when all participating parties expect to gain. DOK3 a. Construct explanations of observed trade relationships among individuals or organizations within a nation and among individuals or organizations in different nations. b. Based on a class trading game or activity, analyze and interpret data to explain benefits and impacts of domestic and international trade.

5. Evaluate how and why both production and consumption increase when individuals, regions, and nations specialize in what they can produce at the lowest cost and then trade with others. DOK3 a. Develop a widget-based activity or game that functions to reveal well-known benefits of specialization of labor principles. b. Write a report on the pros and cons of specialization/division of labor and craftsmanship/individual labor.
6. Explain how investment in factories, machinery, new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living. DOK2 a. Using web-based research (i.e. Central Intelligence Agency *World Factbook*, Heritage Foundation, etc.), populate a detailed online database comparing and contrasting GDPs. Engage in teacher-led discussion using this chart.

Unit 12: Personal Finance—Purchasing and Financial Institutions

Competencies and Suggested Objectives
1. Apply a decision-making model to maximize consumer satisfaction when buying goods and services. DOK2 a. Research a product and apply the following decision-making model to that product to maximize consumer satisfaction: • Recognize the problem (e.g., I need a new television.) • Information searching (e.g., What televisions are available?) • Evaluation of alternatives (e.g. Do I really need the television, and, if so, which one?) • Purchase (e.g., Buy the television.) • Post-purchase satisfaction or dissatisfaction (e.g., Did the television deliver on what was promised in the marketing/advertising campaign?) b. Share the decision-making model on the product you picked on a discussion board (real or virtual) and respond to a minimum of two of your classmates' posts.
2. Differentiate between the advantages and disadvantages of renting, leasing, and owning. DOK3 a. Develop, revise, or populate a graphical chart comparing and contrasting the advantages and disadvantages of the following: • Renting • Leasing • Owning b. Using information from the graphical chart (2.a. above), create a video and/or multimedia presentation explaining your future plans of renting, leasing, or owning and explain why.
3. Interpret the differences in payment types, including debit cards, credit cards, prepaid cards, cash advances, and payday loans. DOK2 a. Research the various payment types and create a multimedia presentation explaining the pros and cons of each of the following types: • Debit cards • Cash advances • Credit cards • Payday loans • Prepaid cards

4. Evaluate services provided by financial deposit institutions to transfer funds. DOK2

a. Identify and discuss the following services:

- Checking accounts
- Savings accounts
- Credit cards
- Mortgages
- Student loans
- Auto loans
- Debit cards
- Online banking
- Signature loan
- ATMs
- Money market account
- High-interest money market account (HIMMA)

b. Research the differences between different types of financial institutions to develop a multimedia presentation comparing various services provided by three local institutions (at least one bank and one credit union) explaining which you would choose.

c. Discuss the various responsibilities and steps involved in opening and using a checking account.

Unit 13: Applied Human Resource Management

Competencies and Suggested Objectives
1. Analyze management functions and their implementation and integration within the business environment. DOK1 a. In student groups, research the functions of management and communicate findings in multiple formats (verbally, graphically, textually, and/or mathematically). Include the following elements: • Planning • Organizing • Staffing • Directing • Controlling
2. Develop personal management skills to function effectively and efficiently in a business environment. DOK2 a. Determine how personal management skills affect employability and create a new employee training video that models proper practices of the following: • Time management skills • Emotional intelligence • Imagination and innovation • Critical-thinking skills
3. Examine the role of ethics and social responsibility in decision making. DOK3 a. Research case studies analyzing unethical business behaviors to generate and compare multiple solutions; engage in a class debate regarding the optimal solution.
4. Describe human resource functions and their importance to an organization's successful operation. DOK1 a. Classify and explain observed relationships between the following elements: • Acquiring: recruiting, interviewing and hiring • Developing (e.g., on-boarding, in-service, and off-boarding): formal training (aside from formal work environment, and informal [within work environment]) • Compensating: payroll, salary, wages, commission, and fringe benefits

5. Describe the role of organized labor and its influence on government and business.[DOK2]
   a. Research recent collective bargaining, mediation, and binding arbitration cases among well-known parties, such as major league sports, United Auto Workers, or others.
   b. In an industry-simulated scenario, engage in negotiations between an employer, labor union, and mediator (teacher) in which the labor union has 12 demands.

Enrichment:

- Analyze management theories and their application within the business environment.
- Ask questions to clarify concepts related to historical and contemporary theories of human resource management to include: classical, administrative, behavioral, and quality management.
- Moving from facts about management theories to projects showing the application in the business environment: Interview a manager that has been in management for at least 10-20 years. Concentrate on changes in management over the years. Which management functions do they spend the most time on and which ones do they delegate? Prepare a report summarizing the findings.

Unit 14: Strategic and Operations Management

Competencies and Suggested Objectives
1. Analyze the organization of a business. DOK1 a. Evaluate the basic forms of ownership to create a graphic organizer to include the advantages and disadvantages for each of following: • Sole proprietorship • Partnership • Corporation and LLCs (S corporation, C corporation and LLCs) • Alternative forms of ownership (franchise, cooperative and nonprofit)
2. Examine intellectual property issues of copyrights, patents, and trademarks. DOK2 a. Research well-known cases of copyright infringement to determine if a student-generated creative work does or does not violate copyright law.
3. Apply operations management principles and procedures to the design of an operation plan. DOK1 a. Analyze a modern manufacturing industry simulation to properly apply operations management principles and procedures to include: • Benchmarking • Continuous improvement (Six Sigma, Lean Production, Total Quality Management [TQM] and Kaizen)
4. Examine the issue of corporate culture and managing in the global environment. DOK1 a. Research modern businesses' cultures and evaluate the attributes of their corporate culture in the context of the global environment. • Beliefs and assumptions: things we hear, observe, and learn, and things we try, fail at, then retry • Perceptions: mission and vision, adaptability, consistency and involvement • Thoughts and feelings
5. Examine factors that lead to long-term sustainability within a business. DOK2 a. Determine how financial health, social engagement, and corporate citizenship affect the long-term success of a business in terms of the triple bottom line, which includes: • People: the impact of business decisions have on the people employed by the business and the consumers of the business • Planet: the environmental impact the business has on its ecological surroundings • Profit: the economic impact of the company (profit = revenue - costs) b. Contact a local business and evaluate its business practices. Research and discuss how that business could make decisions to ensure the sustainability of the business, and create a report making recommendations to the business on how it can implement some of the solutions.

Unit 15: Macroeconomics

Competencies and Suggested Objectives
1. Compare and contrast fiscal and monetary policy. DOK2 a. Evaluate the impact each of the tools the Federal Reserve uses to achieve nation's monetary policy goals and how it relates to the economic health of the US. • Tools: discount rate, open-market operations, reserve requirements, and interest on reserves b. Explore how Congress and the president work together to create fiscal policy through the implementation of a national budget. • Identify methods the government uses to collect tax revenue to fund the national budget. • Distinguish between a budget deficit, budget surplus, and a balanced budget and debate the advantages and disadvantages of adopting a balanced budget amendment. c. Distinguish the costs imposed by unemployment through unemployment's effect on individuals and the overall economy. d. Define unemployment rate and determine how the number of people without gainful employment differs from the number of working-age people who are actively seeking employment. e. Evaluate how prosperity impacts and influences the unemployment rate. (The unemployment rate increases during recessions and decreases during periods of recovery.)
2. Explain the importance of productivity and analyze how specialization, division of labor, investment in physical and human capital, and technological change affect productivity and global trade. DOK3 a. Produce a simple product through a group activity to investigate the characteristics of productivity and determine how the rate of output correlates to the degree of productivity. Compare and contrast the results after incorporating the following changes: • Specificity of task • Process • Technological advancements
3. Explore the concept of business cycles as it relates to fluctuations in the national economy from times of expansion through times of contraction. DOK3 a. Construct explanations of observed relationships between phases of the business cycle (contraction, expansion, peak, and recession) using examples of past technological successes (e.g., compact discs, videocassette recorder, pagers/beepers, etc.)

Unit 16: Personal Finance—Credit and Personal Risk Management

Competencies and Suggested Objectives

1. Analyze factors that affect the choice of credit, the cost of credit, and the legal aspects of using credit. DOK2
   a. Based on research, create a storyboard, graphic novel, comic strip, mind map, time line or related visual representation that depicts the following elements:
      - How credit cards work
      - Risks of using credit
      - How to build a high credit score
   b. Through a teacher-led discussion, identify and apply the following acts to various scenarios:
      - Truth in Lending Act
      - Fair Credit Billing Act
      - Fair Credit Reporting Act
      - Fair Debt Collection Practices Act
      - The Credit CARD Act

2. Analyze choices available to consumers for protection against risk and financial loss. DOK1
   a. Use free online modules from third-party, personal financial literacy courses to define, investigate, and determine how risk affects the potential for financial loss. Generate scores or certificates of completion if possible.

3. Describe how people make choices to protect themselves from the financial risk of lost income, assets, health, or identity. DOK1
   a. Define risk as the potential for loss and explore various consumer behaviors that would be considered no risk, moderate risk, and high risk.
   b. Explore how consumers can choose to accept risk, reduce risk, or transfer the risk to others.

4. Insurance allows people to transfer risk by paying a fee now to avoid the possibility of a larger loss later. DOK2
   a. Explore how individuals and businesses use various insurance products to protect themselves from potential financial risk. Create a graphic organizer to compare each.

Enrichment:

- In small student groups, construct a 3-D scene depicting ways in which price of insurance is influenced by an individual's behavior and determine the type of insurance product consumers must purchase to mitigate the risks associated with each scene.

Unit 17: Financial Accounting

Competencies and Suggested Objectives
1. Understand the role accountants play in business and society. DOK1 a. Research roles accountants play in different businesses to generate a report that includes: • Education/training requirements • Certifications • Average salary • Job description • Job outlook
2. Identify and describe generally accepted accounting principles (GAAP), explain how the application of GAAP impacts the recording of financial transactions, and the preparation of financial statements. DOK3 a. Using GAAP accountability principles below, develop simple marketing scenarios (e.g., cartoons or 20 second commercials) to be used by a federal regulatory agency (e.g., the U.S. Securities and Exchange Commission) to discourage unethical practices. Include the following principles: • Recognition: What items should be recognized in the financial statements (for example as assets, liabilities, revenues, and expenses)? • Measurement: What amounts should be reported for each of the elements included in financial statements? • Presentation: What line items, subtotals, and totals should be displayed in the financial statements, and how might items be aggregated within the financial statements? • Disclosure: What specific information is most important to the users of the financial statements? Disclosures both supplement and explain amounts in the statements. b. Conduct a case study involving fraud, compliance, or regulatory issues to explain how penalties and other outcomes could have been avoided if GAAP principles were followed.

3. Develop an understanding and working knowledge of an annual report and financial statements. DOK4

a. Create a presentation (multimedia, poster, song, report, video, role play, etc.) based on research that explains in detail the following three main financial statements in accounting:

- Balance sheet
- Income statement
- Cash flow statement

4. Complete the steps in the accounting cycle to prepare the financial statements. DOK1

a. Apply each step of the basic accounting cycle to an existing account provided by the teacher or a local business to include:

- Analyzing the transactions as they occur
- Recording transactions in the journals
- Posting debits and credits from journal entries to the general ledger
- Adjusting the assets with a trial balance
- Preparing financial statements (balance sheet, income statement, cash flow statement)
- Closing the temporary accounts

Enrichment:

- Playing an economy/cumulative-based game (such as Monopoly, Life, Payday), track accounting transactions on T accounts to:
  - Record transactions in the journals
  - Post debits and credits
  - Adjust assets with a trial balance
  - Prepare financial statements
  - Justify closure of temporary accounts
- Collaborate with another CTE program within your school or a business within your community to create a work-based learning activity in which real-time profitability data is generated to create a balance sheet, income statement, and a cash flow statement.

Unit 18: Budgets and Forecasting in Finance

Competencies and Suggested Objectives
1. Recognize that businesses must establish, maintain, and analyze appropriate records to make business decisions. DOK2 a. Construct a forecast of observed relationships between the different types of accounting records shown below. • Accounting records (e.g. income statement, balance sheet, cash flow statement) record income, expenses, and equity and are needed to file tax returns. • Bank statements help keep track of the business's progress and are needed to file tax returns.
2. Analyze a business organization's competitive position within the industry. DOK2 a. Create tables, graphs, and/or infographics comparing and/or contrasting market share between two rival companies (e.g., Apple and Samsung; Pepsi and Coca Cola; Toyota and Ford; etc.).
3. Analyze financial data influenced by internal and external factors to make short-term and long-term decisions. DOK3 a. Acting as consultants for a local business, research and analyze internal and external factors (listed below) to recommend short- and long-term strategic decisions that maximize profit. • Internal factors: business structure (human capital, infrastructure), size of corporation, and perception of value • External factors: economic conditions, competitors, and social and political change

Unit 19: Managerial Accounting

Competencies and Suggested Objectives
1. Assess the financial condition and operating results of a company, and analyze and interpret financial statements. DOK3 a. Establish a class business or fundraiser to determine financial conditions and create statements of the operation to include: • Conditions: profitability, cash flow, liquidity, and leverage • Statements: balance sheet, income statement, and cash flow statement
2. Use planning and control principles to evaluate the performance of an organization and apply differential analysis and present-value concepts to make decisions. DOK2 a. Using a teacher-generated or online business simulation (e.g., online coffee stand), apply differential analysis to evaluate the business's performance.
3. Develop a working knowledge of individual and business income tax procedures and requirements to comply with tax laws and regulations. DOK1 a. Using a free, online resource (e.g., IRS.gov's "Understanding Taxes" Modules 1-13 for individual, FedReserve's "Inside the Vault", or EverFi), classify and connect types of taxes, laws, and regulations (listed below) to include completion of a Schedule C and 1040. • Types of taxes: proportional, progressive, and regressive taxes • Tax laws and regulations: filing quarterly versus annually and exemptions

Unit 20: Employment Opportunities in Business

Competencies and Suggested Objectives
1. Research available jobs across business sectors to develop a chart that compares the following elements: DOK1 a. Minimum education b. Certifications c. Minimum experience d. Job description/responsibilities e. Salary
2. Analyze differences in online application requirements from a real job search. DOK1
3. Research and select a real job advertisement, then complete the following: DOK2 • Develop a cover letter to fit the job advertisement using terminology that reflects the culture and values specific to that company. • Create a resume with fabricated elements to fit the real job advertisement.
4. Demonstrate real world interview skills led by the instructor and/or advisory/craft committee members to include the following: DOK2 a. Aligned to a specific industry/job advertisement b. Professional attire c. Cover letter d. Application and/or resume
5. Hand write customized thank you letters to each member of the interview committee.DOK1
6. Document project or activity artifacts in the ePortfolio according to the teacher-generated rubric. DOK1

Student Competency Profile

Student's Name: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student, and it can serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Orientation, Safety, and Leadership		
	1.	Identify the essential characteristics of a healthy office environment.
	2.	Analyze situations in a workplace that can lead to injury or illness.
	3.	Explore security, privacy, and risk management policies and procedures for information technology.
	4.	Investigate how career and technical student organizations (CTSOs) enhance leadership skills.
	5.	Apply basic interpersonal communication skills in personal and professional situations.
	6.	Use technology to enhance the effectiveness of communication.
	7.	Describe the factors that define what is considered ethical and socially responsible business behavior.
	8.	Analyze the relationship between ethics and the law.
	9.	Analyze how modern workplace success depends on the respect of cultural differences and working effectively with people from a range of social and cultural backgrounds.
Unit 2: Introduction to Economics		
	1.	Explain the concepts of scarcity, choice, decision-making and opportunity cost.
	2.	Explain why societies develop economic systems, identify the basic features of different economic systems, and analyze the major features of the U.S. economic system.
	3.	Illustrate how voluntary exchanges and trade are reflections of negative and positive incentives resulting in gain for both parties.
	4.	Analyze the role of price on the market, buyer, and seller.
	5.	Describe different economic systems and how people work individually or collectively to allocate goods and services.

Unit 3: Personal Finance—Decision Making and Income		
	1.	Use a rational decision-making process as it applies to the roles of its citizens, workers, and consumers.
	2.	Identify various forms of income and analyze factors that affect income as a part of the career decision-making process.
	3.	Predict future earnings based on their current plans for education, training, and career options.
	4.	Evaluate how people can increase their income and job opportunities by choosing to acquire more education, work experience, and job skills.
	5.	Determine how income for most people is determined by the market value of their labor, paid as wages and salaries.
	6.	Identify how income is obtained from other sources, such as interest, dividends, and profits from the selling of stocks.
Unit 4: Entrepreneurship		
	1.	Recognize that entrepreneurs possess unique characteristics and evaluate the degree to which one possesses those characteristics.
	2.	Evaluate the opportunities, risks, advantages, and disadvantages of being an entrepreneur.
	3.	Demonstrate ethical practices and social responsibility in business.
	4.	Identify the purpose and worth of a business plan.
	5.	Identify the characteristics of the different legal structures of a business.
	6.	Identify sources of start-up funding with advantages and disadvantages of each.
	7.	Define and describe potential exit strategies for business.
Unit 5: Microeconomics		
	1.	Analyze the role of markets and prices in the U.S. economy.
	2.	Analyze the different types of market structures and the effect they have on price and the quantity of the goods and services produced.
	3.	Analyze and evaluate the impact the market structures, entrepreneurship, and institutions have on the market economy, competition, and income.
	4.	Identify markets in which economic decision-makers have participated as a buyer and as a seller and describe how the interaction of all buyers and sellers influences prices.
	5.	Predict how prices change when there is either a shortage or surplus of the product available.

Unit 6: Personal Finance—Money Management		
	1.	Evaluate how money makes it easier to trade, borrow, save, invest, and compare the value of goods and services.
	2.	Explore how the amount of money in the economy affects the overall price level.
	3.	Develop and evaluate a spending/savings plan.
	4.	Evaluate savings options to meet short- and long- term goals.
	5.	Evaluate investment options to meet short- and long- term goals.
Unit 7: Foundations of Marketing		
	1.	Analyze the marketing mix, their interrelationships, and how they are used in the marketing process.
	2.	Recognize the customer-oriented nature of marketing and analyze the impact of marketing activities on the individual, business, and society.
	3.	Analyze the characteristics, motivations, and behaviors of consumers.
	4.	Recognize how to retain customers and develop relationships with repeat customers.
	5.	Analyze the influence of internal and external factors on marketing.
Unit 8: Market Research and Analysis		
	1.	Analyze the role of marketing research in decision-making.
	2.	Describe the elements, design, and purposes of a marketing plan.
	3.	Identify and analyze the costs/benefits of finding customers.
	4.	Explain how changes in the level of competition in different markets can affect price and output levels.
Unit 9: Career Readiness and Exploration		
	1.	Assess personal skills, abilities, aptitudes, strengths, and weaknesses as they relate to career exploration and development.
	2.	Apply knowledge gained from individual assessment to a comprehensive set of goals and an individual career plan.
	3.	Utilize career resources to develop a comprehensive class/career portfolio.
	4.	Develop strategies to make an effective transition from school to career.
	5.	Relate the importance of workplace expectations to career development.
	6.	Research training and/or licenses/certifications business professionals can obtain to be more competitive in the job market.
	7.	Relate the importance of lifelong learning to career success.

Unit 10: Review of Workplace Safety and Security		
	1.	Maintain a healthy workplace environment.
	2.	Examine the design of workplace spaces that allow each employee to work comfortably without needing to overreach, sit or stand too long, or use awkward postures.
Unit 11: Internal Economics		
	1.	Analyze the role of government in economic systems, especially the role of government in the U.S. economy.
	2.	Examine the role of trade, protectionism, and monetary markets in the global economy.
	3.	Evaluate how growing international economic interdependence causes economic conditions and policies in one nation to be increasingly affected by economic conditions and policies in another nation.
	4.	Recognize that voluntary exchange occurs only when all participating parties expect to gain.
	5.	Evaluate how and why both production and consumption increase when individuals, regions, and nations specialize in what they can produce at the lowest cost and then trade with others.
	6.	Explain how investment in factories, machinery, and new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living.
Unit 12: Personal Finance—Purchasing and Financial Institutions		
	1.	Apply a decision-making model to maximize consumer satisfaction when buying goods and services.
	2.	Differentiate between the advantages and disadvantages of renting, leasing, and owning.
	3.	Interpret the differences in payment types, including debit cards, credit cards, prepaid cards, cash advances, and payday loans.
	4.	Evaluate services provided by financial deposit institutions to transfer funds.
Unit 13: Applied Human Resource Management		
	1.	Analyze management functions and their implementation and integration within the business environment.
	2.	Develop personal management skills to function effectively and efficiently in a business environment.
	3.	Examine the role of ethics and social responsibility in decision making.
	4.	Describe human resource functions and their importance to an organization's successful operation.
	5.	Describe the role of organized labor and its influence on government and business.

Unit 14: Strategic and Operations Management		
	1.	Analyze the organization of a business.
	2.	Examine intellectual property issues of copyrights, patents, and trademarks.
	3.	Apply operations management principles and procedures to the design of an operation plan.
	4.	Examine the issue of corporate culture and managing in the global environment.
	5.	Examine factors that lead to long-term sustainability within a business.
Unit 15: Macroeconomics		
	1.	Compare and contrast fiscal and monetary policy.
	2.	Explain the importance of productivity and analyze how specialization, division of labor, investment in physical and human capital, and technological change affect productivity and global trade.
	3.	Explore business cycles as they relate to fluctuations in the national economy from times of expansion through times of contraction.
Unit 16: Personal Finance—Credit and Personal Risk Management		
	1.	Analyze factors that affect the choice of credit, the cost of credit, and the legal aspects of using credit.
	2.	Analyze choices available to consumers for protection against risk and financial loss.
	3.	Describe how people make choices to protect themselves from the financial risk of lost income, assets, health, or identity.
	4.	Insurance allows people to transfer risk by paying a fee now to avoid the possibility of a larger loss later.
Unit 17: Financial Accounting		
	1.	Understand the role that accountants play in business and society.
	2.	Identify and describe generally accepted accounting principles (GAAP), explain how the application of GAAP impacts the recording of financial transactions, and the preparation of financial statements.
	3.	Develop an understanding and working knowledge of an annual report and financial statements.
	4.	Complete the steps in the accounting cycle to prepare the financial statements.
Unit 18: Budgets and Forecasting in Finance		
	1.	Recognize that businesses must establish, maintain, and analyze appropriate records to make business decisions.
	2.	Analyze a business organization’s competitive position within the industry.
	3.	Analyze financial data influenced by internal and external factors to make short- and long-term decisions.

Unit 19: Managerial Accounting		
	1.	Assess the financial condition and operating results of a company, and analyze and interpret financial statements.
	2.	Use planning and control principles to evaluate the performance of an organization and apply differential analysis and present-value concepts to make decisions.
	3.	Develop a working knowledge of individual and business income tax procedures and requirements to comply with tax laws and regulations.
Unit 20: Employment Opportunities in Business		
	1.	Research available jobs across business sectors to develop a chart that compares the included elements listed in the competency.
	2.	Analyze differences in online application requirements from a real job search.
	3.	Research and select a real job advertisement, then complete the following: DOK2 • Develop a cover letter to fit the job advertisement using terminology that reflects the culture and values specific to that company. • Create a resume with fabricated elements to fit the real job advertisement.
	4.	Demonstrate real-world interview skills led by the instructor and/or advisory/craft committee members to include elements listed in the competency.
	5.	Hand write customized thank you letters to each member of the interview committee.
	6.	Document project or activity artifacts in the ePortfolio according to the teacher-generated rubric.

Source: *Miss. Code Ann. §§ 37-1-3 and 37-31-103*

Appendix A: Industry Standards

National Business Education Association (NBEA)

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
NBEA-A1																		X			
NBEA-A2																		X	X	X	
NBEA-A3																			X	X	
NBEA-A4																		X		X	
NBEA-A5																		X			
NBEA-A6																			X	X	
NBEA-A7																				X	
NBEA-BL1		X																			
NBEA-BL2																					
NBEA-BL3		X																			
NBEA BL4															X						
NBEA-BL5																					
NBEA-BL6																	X				
NBEA-BL7																					
NBEA-BL8																					
NBEA-BL9																					
NBEA-BL10																					
NBEA-CD1										X											X
NBEA-CD2										X											X
NBEA-CD3		X								X											X
NBEA-CD4										X											X
NBEA-CD5										X											X
NBEA-CD6										X											
NBEA-CM1		X	X	X	X	X				X				X	X	X	X		X	X	X
NBEA-CM2		X	X	X	X	X				X				X	X	X	X		X	X	X
NBEA-CM3		X								X				X	X				X		
NBEA-CM4		X	X	X	X	X				X				X	X	X	X		X	X	X
NBEA-CP1				X																	
NBEA-CP2																					
NBEA-CP3																					
NBEA-CP4																					
NBEA-CP5				X															X	X	
NBEA-CP6				X															X	X	
NBEA-EC1			X																		
NBEA-EC2			X																		
NBEA-EC3			X			X															
NBEA-EC4			X														X				
NBEA-EC5						X															
NBEA-EC6																X					
NBEA-EC7			X			X						X					X				
NBEA-EC8												X									
NBEA-EC9																					
NBEA-PF1		X		X			X														
NBEA-PF2				X			X														
NBEA-PF3							X														
NBEA-PF4				X			X														
NBEA-PF5							X						X								
NBEA-PF6							X						X								
NBEA-PF7							X										X				
NBEA-PF8							X										X				
NBEA-EN1					X																
NBEA-EN2																					

NBEA-EN3					X																
NBEA-EN4					X																
NBEA-EN5																			X		
NBEA-EN6																					
NBEA-EN7		X	X																		
NBEA-EN8					X																
NBEA-EN9					X																
NBEA-IT1																					
NBEA-IT2																					
NBEA-IT3																					
NBEA-IT4		X	X	X	X	X				X											
NBEA-IT5																					
NBEA-IT6		X	X	X	X	X				X											
NBEA-IT7																					
NBEA-IT8		X	X	X	X	X				X											
NBEA-IT9																					
NBEA-IT10																					
NBEA-IT11																					
NBEA-IT12		X																			
NBEA-IT13																					
NBEA-IT14																					
NBEA-IT15		X																			
NBEA-IT16																					
NBEA-IT17																					
NBEA-IT18										X											
NBEA-IB1																					
NBEA-IB2		X																			
NBEA-IB3																					
NBEA-IB4		X																			
NBEA-IB5					X																
NBEA-IB6																					
NBEA-IB7																					
NBEA-IB8																					
NBEA-IB9																					
NBEA-MG1														X							
NBEA-MG2																					
NBEA-MG3															X						
NBEA-MG4														X							
NBEA-MG5		X												X							
NBEA-MG6																					
NBEA-MG7		X												X							
NBEA-MG8																					
NBEA-MG9																			X		
NBEA-MG10																			X		
NBEA-MG11															X						
NBEA-MG12															X						
NBEA-MK1								X													
NBEA-MK2								X													
NBEA-MK3								X													
NBEA-MK4								X													
NBEA-MK5									X												
NBEA-MK6									X												

Accounting

NBEA-A1 – Accounting Profession

- Understand the role that accountants play in business and society.
- Describe career opportunities in the accounting profession.
- Demonstrate the skills and competencies required to be successful in the accounting profession and/or in an accounting-related career.

NBEA-A2 – Financial Reports

- Develop an understanding and working knowledge of an annual report and financial statements.

NBEA-A3 – Financial Analysis

- Assess the financial condition and operating results of a company and analyze and interpret financial statements and information to make informed business decisions.

NBEA-A4 – Accounting Applications

- Identify and describe generally accepted accounting principles (GAAP), explain how the application of GAAP impacts the recording of financial transactions, and the preparation of financial statements.

NBEA-A5 – Accounting Process

- Complete the steps in the accounting cycle in order to prepare the financial statements.

NBEA-A6 – Interpretation and Use of Data

- Use planning and control principles to evaluate the performance of an organization and apply differential analysis and present-value concepts to make decision.

NBEA-A7 – Compliance

- Develop a working knowledge of individual income tax procedures and requirements to comply with tax laws and regulations.

Business Law

NBEA-BL1 – Basics of the Law

- Analyze the relationship between ethics and the law and describe sources of the law, the structure of the court system, different classifications of procedural law, and different classifications of substantive law.

NBEA-BL2 – Contract Law, Law of Sales, and Consumer Law

- Analyze the relationships between contract law, law of sales, and consumer law.

NBEA-BL3 – Agency and Employment

- Analyze the role and importance of agency law, and employment law as they relate to the conduct of business in the national and international marketplaces.

NBEA-BL4 – Business Organizations

- Describe the major types of business organizations, including sole proprietorships, partnerships, corporations, and limited liability companies, operating within the socioeconomic arena of the national and international marketplace.

NBEA-BL5 – Property Law

- Explain the legal rules that apply to personal property, [and] real property and intellectual property.

NBEA-BL6 – Negotiable Instruments, Secured Transactions, Bankruptcy

- Analyze the functions of negotiable instruments, insurance, secured transactions, and bankruptcy.

NBEA-BL7 – Computer Law

- Explain how advances in computer technology impact such areas as intellectual property, contract law, criminal law, tort law, and international law.

NBEA-BL8 – Environmental Law and Energy Regulation

- Explain the legal rules that apply to environmental law and energy regulation.

NBEA-BL9 – Family Law

- Explain the legal rules that apply to marriage, divorce, and child custody.

NBEA-BL10 – Wills and Trusts

- Determine the appropriateness of wills and trusts in estate planning.

Career Development

NBEA-CD1 – Self-Awareness

- Assess personal skills, abilities, and aptitudes and personal strengths and weaknesses as they relate to career exploration and development.

NBEA-CD2 – Career Research

- Utilize career resources to develop a career information database that includes international career opportunities.

NBEA-CD3 – Workplace Expectations

- Relate the importance of workplace expectations to career development.

NBEA-CD4 – Career Strategy

- Apply knowledge gained from individual assessment to a comprehensive set of goals and an individual career plan.

NBEA-CD5 – School-to-Career Transition

- Develop strategies to make an effective transition from school to career.

NBEA-CD6 – Lifelong Learning

- Relate the importance of lifelong learning to career success.

Communications

NBEA-CM1 – Foundations of Communications

- Communicate in a clear, complete, concise, correct, and courteous manner on personal and professional levels.

NBEA-CM2 – Societal Communication

- Apply basic social communication skills in personal and professional situations.

NBEA-CM3 – Workplace Communication

- Incorporate appropriate leadership and supervision techniques, customer service strategies, and personal ethics standards to communicate effectively with various business constituencies.

NBEA-CM4 – Technological Communication

- Use technology to enhance the effectiveness of communication.

Computation

NBEA-CP1 – Mathematical Foundations

- Apply basic mathematical operations to solve problems.

NBEA-CP2 – Number Relationships and Operations

- Solve problems involving whole numbers, decimals, fractions, percents, ratios, averages, and proportions.

NBEA-CP3 – Patterns, Functions, and Algebra

- Use algebraic operations to solve problems.

NBEA-CP4 – Measurements

- Use common international standards of measurement when solving problems.

NBEA-CP5 – Statistics and Probability

- Analyze and interpret data using common statistical procedures.

NBEA-CP6 – Problem-Solving Applications

- Use mathematical procedures to analyze and solve business problems.

Economics

NBEA-EC1 – Allocation of Resources

- Assess opportunity costs and trade-offs involved in making choices about how to use scarce economic resources.

NBEA-EC2 – Economic Systems

- Explain why societies develop economic systems, identify the basic features of different economic systems, and analyze the major features of the U.S. economic system.

NBEA-EC3 – Economic Institutions and Incentives

- Analyze the role of core economic institutions and incentives in the U.S. economy.

NBEA-EC4 – Markets and Prices

- Analyze the role of markets and prices in the U.S. economy.

NBEA-EC5 – Market Structures

- Analyze the different types of market structures and the effect they have on the price and the quality of the goods and services produced.

NBEA-EC6 – Productivity

- Explain the importance of productivity and analyze how specialization, division of labor, investment in physical and human capital, and technological change affect productivity and global trade.

NBEA-EC7 – The Role of Government

- Analyze the role of government in economic systems, especially the role of government in the U.S. economy.

NBEA-EC8 – Global Economic Concepts

- Examine the role of trade, protectionism, and monetary markets in the global economy.

NBEA-EC9 – Aggregate Supply and Aggregate Demand

- Analyze how the U.S. economy functions as a whole and describe selected macroeconomic measures of economic activity.

Personal Finance

NBEA-PF1 – Personal Decision Making

- Use a rational decision-making process as it applies to the roles of citizens, workers, and consumers.

NBEA-PF2 – Earning and Reporting Income

- Identify various forms of income and analyze factors that affect income as a part of the career decision-making process.

NBEA-PF3 – Managing Finances and Budgeting

- Develop and evaluate a spending/savings plan.

NBEA-PF4 – Saving and Investing

- Evaluate savings and investment options to meet short- and long-term goals.

NBEA-PF5 – Buying Goods and Services

- Apply a decision-making model to maximize consumer satisfaction when buying goods and services.

NBEA-PF6 – Banking and Financial Institutions

- Evaluate services provided by financial deposit institutions to transfer funds.

NBEA-PF7 – Using Credit

- Analyze factors that affect the choice of credit, the cost of credit, and the legal aspects of using credit.

NBEA-PF8 – Protecting Against Risk

- Analyze choices available to consumers for protection against risk and financial loss.

Entrepreneurship

NBEA-EN1 – Entrepreneurs and Entrepreneurial Opportunities

- Recognize that entrepreneurs possess unique characteristics and evaluate the degree to which one possesses those characteristics.

NBEA-EN2 – Marketing

- Analyze customer groups and develop a plan to identify, reach, and keep customers in a specific target market.

NBEA-EN3 – Economics

- Apply economic concepts when making decisions for an entrepreneurial venture.

NBEA-EN4 – Finance

- Use the financial concepts and tools needed by the entrepreneur in making business decisions.

NBEA-EN5 – Accounting

- Recognize that entrepreneurs must establish, maintain, and analyze appropriate records to make business decisions.

NBEA-EN6 – Management

- Develop a management plan for an entrepreneurial venture.

NBEA-EN7 – Global Markets

- Analyze the effect of cultural differences, export/import opportunities, and trends on an entrepreneurial venture in the global marketplace.

NBEA-EN8 – Legal

- Analyze how forms of business ownership, government regulations, and business ethics affect entrepreneurial ventures.

NBEA-EN9 – Business Plans

- Develop a business plan.

Information Technology

NBEA-IT1 – Impact on Society

- Assess the impact of information technology in a global society.

NBEA-IT2 – Hardware

- Describe current and emerging hardware; configure, install, and upgrade hardware; diagnose problems; and repair hardware.

NBEA-IT3 – Operating Systems and Utilities

- Identify, evaluate, select, install, use, upgrade, customize, and diagnose and solve problems with various types of operating systems and utilities.

NBEA-IT4 – Input Technologies

- Use various input technologies to enter and manipulate information appropriately.

NBEA-IT5 – Productivity Software

- Identify, evaluate, select, install, use, upgrade, and customize productivity software; diagnose and solve software problems.

NBEA-IT6 – Interactive Media

- Use multimedia software to create media rich projects.

NBEA-IT7 – Web Development and Design

- Design, develop, test, implement, update, and evaluate web solutions.

NBEA-IT8 – Information Retrieval and Synthesis

- Gather, evaluate, use, cite, and disseminate information from technology sources.

NBEA-IT9 – Database Management Systems

- Use, plan, develop, and maintain database management systems.

NBEA-IT10 – Systems Analysis and Design

- Analyze and design information systems using appropriate development tools.

NBEA-IT11 – Programming and Application Development

- Design, develop, test, and implement programs.

NBEA-IT12 – Telecommunications and Networking Infrastructures

- Develop the skills to design, deploy, and administer networks and telecommunications systems.

NBEA-IT13 – Information Technology Planning and Acquisition

- Plan the selection and acquisition of information technologies.

NBEA-IT14 – Security, Privacy, and Risk Management

- Design and implement security, privacy, and risk management policies and procedures for information technology.

NBEA-IT15 – Ethical and Legal Issues

- Describe, analyze, develop, and follow policies for managing ethical and legal issues in organizations and in a technology-based society.

NBEA-IT16 – Technical Support and Training

- Develop the technical and interpersonal skills and knowledge to train and support the user community.

NBEA-IT17 – Information Technology and Business Education

- Describe the information technology components of business functions and explain their interrelationships.

NBEA-IT18 – Information Technology Careers

- Explore positions and career paths in information technology.

International Business

NBEA-IB1 – Foundations of International Business

- Explain the role of international business; analyze how it impacts business at all levels, including the local, state, national, and international levels.

NBEA-IB2 – The Global Business Environment

- Describe the interrelatedness of the social, cultural, political, legal, and economic factors that shape and impact the global business environment.

NBEA-IB3 – International Business Communication

- Apply communication strategies necessary and appropriate for effective and profitable international business relations.

NBEA-IB4 – Global Business Ethics and Social Responsibility

- Describe the factors that define what is considered ethical and socially responsible business behavior in a global business environment.

NBEA-IB5 – Organizational Structures for International Business Activities

- Identify forms of business ownership and entrepreneurial opportunities available in international business.

NBEA-IB6 – International Trade

- Relate balance of trade concepts to the import/export process.

NBEA-IB7 – International Management

- Analyze special challenges in operations, human resources, and strategic management in international business.

NBEA-IB8 – International Marketing

- Apply marketing concepts to international business situations.

NBEA-IB9 – International Finance

- Explain the concepts, role, and importance of international finance and risk management.

Management

NBEA-MG1 – Management Functions

- Analyze the management functions and their implementation and integration within the business environment.

NBEA-MG2 – Management Theories

- Analyze management theories and their application within the business environment.

NBEA-MG3 – Business Organization

- Analyze the organization of a business.

NBEA-MG4 – Personal Management Skills

- Develop personal management skills to function effectively and efficiently in a business environment.

NBEA-MG5 – Ethics and Social Responsibility

- Examine the role of ethics and social responsibility in decision making.

NBEA-MG6 – Human Resource Management

- Describe human resource functions and their importance to an organization's successful operation.

NBEA-MG7 – Organized Labor

- Describe the role of organized labor and its influence on government and business.

NBEA-MG8 – Technology and Information Management

- Utilize information and technology tools to conduct business effectively and efficiently.

NBEA-MG9 – Industry Analysis

- Analyze a business organization's competitive position within the industry.

NBEA-MG10 – Financial Decision Making

- Analyze financial data influenced by internal and external factors in order to make short-term and long-term decisions.

NBEA-MG11 – Operations Management

- Apply operations management principles and procedures to the design of an operations plan.

NBEA-MG12 – Global Perspective

- Examine the issues of corporate culture and managing in the global environment.

Marketing

NBEA-MK1 – Foundations of Marketing

- Recognize the customer-oriented nature of marketing and analyze the impact of marketing activities on the individual, business, and society.

NBEA-MK2 – Consumers and Their Behavior

- Analyze the characteristics, motivations, and behaviors of consumers.

NBEA-MK3 – External Factors

- Analyze the influence of external factors on marketing.

NBEA-MK4 – The Marketing Mix

- Analyze the elements of the marketing mix, their interrelationships, and how they are used in the marketing process.

NBEA-MK5 – Marketing Research

- Analyze the role of marketing research in decision making.

NBEA-MK6 – The Marketing Plan

- Describe the elements, design, and purposes of a marketing plan.

Entrepreneurship and Small Business credential (ESB)

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
ESB-1.1					X																
ESB-1.2					X																
ESB-1.3					X																
ESB-1.4					X																
ESB-2.1					X																
ESB-2.2																					
ESB-2.3																					
ESB-2.4																					
ESB-3.1					X																
ESB-3.2					X																
ESB-3.3					X																
ESB-3.4																					
ESB-3.5					X														X		X
ESB-3.6					X																
ESB-3.7		X			X												X				
ESB-3.8					X																
ESB-4.1				X																	
ESB-4.2																					
ESB-4.3																			X		X
ESB-4.4														X							
ESB-4.5																					
ESB-4.6																					
ESB-4.7														X							
ESB-4.8																					
ESB-5.1								X	X												
ESB-5.2								X	X												
ESB-5.3								X	X												
ESB-5.4		X						X	X												
ESB-6.1																		X	X		X
ESB-6.2																X		X			
ESB-6.3													X					X			
ESB-6.4													X					X			
ESB-6.5																		X	X		X
ESB-6.6																		X	X		X
ESB-6.7																		X			

The Entrepreneur

ESB-1.1 – Identify the characteristics entrepreneurs have

ESB-1.2 – Given a scenario including a self-assessment outcome, identify the strengths, weaknesses, and risk tolerance the self-assessment identifies and how to compensate with services.

ESB-1.3 – Given a scenario, demonstrate the ability to recognize a business opportunity.

ESB-1.4 – Identify the risks, benefits, opportunities, and drawbacks of being an entrepreneur.

Opportunity Recognition

ESB-2.1 – Identify the benefits and drawbacks of different types of opportunities (e.g. start a new business, buy an existing business, and buy a franchise.)

ESB-2.2 – Given a scenario, analyze the demand for the good or service and opportunities in an environment.

ESB-2.3 – Given a scenario, identify the customers or potential customers for a business.

ESB-2.4 – Given a scenario, recognize a value proposition.

Starting a Business

ESB-3.1 – Identify the purposes and value of a business plan.

a. Understand the components of a typical business plan.
b. Be familiar with the strategic planning aspects of a business plan
c. Know some of the resources available to help you create a business plan

ESB-3.2 – (BASIC) Identify the appropriate legal structure, benefits and drawbacks for different legal structures for a business.

a. Understand the different basic types of business formation.
b. Understand the business structure different existing companies are organized under.

ESB-3.3 – Given a scenario, calculate the amount of money (cash and credit) needed to start a business.

a. Understand and calculate startup costs.
b. Understand and calculate ongoing (i.e. operating) business expenses

ESB-3.4 – (BASIC) Given a scenario, identify different types of licenses and regulations that are required.

a. Understand the regulatory environment of your chosen business
b. Be familiar with any licenses that will be required for your chosen business

ESB-3.5 – Identify the benefits and drawbacks of various sources of start-up funding equity (friends/family, angel investors, venture), debt (bank, credit cards, personal loans), grants (government, foundation, corporate).

a. Understand different sources of start-up money that may be available to help you start your business.
b. Be familiar with the time-value of money
c. Understand the concept and importance of cash-flow
d. Understand the difference between equity and debt

ESB-3.6 – Given a scenario, identify support that is available for the business on a local, state, and federal level.

a. Know some of the mentoring resources available to help you create a business plan
b. Understand the value of the Small Business Administration to help you start a business
c. Become familiar with federal and local Chamber of Commerce resources
d. Become familiar with trade organizations in the area that your business is in

ESB-3.7 – (BASIC) Identify the ethical practices and social responsibilities of a business

a. Understand ethics as related to an example business
b. Develop a plan for dealing with ethical considerations for a typical small business.
c. Be familiar with environmental regulations

ESB-3.8 – Identify potential exit strategies for a business

a. Understand the product life cycle and know when and if it is time to exit the business as it exists in its current form
b. Be familiar with the main types of exit strategies
c. Know the value of the company, and the sum of its parts

Business Operations

ESB-4.1 – (BASIC) Given a scenario, identify key positions and human capital needs (including compensation and benefits)

a. Understand who the necessary main employees would be for starting a small business.
b. Understand compensation for a small business

ESB-4.2 – Given a scenario, determine whether work can be completed by the owner or whether employees or service providers are needed.

a. Understand the employment needs of the business
b. Determine an employee need growth chart

ESB-4.3 – (BASIC) Given a scenario, identify the taxes that are required.

a. Understand the idea of taxation.
b. Identify different types of taxes that apply to a business.

ESB-4.4 – Given a scenario, identify intellectual property issues of trademarks, copyrights and patents.

a. Understand the difference between tangible and intangible assets
b. Be familiar with the concept of intellectual property
c. Understand the time limit ownership of intellectual property

ESB-4.5 – (BASIC) Given a scenario, identify standard operating procedures (e.g., setup, conduct, internal controls, separation of duties.)

a. Understand the various operating procedures of a typical small business.
b. Understand which employees are responsible for each procedure in a small business.

ESB-4.6 – (BASIC) Given a scenario, identify a supply chain (e.g. clear commitments, active communication, negotiated costs)

a. Understand the role that supplies play in the operation of a typical small business.
b. Be familiar with the concept of a supply chain.

ESB-4.7 – (BASIC) Given a scenario, identify the factors that lead to sustainability

a. Understand the concept of business sustainability.

ESB-4.8 – Given a scenario, identify milestones as part of a growth strategy

a. Understand the idea of setting business goals for growth.
b. Quantify and measure business milestones to verify that goals for growth have been met.
c. Recognize when business goals are attained

<u>Marketing and Sales</u>

ESB-5.1 – Given a scenario, develop a sales strategy and identify characteristics of a successful sale.

a. Understand the concept of market share and target market.
b. Develop reasonable sales goals in quantifiable terms.
c. Recognize who your company's potential customer is.

ESB-5.2 – Given a scenario, identify and analyze the cost/benefits of finding customers.

a. Understand the costs associated with generating new customers.
b. Understand the value of finding new customers.

ESB-5.3 – Given a scenario, identify how to retain customers and develop a relationship with repeat customers.

a. Understand the value of a repeat customer.
b. Identify customer retention methods.

ESB-5.4 – (BASIC) Given a scenario, determine value and methods of communication including: Web sites, Brochures, Social Media, and Advertising.

a. Understand the link between communication methods and customer development and retention.

Financial Management

ESB-6.1 – Given a scenario, interpret basic financial statements such as income statements and balance sheets

a. Understand the four main financial statements (Income Statement, Balance Sheet, Cash Flow Statement, and Statement of Shareholder Equity).
b. Understand the history of these statements and the need for them.
c. Understand how these financial forms relate to financial accounting and managerial accounting.

ESB-6.2 – Given a scenario, understand the factors that influence credit ratings and the importance of a positive credit rating.

a. Understand the concept of credit ratings.
b. Identify factors that are used to determine credit ratings.
c. Identify the consequences of a higher or lower credit rating score.

ESB-6.3 – Given a list of expenses, identify which are fixed versus variable.

a. Understand fixed expenses.
b. Understand variable expenses.

ESB-6.4 – (BASIC) Given a scenario, identify the factors that impact the price to a customer

a. Understand supply and demand equilibrium.

ESB-6.5 – (BASIC) Given a scenario, identify and analyze cash flow including accounts receivable, accounts payable, inventory, and debt.

a. Understand the flow of cash through the business.

ESB-6.6 – (BASIC) Given a scenario, create a cash flow budget.

a. Understand the importance of proper cash flow management

ESB-6.7 – (BASIC) Given a scenario, identify the break-even point for the business.

a. Understand the formula required to determine the break-even point for the business.

Appendix B: 21st Century Skills[1]

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
CS1		X					X	X		X	X	X			X						
CS2			X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
CS3		X	X									X	X	X	X	X				X	
CS4		X																			
CS5		X									X	X			X						
CS6		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
CS7		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CS8		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X
CS9		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CS10		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
CS11		X	X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
CS12		X	X	X	X	X				X				X							X
CS13		X	X	X	X	X	X	X	X	X			X	X	X		X		X		X
CS14		X	X	X	X	X			X	X	X	X		X	X	X	X		X	X	X
CS15		X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X
CS16		X	X	X	X	X	X	X		X		X	X	X	X		X	X	X	X	X

CSS1-21st Century Themes

CS1 Global Awareness

1. Using 21st century skills to understand and address global issues
2. Learning from and working collaboratively with individuals representing diverse cultures, religions, and lifestyles in a spirit of mutual respect and open dialogue in personal, work, and community contexts
3. Understanding other nations and cultures, including the use of non-English languages

CS2 Financial, Economic, Business, and Entrepreneurial Literacy

1. Knowing how to make appropriate personal economic choices
2. Understanding the role of the economy in society
3. Using entrepreneurial skills to enhance workplace productivity and career options

CS3 Civic Literacy

1. Participating effectively in civic life through knowing how to stay informed and understanding governmental processes
2. Exercising the rights and obligations of citizenship at local, state, national, and global levels
3. Understanding the local and global implications of civic decisions

CS4 Health Literacy

1. Obtaining, interpreting, and understanding basic health information and services and using such information and services in ways that enhance health
2. Understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance, and stress reduction
3. Using available information to make appropriate health-related decisions
4. Establishing and monitoring personal and family health goals
5. Understanding national and international public health and safety issues

CS5 Environmental Literacy

[1] *21st century skills.* (n.d.). Washington, DC: Partnership for 21st Century Skills.

1. Demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water, and ecosystems.
2. Demonstrate knowledge and understanding of society's impact on the natural world (e.g., population growth, population development, resource consumption rate, etc.).
3. Investigate and analyze environmental issues, and make accurate conclusions about effective solutions.
4. Take individual and collective action toward addressing environmental challenges (e.g., participating in global actions, designing solutions that inspire action on environmental issues).

CSS2-Learning and Innovation Skills

CS6 Creativity and Innovation

1. Think Creatively
2. Work Creatively with Others
3. Implement Innovations

CS7 Critical Thinking and Problem Solving

1. Reason Effectively
2. Use Systems Thinking
3. Make Judgments and Decisions
4. Solve Problems

CS8 Communication and Collaboration

1. Communicate Clearly
2. Collaborate with Others

CSS3-Information, Media and Technology Skills

CS9 Information Literacy

1. Access and Evaluate Information
2. Use and Manage Information

CS10 Media Literacy

1. Analyze Media
2. Create Media Products

CS11 ICT Literacy

1. Apply Technology Effectively

CSS4-Life and Career Skills

CS12 Flexibility and Adaptability

1. Adapt to change
2. Be Flexible

CS13 Initiative and Self-Direction

1. Manage Goals and Time
2. Work Independently
3. Be Self-directed Learners

CS14 Social and Cross-Cultural Skills

1. Interact Effectively with others

2. Work Effectively in Diverse Teams

CS15 Productivity and Accountability

1. Manage Projects
2. Produce Results

CS16 Leadership and Responsibility

1. Guide and Lead Others
2. Be Responsible to Others

Appendix C: College and Career Ready Standards - Economics

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
E1.1			X																		
E1.2			X																		
E1.3			X																		
E1.4			X																		
E1.5			X																		
E1.6			X																		
E1.7																					
E1.8			X																		
E2.1			X									X									
E2.2			X									X									
E2.3			X									X									
E2.4			X									X									
E2.5			X									X									
E3.1			X									X									
E3.2			X									X									
E3.3			X									X									
E3.4						X						X									
E3.5						X						X									
E3.6												X									
E3.7												X									
E3.8												X									
E3.9												X									
E3.10						X						X									
E3.11			X									X									
E4.1						X															
E4.2																					
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E4.4						X															
E4.5						X															
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E4.7						X															
E4.8						X															
E4.9			X																		
E4.10			X																		
E4.11						X															
E4.12			X			X															
E5.1			X																		
E5.2			X																		
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E5.16						X															
E5.17			X																		
E6.1							X											X			
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College and Career Ready Economics

E.1 – Explain the concepts of scarcity, choice, decision making and opportunity cost.

- **1.1** – Identify that scarcity is the condition of not being able to have all of the goods and services that one wants. It exists because human wants for goods and services exceed the quantity of goods and services that can be produced using all available resources.
- **1.2** – Explain that scarcity is experienced by individuals, governments, and societies.
- **1.3** – Illustrate that making good choices should involve trading off the expected value of one opportunity against the expected value of its best alternative.
- **1.4** – Explain the choices people make have both present and future consequences and differs across individuals and societies.
- **1.5** – Identify choices made by individuals, firms, or government officials are constrained by the resources to which they have access.
- **1.6** – Discuss ways that decisions made by individuals, firms, or government officials often have long run unintended consequences that can partially or entirely offset or supplement the initial effects of the decision
- **1.7** – Explain the concept of marginal benefit and marginal cost in relationship to choice.

1.8 – Evaluate the role that risk takes in decision making and that risk can be reduced by diversification

E.2 – Describe different economic systems and how people work individually or collectively to allocate goods and services.

2.1 – Explain that scarcity requires the use of some distribution method to allocate goods, services, and resources, whether the method is selected explicitly or not.

2.2 – Describe the differences between a market economy, in which allocations result from individuals making decisions as buyers and sellers, and a command economy, in which resources are allocated according to central authority.

2.3 – Identify the three major economic questions: What goods and services will be produced? How will these goods and services be produced? Who will consume them?

2.4 – Compare and contrast how various economics system vary in the extent to which they rely on government directives (central planning) and signals (prices) from private markets to allocate scarce goods, services, and productive resources.

2.5 – Compare the benefits and costs of different allocation methods in order to choose the method that is most appropriate for some specific problem can result in more effective allocations and a more effective overall allocation system.

E.3 – Illustrate how voluntary exchanges and trade are reflections of negative and positive incentives resulting in gain for both parties and that specialization in trade can lead to lower costs of production and increased production and consumption.

3.1 – Describe how consumers, producers, workers, savers, investors, and citizens, people respond to incentives in order to allocate their scarce resources in ways that provide them the highest possible net benefits.

3.2 – Explain how Free trade increases worldwide material standards of living.

3.3 – Evaluate gains from free trade and recognize that they are not distributed equally, and some individuals or groups may lose more than they gain when trade barriers are reduced.

3.4 – Explain why even though there are mutual benefits from trade among people in different countries, many nations employ trade barriers to restrict free trade for national defense reasons, to protect key industries, or because some companies and workers are hurt by free trade.

3.5 – Explain why import restrictions by public policies results in consumers pay higher prices and job opportunities and profits in exporting firms may decrease.

3.6 – Explain that Labor productivity is output per worker

3.7 – Evaluate how growing international economic interdependence causes economic conditions and policies in one nation to be increasingly affected by economic conditions and policies in other nations.

3.8 – Describe how individuals and nations have a comparative advantage in the production of goods or services if they can produce a product at a lower opportunity cost than other individuals or nations.

3.9 – Demonstrate that international trade stems mainly from factors that confer comparative advantage, including international differences in the availability of productive resources and differences in relative prices.

3.10 – Explain that transaction costs are costs (not to be confused with the price of the good or service) that are associated with the purchase of a good or service, such as the cost of locating buyers or sellers, negotiating the terms of an exchange, and insuring that the exchange occurs on the agreed upon terms. When transaction costs decrease, trade increases.

3.11 – Illustrate that an individual, region, or nation can produce at lowest opportunity cost depend on many factors (which may vary over time), including available resources, technology, and political and economic institutions.

E.4 – Analyze the role of price on the market, the buyer and the seller.

4.1 – Demonstrate that market prices are determined through the buying and selling decisions made by buyers and sellers.

4.2 – Explain that the term 'relative price' refers to the price of one good or service compared to the prices of other goods and services. Relative prices are the basic measures of the relative scarcity of products when prices are set by market forces (supply and demand).

4.3 – Demonstrate that the market clearing or equilibrium price for a good or service is the price at which quantity supplied equals quantity demanded.

4.4 – Explain that if a price is above the market clearing price, it will eventually fall, causing sellers to produce less and buyers to purchase more; if it is below the market clearing price, it will eventually rise, causing sellers to produce more and buyers to purchase less.

4.5 – Explain that market outcomes depend on the resources available to buyers and sellers, and on government policies.

4.6 – Demonstrate that a shortage occurs when buyers want to purchase more than producers want to sell at the prevailing price and that a surplus occurs when producers want to sell more than buyers want to purchase at the prevailing price.

4.7 – Explain that shortages of a product usually result in price increases in a market economy; surpluses usually result in price decreases.

4.8 – Relate the concept of market price to exchange rates which are set in the foreign exchange market. When the exchange rate between two currencies changes, the relative prices of the goods and services traded among countries using those currencies change; as a result, some groups gain and others lose.

4.9 – Recognize that demand for a product changes when there is a change in consumers' incomes, preferences, the prices of related products, or in the number of consumers in a market.

4.10 – Recognize that the supply of a product changes when there are changes in either the prices of the productive resources used to make the product, the technology used to make the product, the profit opportunities available to producers from selling other products, or the number of sellers in a market.

4.11 – Illustrate that changes in supply or demand cause relative prices to change; in turn, buyers and sellers adjust their purchase and sales decisions.

4.12 – Illustrate how government-enforced price ceilings set below the market-clearing price and government-enforced price floors set above the market-clearing price distort price signals and incentives to producers and consumers. Price ceilings can cause persistent shortages, while price floors can cause persistent surpluses.

E.5 – Analyze and evaluate the impact the market structures, entrepreneurship and institutions have on the market economy, competition and income.

5.1 – Describe how pursuit of self-interest in competitive markets usually leads to choices and behavior that also promote the national level of well-being.

5.2 – Evaluate the level of competition in an industry is affected by the ease with which new producers can enter the industry, and by consumers' information about the availability, price and quantity of substitute goods and services.

5.3 – Evaluate how market structures which are dominated by large firms, often competing against only a few other firms cause prices to be higher than they would be in more competitive markets.

5.4 – Explain how collusion among buyers or sellers reduces the level of competition in a market and that collusion is more difficult in markets with large numbers of buyers and sellers.

5.5 – Identify the household as a major institution in which consumption and production take place. Recognize that Banks and other financial institutions channel funds from savers to borrowers and investors.

5.6 – Describe how Labor unions have influenced laws created in market economies and, through the process of collective bargaining with employers, labor unions represent some workers in negotiations involving wages, fringe benefits, and work rules.

5.7 – Identify the role that Not-for-profit organizations have and that they are established primarily for religious, health, educational, civic, or social purposes and are exempt from certain taxes.

5.8 – Evaluate the role that Property rights, contract enforcement, standards for weights and measures, incorporation and liability rules affect incentives for people to produce and exchange goods and services have in regulating price and market security.

5.9 – Discuss how entrepreneurs organize resources to produce goods and services because they expect to earn profits.

5.10 – Demonstrate that Entrepreneurs (as well as other sellers) earn profits when the revenues they receive from selling the products they sell are greater than the costs of production.

5.11 – Demonstrate that Entrepreneurs (as well as other sellers) incur losses when the revenues they receive from selling the products they sell do not cover the costs of production.

5.12 – Compare and contrast positive and negative aspects of entrepreneurship.

5.13 – Evaluate how entrepreneurial decisions are influenced by tax, regulatory, education, and research support policies.

5.14 – Explain and define the different forms of getting income: labor, capital, natural resources, and entrepreneurial talents.

5.15 – Analyze how peoples' incomes, in part, reflect choices they have made about education, training, skill development, and careers.

5.16 – Demonstrate how changes in the structure of the economy, including technology, government policies, the extent of collective bargaining and discrimination, can influence personal income.

5.17 – Illustrate how in a labor market, in the absence of other changes, a higher wage increases the reward for work and reduces the willingness of employers to hire workers.

E.6 – Evaluate the role of money and its relationship to inflation, unemployment and interest rates in the market economy.

6.1 – Describe the three functions of money: a store of value, a unit of account, and a medium of exchange.

6.2 – Explain how money encourages specialization by decreasing the costs of exchange.

6.3 – Identify Inflation and its impact on the value of money.

6.4 – Compare and contrast M-1 and M-2 money in the United States.

6.5 – Explain why deposits in checking accounts are considered money but assets such as stocks and bonds are not. Also explain why a credit card should not be considered money.

6.6 – People consume goods and services, not money; money is useful primarily because it can be used to buy goods and services.

6.7 – Producers use natural resources, human resources, and capital goods (not money) to make goods and services.

6.8 – Inflation is an increase in most prices; deflation is a decrease in most prices.

6.9 – The consumer price index (CPI) is the most commonly used measure of price-level changes. It can be used to compare the price level in one year with price levels in earlier or later periods.

6.10 – The annual inflation rate is the percentage change in the average prices of goods and services over a twelve month period.
6.11 – Explain how in the long-run, inflation results from increases in a nation's money supply that exceed increases in its output of goods and services.
6.12 – Define an interest rate as the price of money that is borrowed or saved which are determined by the forces of supply and demand.
6.13 – Distinguish between real and nominal interest rates.
6.14 – Evaluate the impact of higher real interest rates on business investment spending and consumer spending on housing, cars, and other major purchases.
6.15 – Describe how expectations of increased inflation may lead to higher interest rates.
6.16 – Examine the types of unemployment.
6.17 – Evaluate why unemployment statistics are an imperfect methods of measuring unemployment.
6.18 – Compare and contrast how unexpected inflation imposes costs on many people and benefits others.
6.19 – Discuss how inflation and unemployment can reduce the rate of growth of national living standards.

E.7 – Describe economic growth and the causes and effects of economic fluctuations.

7.1 – Describe the characteristics of economic growth in the long and short term. Trace and illustrate how economic growth has been a vehicle for alleviating poverty and raising standards of living.
7.2 – Explain the importance of investing in new physical or human capital on future productivity and consumption, but such investments require the sacrifice of current consumption and entail economic risks.
7.3 – Describe how lower interest rates encourage investment.
7.4 – Describe how the rate of productivity increase in an economy is strongly affected by the incentives that reward successful innovation and investments (in research and development, and in physical and human capital).
7.5 – Define and explain GDP, its components, and how it can be calculated.
7.6 – Compare and contrast GDP and GDP per capita.
7.7 – Compare and contrast real and nominal GDP.
7.8 – Evaluate the business cycle in terms of fluctuations in real GDP around its potential level.

E.8 – Evaluate the role of the government in correcting market failures.

8.1 – Describe the reasons for a market failure.
8.2 – Explain the role for government in the economy is to define, establish, and enforce property rights.
8.3 – Compare and contrast positive and negative externalities on the market.
8.4 – Identify methods the United States government can use to help correct for insufficient output of a positive and excess production of negative externalities: such as subsidies, laws, government ownership, income redistribution through tax laws, and price controls.
8.5 – Evaluate the pros and cons of market intervention by the government to correct market failures.

E.9 – Compare and contrast Fiscal and Monetary Policy.

9.1 – Discuss how Fiscal policies are decisions to change spending and taxation levels by the federal government to influence national levels of output, employment, and prices
9.2 – Describe the short term and long term benefits and costs of Fiscal policy.
9.3 – Discuss how monetary policy by the Federal Reserve Bank influences the overall levels of employment, output, and prices.

9.4 – Distinguish between a budget deficit, a budget surplus and a balanced budget.
9.5 – Describe why a government debt is created.
9.6 – Evaluate how monetary policies lead to changes in the supply of money, short term interest rates, and the availability of credit.
9.7 – Describe the Federal Reserve System's three major monetary policy tools.
9.8 – Distinguish between the federal funds rate, the discount rate and the prime rate.
9.9 – Describe the reasons the Federal Reserve would increase interest rate targets.

Appendix D: College and Career Ready Standards – English Language Arts

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
RL.9.1																					
RL.9.2																					
RL.9.3																					
RL.9.4														X							
RL.9.5																					
RL.9.6																					
RL.9.7																					
RL.9.8																					
RL.9.9																					
RL.9.10																					
RL.9.10																					
RI.9.3														X	X						
RI.9.5																					
RI.9.6																					
RI.9.7																					
RI.9.8		X	X							X											
RI.9.9																					
W.9.1		X	X	X	X	X										X					X
W.9.2		X	X	X	X	X				X				X		X					X
W.9.3		X	X	X	X	X				X											
W.9.4		X	X	X	X	X				X				X		X					X
W.9.5																					
W.9.6		X	X	X	X	X				X				X		X			X		X
W.9.7		X	X				X	X		X		X	X	X	X	X		X	X		X
W.9.8		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
W.9.9		X												X	X	X			X	X	
W.9.10																					
SL.9.1		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X			X
SL.9.2		X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X		
SL.9.3								X	X		X	X	X					X			
SL.9.4		X	X	X	X	X				X				X	X				X		
SL.9.5		X	X	X	X	X				X				X	X		X		X		
SL.9.6		X	X		X									X	X						X
L.9.1		X	X	X	X	X				X											X
L.9.2		X	X							X											X
L.9.3		X	X	X	X	X				X											X
L.9.4														X	X	X	X				X
L.9.5																					
L.9.6		X	X	X	X	X				X				X	X	X	X		X	X	X
RL.10.10																					
RH.9-10.1														X	X						
RH.9-10.2		X			X					X				X	X						
RH.9-10.3														X	X						
RH.9-10.4														X	X		X				X
RH.9-10.5																					
RH.9-10.6		X		X	X																
RH.9-10.7															X		X			X	
RH.9-10.8																					
RH.9-10.9		X		X						X							X				
RH.9-10.10																					
RST.9-10.1		X	X	X	X	X				X				X	X		X				
RST.9-10.2		X								X				X	X	X	X				
RST.9-10.3															X					X	
RST.9-10.4														X	X	X	X		X	X	
RST.9-10.5							X	X	X			X			X		X				

RST.9-10.6																				X
RST.9-10.7		X	X	X	X					X				X	X		X		X		
RST.9-10.8																			X		
RST.9-10.9		X	X	X	X					X										X	
RST.9-10.10																					
WHST.9-10.1		X	X	X	X	X				X											
WHST.9-10.2		X	X	X	X	X				X				X	X	X					
WHST.9-10.3																					
WHST.9-10.4															X						X
WHST.9-10.5																					X
WHST.9-10.6		X	X	X	X	X				X											X
WHST.9-10.7		X	X	X	X	X				X				X	X	X			X		X
WHST.9-10.8		X	X	X	X	X				X											
WHST.9-10.9														X	X	X			X		
WHST.9-10.10																					
RL.11.1		X	X	X	X	X				X				X	X						
RL.11.2																					
RL.11.3																					
RL.11.4																					
RL.11.5																					
RL.11.6																					
RL.11.7																					
RL.11.8																					
RL.11.9																					
RL.11.10																					
RI.11.3		X	X	X	X	X				X				X	X						
RI.11.4														X	X		X				
RI.11.5																					
RI.11.6																					
RI.11.7		X	X	X	X	X				X				X	X		X				
RI.11.8																					
RI.11.9																					
RI.11.10																					
W.11.1		X	X	X	X	X				X											
W.11.2		X	X	X	X	X				X				X	X	X					
W.11.3		X	X	X	X					X											
W.11.4		X	X	X	X	X				X					X						X
W.11.5																					X
W.11.6		X	X	X	X	X				X											X
W.11.7		X	X	X	X	X				X				X	X	X					X
W.11.8		X	X	X	X	X				X											
W.11.9														X	X	X	X				
W.11.10																					
SL.11.1		X	X	X	X	X				X				X	X	X	X				
SL.11.2		X	X	X	X	X				X				X	X	X	X		X		
SL.11.3																					
SL.11.4		X	X	X	X	X				X				X	X	X	X				
SL.11.5		X	X	X	X	X				X				X	X				X		
SL.11.6														X	X						
L.11.1																					
L.11.2																					
L.11.3																					
L.11.4																					
RL.12.10																					
RH.11-12.1		X	X	X	X	X				X											
RH.11-12.2		X	X	X	X	X															
RH.11-12.3		X	X	X	X					X					X						
RH.11-12.4														X	X	X	X				
RH.11-12.5																					
RH.11-12.6																					X
RH.11-12.7		X	X	X	X	X				X				X	X						
RH.11-12.8																					
RH.11-12.9		X	X	X	X					X											
RH.11-12.10																					

RST.11-12.1		X		X	X	X								X	X	X	X		X		
RST.11-12.2		X	X	X	X	X				X				X	X	X	X				
RST.11-12.3															X					X	
RST.11-12.4														X	X	X	X		X	X	X
RST.11-12.5																					
RST.11-12.6																					
RST.11-12.7		X	X	X	X	X				X				X	X		X		X		
RST.11-12.8																					
RST.11-12.9		X	X	X	X	X				X				X	X		X				
RST.11-12.10		X	X	X	X	X				X				X	X		X				
WHST.11-12.1		X	X	X	X					X											
WHST.11-12.2		X								X				X	X						
WHST.11-12.6		X	X	X	X	X				X											X
WHST.11-12.8		X	X	X	X	X				X											

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Reading Literature Key Ideas and Details

RL.9.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.

RL.9.2 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.

RL.9.3 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.

Craft and Structure

RL.9.4 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).

RL.9.5 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.

RL.9.6 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.

Integration of Knowledge and Ideas

RL.9.7 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 Landscape with the Fall of Icarus).

RL.9.8 Not applicable to literature.

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RL.9.9 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

RL.9.10 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.

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Reading Informational Text Key Ideas and Details

RI.9.3 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.

Craft and Structure

RI.9.5 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).
RI.9.6 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.

Integration of Knowledge and Ideas

RI.9.7 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.
RI.9.8 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.
RI.9.9 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.

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Writing Text Types and Purposes

W.9.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.9.1a 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.
W.9.1b 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.
W.9.1c 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.
W.9.1d Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
W.9.1e Provide a concluding statement or section that follows from and supports the argument presented.
W.9.2 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.
W.9.2a 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.
W.9.2b 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.
W.9.2c Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.

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W.9.2d Use precise language and domain-specific vocabulary to manage the complexity of the topic.
W.9.2e Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
W.9.2f 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).
W.9.3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
W.9.3a 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.

W.9.3b Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
W.9.3c Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.
W.9.3d Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.
W.9.3e Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Production and Distribution of Writing

W.9.4 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.)
W.9.5 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.)
W.9.6 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.

Research to Build and Present Knowledge

W.9.7 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.

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W.9.8 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.
W.9.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.9.9a 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]").
W.9.9b 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").

Range of Writing

W.9.10 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 audience.

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SL.9.1 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.
SL.9.1a 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.
SL.9.1b 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.
SL.9.1c 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.

SL.9.1d 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.
SL.9.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
SL.9.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

Presentation of Knowledge and Ideas

SL.9.4 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.

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SL.9.5 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.
SL.9.6 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 for specific expectations.)

College and Career Ready English I
Language
Conventions of Standard English

L.9.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
L.9.1a Use parallel structure.*
L.9.1b 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.
L.9.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
L.9.2a Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.
L.9.2b Use a colon to introduce a list or quotation.
L.9.2c Spell correctly

Knowledge of Language

L.9.3 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
L.9.3a Write and edit work so that it conforms to the guidelines in a style manual (e.g., MLA Handbook, Turabian's Manual for Writers) appropriate for the discipline and writing type.

Vocabulary Acquisition and Use

L.9.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.
L.9.4a 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.
L.9.4b Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy).

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L.9.4c 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.
L.9.4d 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).

L.9.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
L.9.5a Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text.
L.9.5b Analyze nuances in the meaning of words with similar denotations.
L.9.6 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.

College and Career Ready English II

Range of Reading and Level of Text Complexity

RL.10.10 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.

Grades 9-10: Literacy in History/SS

Reading in History/Social Studies Key Ideas and Details

RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.
RH.9-10.2 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.
RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

Craft and Structure

RH.9-10.4 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 science.
RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.
RH.9-10.6 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.

Integration of Knowledge and Ideas

RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.
RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.
RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Range of Reading and Level of Text Complexity

RH.9-10.10 By the end of grade 10, read and comprehend history/social studies texts in the grades 9–10 text complexity band independently and proficiently.

Grades 9-10: Literacy in Science and Technical Subjects

Reading in Science and Technical Subjects Key Ideas and Details

RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
RST.9-10.2 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.
RST.9-10.3 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.

Craft and Structure

RST.9-10.4 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 grades 9–10 texts and topics.
RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

RST.9-10.6 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.

Integration of Knowledge and Ideas

RST.9-10.7 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.

RST.9-10.8 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.

RST.9-10.9 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

Range of Reading and Level of Text Complexity

RST.9-10.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

Grades 9-10: Writing in History/SS, Science, and Technical Subjects

Writing Text Types and Purposes

WHST.9-10.1 Write arguments focused on discipline-specific content.

WHST.9-10.1a 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.

WHST.9-10.1b 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.

WHST.9-10.1c 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.

WHST.9-10.1d Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

WHST.9-10.1e Provide a concluding statement or section that follows from or supports the argument presented.

WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

WHST.9-10.2a 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.

WHST.9-10.2b 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.

Grades 9-10

Writing in History/SS, Science, and Technical Subjects

WHST.9-10.2c Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.

WHST.9-10.2d 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.

WHST.9-10.2e Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.

WHST.9-10.2f 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).

WHST.9-10.3 Not Applicable

Production and Distribution of Writing

WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-10.5 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.
WHST.9-10.6 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.

Research to Build and Present Knowledge

WHST.9-10.7 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.

WHST.9-10.8 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.
WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

Grades 9-10
Writing in History/SS, Science, and Technical Subjects
Range of Writing

WHST.9-10.10 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.

English III
Reading Literature Key Ideas and Details

RL.11.1 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.
RL.11.2 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.
RL.11.3 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).

Craft and Structure

RL.11.4 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.)
RL.11.5 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.
RL.11.6 Analyze a case in which grasping a point of view requires distinguishing what is directly stated in a text from what is really meant (e.g., satire, sarcasm, irony, or understatement).

Integration of Knowledge and Ideas

RL.11.7 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.)
RL.11.8 Not applicable to literature.
RL.11.9 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.

Range of Reading and Level of Text Complexity

RL.11.10 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.

English III

Reading Informational Text Key Ideas and Details

Rl.11.3 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

Rl.11.4 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).
Rl.11.5 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.
Rl.11.6 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

Rl.11.7 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.
Rl.11.8 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).
Rl.11.9 Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including Them 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.

Range of Reading and Level of Text Complexity

Rl.11.10 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.

English III

Writing

W.11.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.11.1a 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.
W.11.1b 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.
W.11.1c 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.
W.11.1d Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
W.11.1e Provide a concluding statement or section that follows from and supports the argument presented.
W.11.2 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.
W.11.2a 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.

English III

W.11.2b 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.
W.11.2c 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.
W.11.2d Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
W.11.2e Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
W.11.2f 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).
W.11.3 Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
W.11.3a 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.
W.11.3b Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.
W.11.3c 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).
W.11.3d Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.
W.11.3e Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.

Production and Distribution of Writing

W.11.4 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.)

English III

W.11.5 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.)
W.11.6 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

W.11.7 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.
W.11.8 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.
W.11.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.11.9a 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").
W.11.9b 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

W.11.10 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.

English III
Speaking and Listening
Comprehension and Collaboration

SL.11.1 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.
SL11.1a 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.
SL.11.1b Work with peers to promote civil, democratic discussions and decision making, set clear goals and deadlines, and establish individual roles as needed.
SL.11.1c 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.
SL.11.1d 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.
SL.11.2 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.
SL.11.3 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

SL.11.4 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.

English III

SL11.5 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.
SL.11.6 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 for specific expectations.)

English III
Language
Conventions of Standard English

L.11.1a Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.
L.11.1b Resolve issues of complex or contested usage, consulting references (e.g., Merriam-Webster's Dictionary of English Usage, Garner's Modern American Usage) as needed.
L.11.2a Observe hyphenation conventions.
L.11.3a Vary syntax for effect, consulting references (e.g., Tufte's Artful Sentences) for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.

Vocabulary Acquisition and Use

L.11.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.
L.11.4b Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).

English IV

Range of Reading and Level of Text Complexity

RL.12.10 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.

Grades 11-12: Literacy in History/SS

Reading in History/Social Studies Key Ideas and Details

RH.11-12.1 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.

RH.11-12.2 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.

RH.11-12.3 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

RH.11-12.4 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 faction in Federalist No. 10).

RH.11-12.5 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.

RH.11-12.6 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

Rh.11-12.7 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.

RH.11-12.8 Evaluate an author's premises, claims, and evidence by corroborating or challenging them with other information.

RH.11-12.9 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

RH.11-12.10 By the end of grade 12, read and comprehend history/social studies texts in the grades 11–CCR text complexity band independently and proficiently.

Grades 11-12: Literacy in Science and Technical Subjects

Reading in Science and Technical Subjects Key Ideas and Details

RST. 11-12.1 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.

RST.11-12.2 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.

RST.11-12.3 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

RST.11-12.4 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 grades 11–12 texts and topics.

RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.

RST.11-12.6 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.

RST.11-12.7 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.

RST.11-12.8 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.

RST.11-12.9 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

RST.11-12.10 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.

Grades 11-12: Writing I History/SS, Science and Technical Subjects

Writing

Text Types and Purposes

WHST.11-12.1a 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.

WHST.11-12.1b 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.

WHST.11-12.1c 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.

WHST.11-12.2a 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.

Grades 11-12: Writing I History/SS, Science and Technical Subjects

WHST.11-12.2d 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.

Production and Distribution of Writing

WHST.11-12.6 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.

WHST.11-12.8 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.

Appendix E: College and Career Ready Standards – Mathematics

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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Mathematics Standards

Number and Quantity

Reason quantitatively and use unites to solve problems

N-Q.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.*

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

Algebra

Analyze and solve linear equations and pairs of simultaneous linear equations

8.EE.8 Analyze and solve pairs of simultaneous linear equations.

a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

Interpret the structure of expressions

A-SSE.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.
A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*
c. Use the properties of exponents to transform expressions for exponential functions. For example the expression $1.15t$ can be rewritten as $[1.151/12]\ 12t \approx 1.01212t$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

Creating equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*
A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
A-CED.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.*

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.

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

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.

Functions

Define, evaluate, and compare functions

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. 1

8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
8.F.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.

Use functions to model relationships between quantities

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

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.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.* Analyze functions using different representations Supporting
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.
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.

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities.* a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

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

F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.*

a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.
b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
F-LE.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).*
F-LE.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.* Interpret expressions for functions in terms of the situation they model Supporting
F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.*

Geometry

Understand and apply the Pythagorean Theorem

8.G.6 Explain a proof of the Pythagorean Theorem and its converse.
8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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.6 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.

Statistics and Probability

Investigate patterns of association in bivariate data

8.SP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

8.SP.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.

8.SP.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

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).*

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.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.

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 between correlation and causation.*

Algebra I

Number and Quantity

Use properties of rational and irrational numbers

N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Reason quantitatively and use units to solve problems

N-Q.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.*

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

Algebra

Interpret the structure of expressions

A-SSE.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.

A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y 4 as (x2) 2 – (y2) 2 thus recognizing it as a difference of squares that can be factored as (x2 – y 2) (x2 + y2).

Write expressions in equivalent forms to solve problems

A-SSE.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%.

Algebra I

Perform arithmetic operations on polynomials

A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Understand the relationship between zeros and factors of polynomials

A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Create equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

A-CED.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.*

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.

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.

a. 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.

b. 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 ± bi for real numbers a and b.

Algebra I

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

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.

Functions

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.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.*

Algebra I

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.

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.

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. B

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities.*

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

Build new functions from existing functions

F-BF.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

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

F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.*

a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F-LE.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).*

F-LE.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.*

Algebra I

Interpret expressions for functions in terms of the situation they model

F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.*

Statistics and Probability *

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).*

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.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.

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 between correlation and causation.*

Geometry Course
Geometry
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.6 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.

Geometry Course
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.

Understand similarity in terms of similarity transformations

G-SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:
a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
G-SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems involving similarity

G-SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles

G-SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.
G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

Understand and apply theorems about circles

G-C.1 Prove that all circles are similar
G-C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Find arc lengths and areas of sectors of circles

G-C.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.

Translate between the geometric description and the equation for a conic section A

G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Use coordinates to prove simple geometric theorems algebraically

G-GPE.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).
G-GPE.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).
G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*

Explain volume formulas and use them to solve problems

G-GMD.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.
G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*

Visualize relationships between two-dimensional and three-dimensional objects

G-GMD.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.

Apply geometric concepts in modeling situations

G-MG.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).*

G-MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*

G-MG.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).*

Algebra II

Number and Quantity

Extend the properties of exponents to rational exponents

N-RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want [51/3] 3 = 5(1/3) 3 to hold, so [51/3] 3 must equal 5.

N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Reason quantitatively and use units to solve problems

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

Perform arithmetic operations with complex numbers

N-CN.1 Know there is a complex number i such that i 2 = −1, and every complex number has the form a + bi with a and b real.

N-CN.2 Use the relation i 2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Use complex numbers in polynomial identities and equations

N-CN.7 Solve quadratic equations with real coefficients that have complex solutions.

Algebra

Interpret the structure of expressions

A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y 4 as (x2) 2 – (y2) 2, thus recognizing it as a difference of squares that can be factored as (x2 – y 2) (x2 + y2).

Write expressions in equivalent forms to solve problems

A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* 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%.

Algebra II

A-SSE.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.*

Understand the relationship between zeros and factors of polynomials

A-APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems

A-APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x2 + y2) 2 = (x2 – y 2) 2 + (2xy) 2 can be used to generate Pythagorean triples.

Rewrite rational expressions

A-APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Create equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

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.4 Solve quadratic equations in one variable. b. 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 ± bi for real numbers a and b.

Algebra II

Solve systems of equations

A-REI.6 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 x2 + y2 = 3.

Represent and solve equations and inequalities graphically

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.*

Functions

Understand the concept of a function and use function notation

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 ≥ 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.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.*

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.*

c. Graph polynomial functions, identifying zeros 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.

Algebra II

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

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities.*
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
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.
F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

Build new functions from existing functions

F-BF.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.
F-BF.4 Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2x 3 or f(x) = (x+1)/(x-1) for $x \neq 1$.

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

F-LE.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).*
F-LE.4 For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*

Interpret expressions for functions in terms of the situation they model

F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.*

Algebra II

Extend the domain of trigonometric functions using the unit circle

F-TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
F-TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Model periodic phenomena with trigonometric functions

F-TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*

Prove and apply trigonometric identities

F-TF.8 Prove the Pythagorean identity sin (Θ)2 + cos (Θ)2 = 1 and use it to find sin (Θ), cos (Θ), or tan (Θ), given sin (Θ), cos (Θ), or tan (Θ) and the quadrant of the angle.

Geometry

Translate between the geometric description and the equation for a conic section

G-GPE.2 Derive the equation of a parabola given a focus and directrix.

Statistics and Probability

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

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.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.

Algebra II

Understand and evaluate random processes underlying statistical experiments

S-IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.*

S-IC.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?*

Make inferences and justify conclusions from sample surveys, experiments, and observational studies

S-IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.*

S-IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.*

S-IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.*

S-IC.6 Evaluate reports based on data.*

Understand independence and conditional probability and use them to interpret data

S-CP.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").*

S-CP.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.*

S-CP.3 Understand the conditional probability of A given B as P(A 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.*

S-CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

S-CP.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.*

Use the rules of probability to compute probabilities of compound events in a uniform probability model

S-CP.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.*

S-CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.*

Integrated Mathematics

Number and Quantity

Reason quantitatively and use units to solve problems

N-Q.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.*

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*

Algebra

Interpret the structure of expressions

A-SSE.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.

Write expressions in equivalent forms to solve problems

A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*

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%.

Create equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

A-CED.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.*

Integrated Mathematics I

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.

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

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.

Functions

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.*

Integrated Mathematics I

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.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.*

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.

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.

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities.* a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*

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

F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.*

a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F-LE.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).*

F-LE.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.*

Interpret expressions for functions in terms of the situation they model

F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.*

Integrated Mathematics I
Geometry

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.6 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.

Integrated Mathematics I

Statistics and Probability

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).*

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.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.

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 between correlation and causation.*

Integrated Mathematics I

Number and Quantity

Extend the properties of exponents to rational exponents

N-RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want [51/3] 3 = 5(1/3) 3 to hold, so [51/3] 3 must equal 5.

N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Use properties of rational and irrational numbers

N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Reason quantitatively and use units to solve problems

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

Perform arithmetic operations with complex numbers

N-CN.1 Know there is a complex number i such that i 2 = −1, and every complex number has the form a + bi with a and b real.

N-CN.2 Use the relation i 2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Use complex numbers in polynomial identities and equations

N-CN.7 Solve quadratic equations with real coefficients that have complex solutions.

Algebra

Interpret the structure of expressions

A-SSE.1 Interpret expressions that represent a quantity in terms of its context.* 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.

Integrated Mathematics II

A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y 4 as (x2) 2 – (y2) 2, thus recognizing it as a difference of squares that can be factored as (x2 – y 2) (x2 + y2).

Write expressions in equivalent forms to solve problems

A-SSE.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.

Perform arithmetic operations on polynomials

A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Create equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
A-CED.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.*

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

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.

Solve equations and inequalities in one variable

A-REI.4 Solve quadratic equations in one variable.
a. 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.
b. 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 ± bi for real numbers a and b.

Solve systems of equations

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 x2 + y2 = 3.

Functions

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

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.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.*

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.
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 and 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.

Integrated Mathematics II

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities.*
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
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.

Build new functions from existing functions

F-BF.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.

Geometry

Understand similarity in terms of similarity transformations

G-SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:
a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
G-SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
G-SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Prove theorems using similarity

G-SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
G-SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles

G-SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
G-SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.

Integrated Mathematics II

G-SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

Explain volume formulas and use them to solve problems

G-GMD.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.
G-GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*

Statistics and Probability*

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

S-ID.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.

Understand independence and conditional probability and use them to interpret data

S-CP.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").*

S-CP.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.*

S-CP.3 Understand the conditional probability of A given B as P(A 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.*

S-CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

S-CP.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.

Integrated Mathematics II

Use the rules of probability to compute probabilities of compound events in a uniform probability model

S-CP.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.*

S-CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.*

Integrated Mathematics III

Number and Quantity

Reason quantitatively and use units to solve problems

N-Q.2 Define appropriate quantities for the purpose of descriptive modeling.*

Algebra

Interpret the structure of expressions

A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y 4 as (x2) 2 – (y2) 2 , thus recognizing it as a difference of squares that can be factored as (x2 – y 2)(x2 + y2).

Write expressions in equivalent forms to solve problems

A-SSE.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.*

Understand the relationship between zeros and factors of polynomials

A-APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems

A-APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x2 + y2) 2 = (x2 – y 2) 2 + (2xy)2 can be used to generate Pythagorean triples.

Rewrite rational expressions

A-APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Integrated Mathematics III

Create equations that describe numbers or relationships

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*

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.

Represent and solve equations and inequalities graphically

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.*

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.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.*

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.* c. Graph polynomial functions, identifying zeros 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.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.

Build new functions from existing functions

F-BF.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.

F-BF.4 Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.

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

F-LE.4 For exponential models, express as a logarithm the solution to $abct = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.*

Extend the domain of trigonometric functions using the unit circle

F-TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F-TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Model periodic phenomena with trigonometric functions

F-TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*

Prove and apply trigonometric identities

F-TF.8 Prove the Pythagorean identity sin (Θ)2 + cos (Θ)2 = 1 and use it to find sin (Θ), cos (Θ), or tan (Θ), given sin (Θ), cos (Θ), or tan (Θ) and the quadrant of the angle.

Integrated Mathematics III
Geometry

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.

Understand and apply theorems about circles

G-C.1 Prove that all circles are similar.

G-C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

G-C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Find arc lengths and areas of sectors of circles

G-C.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.

Translate between the geometric description and the equation for a conic section

G-GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

G-GPE.2 Derive the equation of a parabola given a focus and directrix.

Use coordinates to prove simple geometric theorems algebraically

G-GPE.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).

G-GPE.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).

Integrated Mathematics III

G-GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*

Visualize relationships between two-dimensional and three-dimensional objects

G-GMD.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.

Apply geometric concepts in modeling situations

G-MG.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).*

G-MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*

G-MG.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).*

Statistics and Probability*

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

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.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.

Understand and evaluate random processes underlying statistical experiments

S-IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

Integrated Mathematics III

S-IC.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?*

Make inferences and justify conclusions from sample surveys, experiments, and observational studies

S-IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.*

S-IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.*

S-IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.*

S-IC.6 Evaluate reports based on data.*

Advanced Mathematics Plus

Number and Quantity

Perform arithmetic operations with complex numbers

N-CN.3 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Represent complex numbers and their operations on the complex plane

N-CN.4 Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.

N-CN.5 Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 + \sqrt{3}\, i)3 = 8$ because $(-1 + \sqrt{3}\, i)$ has modulus 2 and argument 120°.

N-CN.6 Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

Use complex numbers in polynomial identities and equations

N-CN.8 Extend polynomial identities to the complex numbers. For example, rewrite x2 + 4 as (x + 2i)(x – 2i).

N-CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials

Represent and model with vector quantities

N-VM.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).

N-VM.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

N-VM.3 Solve problems involving velocity and other quantities that can be represented by vectors.

Advanced Mathematics Plus

Perform operations on vectors

N-VM.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 connecting the tips in the appropriate order, and perform vector subtraction component-wise.

N-VM.5 Multiply a vector by a scalar.

a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(vx, vy) = (cvx, cvy).

b. Compute the magnitude of a scalar multiple cv using ||cv|| = |c|v. Compute the direction of cv knowing that when |c|v 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

N-VM.6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

N-VM.7 Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.

N-VM.8 Add, subtract, and multiply matrices of appropriate dimensions.

N-VM.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.

N-VM.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.

N-VM.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.

N-VM.12 Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Algebra

Use polynomial identities to solve problems

A-APR.5 Know and apply the Binomial Theorem for the expansion of (x + y) n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

Advanced Mathematics Plus

Rewrite rational expressions

A-APR.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Solve systems of equations

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).

Functions

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

Build a function that models a relationship between two quantities

F-BF.1 Write a function that describes a relationship between two quantities. *
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.

Build new functions from existing functions

F-BF.4 Find inverse functions.
b. Verify by composition that one function is the inverse of another.
c. Read values of an inverse function from a graph or a table, given that the function has an inverse.
d. Produce an invertible function from a non-invertible function by restricting the domain.
F-BF.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

Advanced Mathematics Plus

Extend the domain of trigonometric functions using the unit circle

F-TF.3 Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number.
F-TF.4 Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Model periodic phenomena with trigonometric functions

F-TF.6 Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
F-TF.7 Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context. *

Prove and apply trigonometric identities

F-TF.9 Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.

Geometry

Apply trigonometry to general triangles

G-SRT.9 Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
G-SRT.10 Prove the Laws of Sines and Cosines and use them to solve problems.
G-SRT.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Understand and apply theorems about circles

G-C.4 Construct a tangent line from a point outside a given circle to the circle.

Translate between the geometric description and the equation for a conic section

Advanced Mathematics Plus

G-GPE.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

Explain volume formulas and use them to solve problems

G-GMD.2 Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

Statistics and Probability*

Use the rules of probability to compute probabilities of compound events in a uniform probability model

S-CP.8 Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.*

S-CP.9 Use permutations and combinations to compute probabilities of compound events and solve problems.*

Calculate expected values and use them to solve problems

S-MD.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.*

S-MD.2 Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.*

S-MD.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.*

S-MD.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?*

Advanced Mathematics Plus

Use probability to evaluate outcomes of decisions

S-MD.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.*

S-MD.6 Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).*

S-MD.7 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).*

Appendix F: International Society for Technology in Education Standards (ISTE)

	Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Standards																					
T1		X		X	X	X	X			X			X	X				X			X
T2		X				X				X											X
T3		X	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X
T4		X	X			X				X		X				X		X		X	X
T5			X	X	X			X				X	X					X	X	X	
T6		X	X	X	X	X	X	X	X	X		X	X	X			X	X	X		X
T7		X		X	X			X				X		X	X		X	X	X		

T1 Empowered Learner
T2 Digital Citizen
T3 Knowledge Constructor
T4 Innovative Designer
T5 Computational Thinker
T6 Creative Communicator
T7 Global Collaborator

T1 Empowered Learner

Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. Students:

a. Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
b. Build networks and customize their learning environments in ways that support the learning process.
c. Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.
d. Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

T2 Digital Citizen

Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical. Students:

a. Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
b. Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
c. Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.

d. Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.

T3 Knowledge Constructor

Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others. Students:

a. Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
b. Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
c. Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

T4 Innovative Designer

Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions. Students:

a. Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
b. Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
c. Develop, test and refine prototypes as part of a cyclical design process.
d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.

T5 Computational Thinker

Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. Students:

a. Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
b. Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

T6 Creative Communicator

Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals. Students:

a. Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

b. Create original works or responsibly repurpose or remix digital resources into new creations.
c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
d. Publish or present content that customizes the message and medium for their intended audiences.

T7 Global Collaborator

Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. Students:

a. Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
b. Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.
c. Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.
d. Explore local and global issues and use collaborative technologies to work with others to investigate solutions.