California Career Technical Education Model Curriculum Standards

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Overview

The Career Technical Education (CTE) Model Curriculum Standards publication is organized for use as a complete document or for access to individual industry sectors and pathways. The document includes Standards for Career Ready Practice—which describe the knowledge and skills that students need prior to entering a career technical education program—as part of the career technical education sequence or as integrated elements of other course work in preparation for careers and college.

Each of the 15 industry sector sections includes a description, anchor standards, pathway standards, and an academic alignment matrix. The standards can be adjusted to be part of the curriculum (grades seven through twelve), provided through adult education, or included in community college programs. The document also lists the representatives who participated in each sector's content development and the references that were consulted to revise the CTE standards.

Standards for Career Ready Practice

California's Standards for Career Ready Practice, which follow this overview, are based on the Career Ready Practices of the Common Career Technical Core (CCTC), a state-led initiative sponsored by the National Association of State Directors of Career Technical Education Consortium (NASDCTEc):

> Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study. (NASDCTEc 2012, 2)

California's 12 Standards for Career Ready Practice align with the state's CTE anchor standards and reflect the expectations from business and industry, labor and community organizations, and secondary and postsecondary education representatives from 42 participating states.

Anchor Standards

The 11 anchor standards build on the Standards for Career Ready Practice and are common across the 15 industry sectors. Content for these standards was drawn from several documents: "Preparing Students for the 21st Century Economy" (American Association of Colleges for Teacher Education and the Partnership for 21st Century Skills 2010); *How Should Colleges Prepare Students to Succeed in Today's Global Economy?* (Association of American Colleges and Universities and Peter D. Hart Research Associates, Inc. 2006); "Importance of Skills and Knowledge for College and Career Readiness," from *The MetLife Survey of the American Teacher: Preparing Students for College and Careers* (MetLife, Inc. 2011); and *Are They Really Ready to Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce* (The Conference Board et al. 2006).

Each anchor standard is followed by performance indicators using action verbs from the Beyond Knowledge Construct, presented in a hierarchical progression of simple tasks to more complex tasks. Performance indicators provide guidance for curriculum design and standards measurement.

The industry-sector anchor standards have been customized with selected additions to better reflect the needs and special conditions of each industry sector.

Anchor Standard 1 (Academics) guides users to sector-specific core academic standards related to each industry sector, which are listed in the alignment matrix at the end of each sector section. Anchor standards 2–10 are deliberately aligned with one of the Common Core English language arts standards, using similar language demonstrating the natural connections between the two subjects. Anchor Standard 11 (Demonstration and Application) highlights classroom, laboratory, and workplace learning specific to the individual sector and pathways.

Pathway Standards

All 15 industry sectors contain multiple pathways. In order to be identified and listed for an industry sector, each pathway had to meet the following criteria:

- unique to an industry sector
- has an occupational focus
- consistent in size and scope
- composed of similar functions
- inclusive of all aspects of the industry
- includes 8–12 pathway-specific standards
- demonstrates sequence potential
- reasonable and appropriate for high school
- leads to high-skill, high-wage, or high-demand jobs
- sustainable and viable over the next 10 years

Academic Alignment Matrix

Each sector includes an academic alignment matrix that displays where a natural, obvious alignment occurs. Compiled by five teams of academic content experts in collaboration with industry-sector consultants, teachers, and other advisers, the alignment was selected if it was determined that the pathway standard would enhance, reinforce, or provide an application for a specific academic subject standard.

The alignment matrices include the subjects of Common Core English language arts and mathematics standards, history/social studies standards, and Next Generation Science Core Ideas. To assist with further review and implementation, each academic alignment is notated with specific pathway standards codes.

Implementation

The Standards for Career Ready Practice can be integrated with a course or incorporated into several courses over multiple school years (grades seven through twelve). The practices are expectations for all students, whether they are enrolled in a CTE program or following a more generalized course sequence. It is expected that all students who exit high school will be proficient in these practices.

The anchor standards are the basis for each of the pathways within each sector. These standards are designed to assist with the development of course curricula and instructional lesson plans; they describe what is to be taught and measured. In most cases, the teacher determines the sequence and strategies to be used to meet the needs of the student population he or she is serving.

The performance indicators that follow each standard offer guidance for both course design and student assessment. They are intended to guide course work as it is developed. The pathways organize the standards with a career focus, but they are not designed to be offered as single courses. Rather, the standards from each pathway are collected and organized into a sequence of learning. To meet local demands of business and industry and particular student populations, standards can be collected from more than one sector to create a course.

Using the academic alignment matrices as a resource, academic and CTE teachers can see where enhancements and support for both sets of standards can be initiated. CTE teachers can quickly identify academic standards that have a substantial relationship to their instruction. Likewise, academic teachers can specify individual academic standards and quickly identify related CTE standards, which will assist them in incorporating application and technology in their curricula and lessons.

The CTE Model Curriculum Standards are intended to serve the entire education community—from middle schools and high schools to postsecondary colleges and career training programs. A major aim of these standards is to prepare students for postsecondary education and training and to help them make a smooth transition into the workforce. In order for both the people and the economy of California to prosper, it is essential for all students to emerge from schools ready to pursue their career and college goals. Equipping all high school students with the knowledge and skills necessary to plan and manage their education and careers throughout their lives will help to guarantee these important outcomes. Strong CTE programs will continue to provide important educational opportunities to assist students as they pursue their dreams and strive for economic prosperity. The CTE Model Curriculum Standards are a resource for educators and the business world for ensuring high-quality CTE learning experiences and improved student outcomes in the twenty-first-century economy.

California Standards for Career Ready Practice

Standards for Career Ready Practice describe the fundamental knowledge and skills that a career-ready student needs in order to prepare for transition to postsecondary education, career training, or the workforce. These standards are not exclusive to a career pathway, a CTE program of study, a particular discipline, or level of education. Standards for Career Ready Practice are taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study. Standards for Career Ready Practice are a valuable resource to CTE and academic teachers designing curricula and lessons in order to teach and reinforce the career-ready aims of the CTE Model Curriculum Standards and the Common Core State Standards.

1. Apply appropriate technical skills and academic knowledge.

Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and other work-related practices.

2. Communicate clearly, effectively, and with reason.

Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others, are active listeners who speak clearly and with purpose, and are comfortable with the terminology common to the workplace environment. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

3. Develop an education and career plan aligned with personal goals.

Career-ready individuals take personal ownership of their own educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process and understand that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever-changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

4. Apply technology to enhance productivity.

Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks—personal and organizational—of technology applications, and they take actions to prevent or mitigate these risks.

5. Utilize critical thinking to make sense of problems and persevere in solving them.

Career-ready individuals recognize problems in the workplace, understand the nature of the problems, and devise effective plans to solve the problems. They thoughtfully investigate the root cause of a problem prior to introducing solutions. They carefully consider options to solve the problem and, once agreed upon, follow through to ensure the problem is resolved.

6. Practice personal health and understand financial literacy.

Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

7. Act as a responsible citizen in the workplace and the community.

Career-ready individuals understand the obligations and responsibilities of being a member of a community and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them and think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond minimum expectations and in participating in activities that serve the greater good.

8. Model integrity, ethical leadership, and effective management.

Career-ready individuals consistently act in ways that align with personal and community-held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they recognize the short-term and long-term effects that management's actions and attitudes can have on productivity, morale, and organizational culture.

9. Work productively in teams while integrating cultural and global competence.

Career-ready individuals positively contribute to every team as both team leaders and team members. They apply an awareness of cultural differences to avoid barriers to productive and positive interaction. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.

10. Demonstrate creativity and innovation.

Career-ready individuals recommend ideas that solve problems in new and different ways and contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek new methods, practices, and ideas from a variety of sources and apply those ideas to their own workplace practices.

11. Employ valid and reliable research strategies.

Career-ready individuals employ research practices to plan and carry out investigations, create solutions, and keep abreast of the most current findings related to workplace environments and practices. They use a reliable research process to search for new information and confirm the validity of sources when considering the use and adoption of external information or practices.

12. Understand the environmental, social, and economic impacts of decisions.

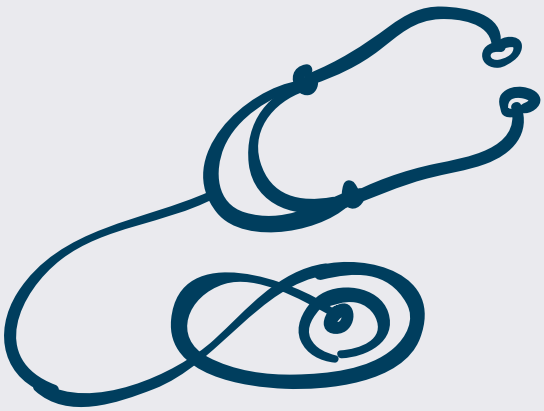
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, and materials and adhere to regulations affecting the nature of their work. They are cognizant of impacts on the social condition, environment, workplace, and profitability of the organization.

Note: As stated previously, California's Standards for Career Ready Practice are based on the CCTC Career Ready Practices posted at https://careertech.org/ (accessed June 8, 2016).

Health Science and Medical Technology

Sector Description

The standards in this sector represent the academic and technical skills and knowledge students need to pursue a full range of career opportunities in health science and medical technology, from entry level to management as well as technical and professional career specialties. The standards describe what workers need to know and be able to do to contribute to the delivery of safe and effective health care. The six career pathways are grouped into functions that have a common purpose and require similar attributes. The pathways are Biotechnology, Patient Care, Health Care Administrative Services, Health Care Operational Support Services, Public and Community Health, and Mental and Behavioral Health. Standards for each career path build on and continue the anchor standards with more complexity, rigor, and career specificity.



1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Health Science and Medical Technology academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Health Science and Medical Technology sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)

2.1 Recognize the elements of communication using a sender–receiver model.

2.2 Identify barriers to accurate and appropriate communication.

2.3 Interpret verbal and nonverbal communications and respond appropriately.

2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.

2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.

2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

2.7 Recognize major word parts of medical terminology including roots, prefixes and suffixes.

2.8 Understand and use correct medical terminology for common pathologies.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)

3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.

3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.

3.3 Explore how information and communication technologies are used in career planning and decision making.

3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.

3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.

3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.

3.7 Recognize the importance of small business in the California and global economies.

3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.

3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.

4.0 Technology

Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Health Science and Medical Technology sector workplace environment. (Direct alignment with WS 11-12.6)

4.1 Use electronic reference materials to gather information and produce products and services.

4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.

4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.

4.4 Discern the quality and value of information collected using digital technologies, and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Health Science and Medical Technology sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

5.5 Know how to apply mathematical computations related to health care procedures (metric and household, conversions and measurements).

5.6 Read, interpret, and extract information from documents.

6.0 Health and Safety

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Health Science and Medical Technology sector workplace environment. (Direct alignment with RSTS 9-10, 11-12.4)

6.1 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.

6.2 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.

6.3 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.

6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.

6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.

6.6 Maintain a safe and healthful working environment.

6.7 Identify and follow ecological practices applicable to the health care setting (i.e., recycling, energy efficiency, environmentally preferable chemical use, waste disposal, and water conservation).

6.8 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Health Science and Medical Technology sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

7.1 Recognize how financial management impacts the economy, workforce, and community.

7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to changing and varied roles and responsibilities.

7.4 Practice time management and efficiency to fulfill responsibilities.

7.5 Apply high-quality techniques to product or presentation design and development.

7.6 Demonstrate knowledge and practice of responsible financial management.

7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

7.8 Explore issues of global significance and document the impact on the Health Science and Medical Technology sector.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)

8.1 Access, analyze, and implement quality assurance standards of practice.

8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Health Science and Medical Technology industry sector.

8.3 Demonstrate ethical and legal practices consistent with Health Science and Medical Technology sector workplace standards.

8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.

8.5 Analyze organizational culture and practices within the workplace environment.

8.6 Adhere to copyright and intellectual property laws and regulations, and use and appropriately cite proprietary information.

8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Health Science and Medical Technology sector laws and practices.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the Cal-HOSA career technical student organization. (Direct alignment with SLS 11-12.1b)

9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.

9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in groups, teams, and career technical student organization activities.

9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.

9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.

9.5 Understand that the modern world is an international community and requires an expanded global view.

9.6 Respect individual and cultural differences and recognize the importance of diversity in the workplace.

9.7 Participate in interactive teamwork to solve real Health Science and Medical Technology sector issues and problems.

10.0 Technical Knowledge and Skills

Apply essential technical knowledge and skills common to all pathways in the Health Science and Medical Technology sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)

10.1 Interpret and explain terminology and practices specific to the Health Science and Medical Technology sector.

10.2 Comply with the rules, regulations, and expectations of all aspects of the Health Science and Medical Technology sector.

10.3 Construct projects and products specific to the Health Science and Medical Technology sector requirements and expectations.

10.4 Collaborate with industry experts for specific technical knowledge and skills.

10.5 Complete certification in emergency care as appropriate (cardiopulmonary resuscitation [CPR], automated external defibrillator [AED], first aid).

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Health Science and Medical Technology anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings and through the Cal-HOSA career technical student organization.

11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Health Science and Medical Technology sector program of study.

11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.

11.4 Employ entrepreneurial practices and behaviors appropriate to Health Science and Medical Technology sector opportunities.

11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

A. Biotechnology Pathway

The standards for the applications of the Biotechnology pathway relate to occupations and functions relevant for understanding and solving biomedical problems and creating products to improve the quality of human life. The standards represent knowledge and skills necessary to succeed in diverse careers in this pathway.

Sample occupations associated with this pathway:

- Clinical Trials Research Coordinator
- Forensic Pathologist
- Biostatistician
- Geneticist Lab Assistant

A1.0 Define and assess biotechnology and recognize the diverse applications and impact on society.

- A1.1 Use data to explain how biotechnology fields such as pharmaceuticals, agriculture, diagnostics, industrial products, instrumentation, and research and development are impacting human life.
- A1.2 Describe the use of model organisms in biotechnology research and manufacturing.
- A1.3 Recognize the role of innovation in creation of emerging biotechnology careers, including those in nanotechnology, biofuels, and forensics.
- A1.4 Research and identify public misunderstandings related to biotechnology and discern the source of these misunderstandings.
- A1.5 Evaluate the impact of biotechnological applications on both developing and industrial societies, including legal and judicial practices.
- A1.6 Explore and outline the various science and non-science fields and careers associated with biotechnology.

A2.0 Understand the ethical, moral, legal, and cultural issues related to the use of biotechnology research and product development.

- A2.1 Know the relationship between morality and ethics in the development of biotechnology health care products.
- A2.2 Know the difference between personal, professional, and organizational ethics.
- A2.3 Understand the necessity for accurate documentation and record keeping.
- A2.4 Understand the critical need for ethical policies and procedures for institutions engaged in biotechnology research and product development.
- A2.5 Describe the dilemma of health care costs related to advancements in biotechnology and public access to treatments.
- A2.6 Prepare a presentation comparing the benefits and harm that can be the result of biotechnology innovations in both the research and application phases and which course of action will result in the best outcomes.

A3.0 Demonstrate competencies in the fundamentals of molecular cell biology, including deoxyribonucleic acid (DNA) and proteins and standard techniques for their purification and manipulation.

- A3.1 Define and describe the structure and function of DNA ribonucleic acid (RNA) and proteins, explain the consequences of DNA mutations on proteins.
- A3.2 Describe enzyme structure and function, diagram the impact of enzymes and catalysis on reaction rates, and recognize the emerging role of enzymes in replacing industrial chemicals.
- A3.3 Employ standard techniques of DNA extraction, purification, restriction digests, bacterial cell culture, and agarose gel electrophoresis and document and evaluate results.
- A3.4 Employ standard protein techniques, including antibody production, enzyme assays, spectrophotometry, gel electrophoresis, and chromatography and document and evaluate results.
- A3.5 Predict outcomes of DNA and protein separation protocols.

A4.0 Recognize basic concepts in cell biology and become familiar with the laboratory tools used for their analysis.

- A4.1 List and describe the structure and function of cellular organelle.
- A4.2 Describe conditions that promote cell growth under aseptic conditions in the laboratory and workplace.
- A4.3 Use various methods to monitor the growth of cell cultures.
- A4.4 Explain the basic concepts of cell growth and reproduction, DNA replication, mitosis, meiosis, and protein synthesis.
- A4.5 Discuss the structure and function of the macromolecules that compose cells, including carbohydrates, lipids, DNA, RNA, and protein molecules.
- A4.6 Distinguish between prokaryotic cells, eukaryotic cells, and viruses.
- A4.7 Conduct indicator tests for the common macromolecules of the cell.

A5.0 Integrate computer skills into program components.

- A5.1 Use the Internet and World Wide Web to collect and share scientific information.
- A5.2 Use a variety of methods, including literature searches in libraries, computer databases, and online for gathering background information, making observations, and collecting and organizing data.
- A5.3 Compile labs (results, tables, graphs) in a legal scientific notebook and/or an Internet site or Web page.

A6.0 Implement use of the metric system, orders of magnitude, and the pH scale in preparation of reagents, analysis of data, and graphing.

- A6.1 Apply knowledge of symbols, algebra, and statistics to graphical data presentation.

A6.2 Prepare solutions based on both percent and weight composition to demonstrate proficiency in use of mechanical and digital microbalances.

A6.3 Calculate and prepare solutions of various molarity; calculate and prepare buffers of various pH; and prepare serial dilutions.

A6.4 Create data tables and graphs using Excel for the purpose of collecting and analyzing data.

A7.0 Understand the function of regulatory agencies for the biotechnology industry and the lasting impact of routine laboratory and communication practices on product development and manufacturing.

A7.1 Identify agencies at the local, state, and federal levels.

A7.2 Be aware of the role of agencies in promoting patient safety, quality control, and entrepreneurship.

A7.3 Describe intellectual property.

A7.4 Understand a patent and use online resources to search a patent database.

A7.5 Demonstrate accurate record keeping and follow good laboratory practice (GLP) for lab notebooks.

A7.6 Articulate issues of ethical concern, including plagiarism, copyrights, trademarks, and patents and use online data resources and searchable databases to investigate a copyright, trademark, or patent.

A8.0 Follow sustainable and safe practices with high regard for quality control.

A8.1 Follow written protocols and oral directions to perform a variety of laboratory and technical tasks.

A8.2 Recognize laboratory safety hazards using safe practices to avoid accidents.

A8.3 Locate and use Material Safety Data Sheets (MSDS).

A8.4 Outline the appropriate responses to a laboratory accident including identification of location and use of emergency equipment.

A8.5 Practice laboratory and personal safety including the location and use of emergency equipment (personal protective equipment, no food or drink, no open-toe shoes).

A8.6 Properly and safely use and monitor a variety of scientific equipment, including pH meters, microscopes, spectrophotometers, pipets, micropipets, and balances.

A8.7 Determine which equipment is appropriate to use for a given task and the units of measurement used.

A8.8 Perform specimen collection, label samples, and prepare samples for testing.

A8.9 Handle, transport, and store samples safely.

A9.0 Understand that manufacturing represents inter-connectedness between science and production.

A9.1 Describe the major steps of a product's move through a company's product pipeline.

A9.2 Identify several products obtained through recombinant DNA technology.

A9.3 Outline the steps in production and delivery of a product made through recombinant DNA technology.

A9.4 Cite examples of plant parts or extracts used as pharmaceuticals.

A9.5 Use the Internet to find information about traditional pharmaceuticals, herbal remedies, and recombinant pharmaceuticals.

A9.6 Evaluate the impact of robotics and automation on aseptic processes.

A9.7 Design a flow chart describing the steps for creating a new drug from hypothesis to distribution.

B. Patient Care Pathway

The standards for the Patient Care pathway apply to occupations or functions involved in the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions. The standards specify the knowledge and skills needed by professional and technical personnel pursuing careers in this pathway.

Sample occupations associated with this pathway:

- Kinesiotherapist
- Nurse Anesthetist
- Respiratory Therapist
- Radiologic Technician
- Dental Hygienist

B1.0 Recognize the integrated systems approach to health care delivery services: prevention, diagnosis, pathology, and treatment

- B1.1 Know relationship and use of an integrated health care delivery system.
- B1.2 Understand the range between prevention, diagnosis, pathology, and treatment procedures.
- B1.3 Understand the significance of nontraditional approaches to health care in relationship to delivery systems.
- B1.4 Illustrate the value of preventive and early intervention in relationship to health care practices.
- B1.5 Describe the importance of reimbursement systems in relationship to the delivery of patient care.

B2.0 Understand the basic structure and function of the human body and relate normal function to common disorders.

- B2.1 Know basic human body structure and function in relationship to specific care between prevention, diagnosis, pathology, and treatment.
- B2.2 Describe basic stages of growth and development.
- B2.3 Recognize common disease and disorders of the human body.
- B2.4 Compare normal function of the human body to the diagnosis and treatment of disease and disorders.

B3.0 Know how to apply mathematical computations used in health care delivery system.

- B3.1 Apply mathematical computations related to health care procedures (metric and household, conversions and measurements).
- B3.2 Analyze diagrams, charts, graphs, and tables to interpret health care results.
- B3.3 Record time using the 24-hour clock.

B4.0 Recognize and practice components of an intake assessment relevant to patient care.

- B4.1 Conduct basic interview to acquire new knowledge (e.g., medical and family histories).
- B4.2 Identify and summarize major life events as they impact health care practices and patient outcomes.
- B4.3 Observe patient actions, interests, and behaviors while documenting responses.
- B4.4 Collect and synthesize information or data about the patient's symptoms and vital signs.
- B4.5 Evaluate information gathered and connect patient data to appropriate system of care.

B5.0 Know the definition, spelling, pronunciation, and use of appropriate terminology in the health care setting.

- B5.1 Use medical terminology in patient care appropriate to communicate information and observations.
- B5.2 Accurately spell and define occupationally specific terms related to health care.
- B5.3 Use roots, prefixes, and suffixes to communicate information.
- B5.4 Use medical abbreviations to communicate information.
- B5.5 Know the basic structure of medical terms.
- B5.6 Demonstrate the correct pronunciation of medical terms.
- B5.7 Practice word building medical terminology skills.

B6.0 Communicate procedures and goals to patients using various communication strategies to respond to questions and concerns.

- B6.1 Observe and document the ability of patients to comprehend and understand procedures and determine how to adjust communication techniques.
- B6.2 Use active listening skills (e.g., reflection, restatement, and clarification) and communication techniques to gather information from the patient.
- B6.3 Formulate appropriate responses to address the patients concerns and questions in a positive manner.
- B6.4 Employ sensitivity and withhold bias when communicating with patients.
- B6.5 Report patient's progress and response to treatment goals.
- B6.6 Maintain written guidelines of the Health Insurance Portability and Accountability Act (HIPAA) in all communications.

B7.0 Apply observation techniques to detect changes in the health status of patients.

- B7.1 Demonstrate observation techniques.
- B7.2 Differentiate between normal and abnormal patient health status.
- B7.3 Document the patient findings and report information appropriately.
- B7.4 Plan basic care procedures within the scope of practice to assist with patient comfort.

B8.0 Demonstrate the principles of body mechanics as they apply to the positioning, transferring, and transporting of patients.

- B8.1 Explain the principles of body mechanics.
- B8.2 Determine appropriate equipment for transportation and transfer, including the modification of equipment and techniques to accommodate the health status of the patient.
- B8.3 Demonstrate appropriate transport and transfer methods to accommodate the health status of the patient.
- B8.4 Evaluate equipment for possible hazards.
- B8.5 Integrate proper body mechanics, ergonomics, safety equipment, and techniques to prevent personal injury to patients and clients.

B9.0 Implement wellness strategies for the prevention of injury and disease.

- B9.1 Know and implement practices to prevent injury and protect health for self and others.
- B9.2 Determine effective health and wellness routines for health care workers (i.e., stress management, hygiene, diet, rest, and drug use).
- B9.3 Identify practices to prevent injuries and protect health, for self and others (i.e., seatbelts, helmets, and body mechanics).
- B9.4 Know how to access available wellness services (i.e., screening, exams, and immunizations).
- B9.5 Identify alternative/complementary health practices as used for injury and disease prevention.
- B9.6 Explore consequences of not utilizing available wellness services and behaviors that prevent injury and illness.

B10.0 Comply with protocols and preventative health practices necessary to maintain a safe and healthy environment for patients, health care workers, coworkers, and self within the health care setting.

- B10.1 Describe the infection control cycle with consideration of the various types of microorganisms.
- B10.2 Demonstrate use of facility policies and procedures of infection control while performing patient care.
- B10.3 Evaluate potential causes and methods of transmitting infections and how to apply standard precautionary guidelines.
- B10.4 Demonstrate the use of appropriate personal protective equipment (PPE).
- B10.5 Practice proper hand hygiene.
- B10.6 Use various manual and mechanical decontamination and sterilization techniques and procedures.
- B10.7 Document and analyze sanitation and infection control procedures.

B11.0 Comply with hazardous waste disposal policies and procedures, including documentation, to ensure that regulated waste is handled, packaged, stored, and disposed of in accordance with federal, state, and local regulations.

- B11.1 Describe basic emergency procedures used to respond to a hazardous spill.
- B11.2 Explain how waste is handled, packaged, stored, and disposed of in accordance with federal, state, and local regulations including hazardous chemicals, biohazards, and radioactive materials.
- B11.3 Adhere to the health care setting's waste management program (e.g., recycling and reduction of regulated medical, solid, hazardous, chemical, and radioactive waste materials).
- B11.4 Apply protective practices and procedure for airborne and blood-borne pathogens for equipment and facilities and identify unsafe conditions for corrective action.

B12.0 Adhere to the roles and responsibilities, within the scope of practice, that contribute to the design and implementation of treatment planning.

- B12.1 Understand scope of practice and related skills within prevention, diagnosis, pathology, and treatment occupations.
- B12.2 Describe the various roles and responsibilities of health care workers as team members in an integrated health care delivery system
- B12.3 Demonstrate the knowledge and delivery of specific skills and procedures as outlined within the scope of practice appropriate for patient care in prevention, diagnosis, pathology, and treatment.
- B12.4 Follow appropriate guidelines for implementation of various procedures.

B13.0 Research factors that define cultural differences between and among different ethnic, racial, and cultural groups and special populations.

- B13.1 Utilize culturally appropriate community resources.
- B13.2 Recognize complementary and alternative medicine as practiced within various cultures.
- B13.3 Develop ethnographic skills, by location and information retrieval, carefully observe social behavior, and manage stress and time.
- B13.4 Ask questions and explore aspects of global significance.
- B13.5 Analyze data using relevant concepts.
- B13.6 Know when and how to incorporate trained interpreters to facilitate communication and improve patient outcomes.

C. Health Care Administrative Services Pathway

Health care administrative workers include site administrators, managers, attorneys, receptionists, secretaries, billing and coding specialists, health informatics technicians, accountants, managers, and other knowledge workers that support the process of patient care. Health care administrative workers are the invisible backbone of health care; without appropriately skilled workers in these fields, health care systems simply could not function.

Sample occupations associated with this pathway:

- Clinical Data Specialist
- Ethicist
- Medical Illustrator
- Health Care Administrator

C1.0 Understand health care systems as the organization of people, institutions, funding, and resources as well as the broad scope of operations in which health care services are delivered to meet the health needs of target populations.

- C1.1 Understand the specific roles and responsibilities of health care workers, including the health care administrative role of leadership for individuals and the organization within a variety of health care delivery systems.
- C1.2 Recognize the resources necessary for a health system (e.g., financial, health informatics, diagnostic equipment, pharmaceuticals, and other therapeutic resources).
- C1.3 Recognize the different general methods of funding health care (e.g., out-of-pocket payments, health insurance, government funding, charities).
- C1.4 Recognize major specific payment systems (e.g., Medicare, Medicaid, Workers Compensation).
- C1.5 Recognize the varied vital roles that health care administrative workers serve in the health care process.
- C1.6 Understand the full process of health care delivery (e.g., from patient illness or injury to recovery).
- C1.7 Understand common U.S. models for structuring health care funding (e.g., Health Maintenance Organizations [HMOs], Preferred Provider Organization [PPOs], Managed Care Organization [MCOs], and Independent Physician Association [IPAs]).
- C1.8 Diagram a selected health care organization.

C2.0 Understand the various health care provider and support roles in patient care as an integrated, comprehensive health care system, to offer the very best options for treatment of patients.

- C2.1 Recognize health care identifiers (e.g., National Provider Indicator [NPI], Drug Enforcement Administration [DEA] numbers, and Clinical Laboratory Improvement Amendments [CLIA] numbers).

C2.2 Describe common medical record documentation formats (e.g., Subjective, Objective, Assessment, and Plan [SOAP] notes, admission notes).

C2.3 Understand the major forms of health care interventions (e.g., preventive, curative, palliative).

C2.4 Understand the difference between different patient care provider and support roles (e.g., health care administrator, clinical data specialist, health informatics technician, and billing and coding specialist).

C3.0 Understand the overarching concepts of economic and financial management systems, system and information management, and the latest innovations in health care as they affect health care delivery.

C3.1 Understand the basics of business principles, systems thinking, and business management.

C3.2 Understand operational planning and management tools for performance and quality improvement.

C3.3 Understand development of financial statements, statement generation, reimbursement systems, costing process, measurement, and control.

C3.4 Execute financial mathematics, e.g., time value of money calculations, capital budgeting, return on investment, and project risk analyses.

C3.5 Perform differential reimbursement calculations by payers (e.g., Medicare/Medicaid, self-pay, managed care) and describe the major principles of health insurance.

C3.6 Understand and explain economic evaluation (e.g., cost benefit/cost effectiveness analysis).

C4.0 Know the role and relationship of public policies and community engagement on the health care delivery system.

C4.1 Understand community needs and values and the role of external relations (e.g., demographic/population contexts for development and management of health care services).

C4.2 Comprehend and explain the legal and regulatory environment for health services.

C4.3 Recognize and explain quantity of health care services.

C4.4 Analyze public policy context and choices relating to specific health care delivery systems.

C5.0 Understand and maintain standards of excellence, professional, ethical, and moral conduct required in management of personnel and policy within the health care delivery system.

C5.1 Understand the alignment of personal and organizational conduct management with ethical and professional standards.

C5.2 Know the organizational responsibility to the patient and community and a commitment to lifelong learning and improvement.

C5.3 Practice the philosophy of respect for life and the need for a balance of benefit over harm resulting from any intervention.

C6.0 Understand the dynamics of human relations, self-management, organizational, and professional leadership skills necessary within the health care administrative system.

C6.1 Identify leadership skills and explain their value to an organization.

C6.2 Understand image building and public relations techniques.

C6.3 Know and assess decision-making skills.

C6.4 Demonstrate effective teamwork and critical analysis applying conflict-resolution techniques.

C6.5 Examine the value of leadership skills, self-initiation, and confidence through personal reflection.

C6.6 Demonstrate parliamentary procedure skills through team activities.

C6.7 Describe human resource management and its importance to the successful operation of an organization.

C7.0 Follow the model of medical safety practices and processes that can help prevent system medication errors and understand the consequences of mistakes.

C7.1 Recognize the major consequences mistakes in health care may cause (e.g., deaths, lawsuits).

C7.2 Recognize the critical nature of accurate and complete documentation (e.g., medical allergies, conflicting prescriptions).

C7.3 Identify patients accurately using appropriate strategies (e.g., continual verification).

C7.4 Delineate the process for assessing information required by patients, staff, and the community to determine the best course of action.

C8.0 Understand the resources, routes and flow of information within the health care system and participate in the design and implementation of effective systems or processes.

C8.1 Describe an effective health care information system, including resources, routes, and flow of information.

C8.2 Enter information within the parameters of the information system. (e.g., entering appropriate data types in the appropriate fields).

C8.3 Follow security guidelines to protect patient data.

C8.4 Evaluate the effectiveness of health information systems and determine improvement strategies.

C9.0 Use an electronic health care patient information system to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine.

C9.1 File records using various methodologies (e.g., alphabetically, by patient record number).

C9.2 Enter information within the parameters of the information system. (e.g., entering appropriate data types in the appropriate fields).

C9.3 Archive and purge documents following policies and regulatory guidelines.

C9.4 Compose a rationale that compares and contrasts the relative advantages and disadvantages of paper versus electronic records.

C9.5 Distinguish which type of documents must have hard copies retained, and which may be stored only in digital form.

C10.0 Understand common file formats for document and medical imaging, digitizing paper records, and storing medical images.

C10.1 Understand basic document and medical imaging concepts (e.g., resolution, color-depth, compression).

C10.2 Understand common file formats for document and medical imaging (e.g., tagged image file format [TIFF], joint photographic experts group [JPEG], 2000).

C10.3 Demonstrate how to scan paper records.

C10.4 Calculate the approximate storage needs for digitized records and images.

C10.5 Attach digitized records and medical images to patient records.

C11.0 Know how to schedule and manage appointments for providers.

C11.1 Understand prioritizing methods (e.g., first-come, first-served; emergency appointments; types of procedures).

C11.2 Recognize the logistical challenges of appointments (e.g., quality of care versus cost of care).

C11.3 Manage provider general schedules (e.g., what days and times providers are available).

C11.4 Understand how to schedule patient appointments for providers.

C11.5 Explain how to communicate the status of an appointment to the provider.

C12.0 Understand how to use health information effectively.

C12.1 Recognize the major uses of health information (e.g., patient care, billing, research).

C12.2 Determine which data components are necessary for the successful completion of tasks.

C12.3 Formulate and report information clearly and concisely.

C12.4 Disseminate information to various audiences.

C13.0 Understand the need to communicate health/medical information accurately and within legal/regulatory bounds across the organization.

C13.1 Determine which communication methods patients have approved (e.g., e-mail, phone, voicemails).

C13.2 Determine who has been approved for receiving patient communications beyond the patient (e.g., family members, lawyers).

C13.3 Communicate with patients compassionately, accurately, and effectively.

C13.4 Use information technology for mass communications (e.g., mail merge, e-mail, auto-dialers).

C14.0 Understand how to transfer information to third-parties.

- C14.1 Recognize the types of third parties that may need patient information (e.g., specialists, pharmacies, insurance companies).
- C14.2 Understand the laws and regulations regarding the transfer of information to a third party (e.g., when a company is a covered entity, when a business agreement is required).
- C14.3 Use various technologies to transmit information securely (e.g., fax, electronic and postal mail).

C15.0 Code health information and bill payers using industry standard methods of classification of diseases, current procedural terminology, and common health care procedure coding system.

- C15.1 Understand the basic concepts of accrual-based accounting (e.g., accounts payable, accounts receivable, credits, debits).
- C15.2 Understand medical record documentation (e.g., chart notes, injections, medications, lab reports).
- C15.3 Synthesize required information from a medical record and other medical documents for a variety of purposes upon regulatory or legal request.
- C15.4 Translate code services (e.g., diagnostic procedures, surgeries) using industry standard methods (e.g., International Classification of Diseases-ninth Ed. [ICD-9], Current Procedural Terminology-fourth Ed. [CPT-4], Healthcare Common Procedure Coding System [HCPCS]).
- C15.5 Demonstrate how to bill third-party payers (e.g., insurance companies, Medicare).
- C15.6 Receive and process information from third-party payers (e.g., Explanation of Benefits [EOB], Remittance Advice).
- C15.7 Audit and analyze coding done by others to determine proper billing.

C16.0 Use a systematic method of continual process improvement.

- C16.1 Learn new knowledge and skills regularly (e.g., on-the-job-training [OJT], continuing education).
- C16.2 Discover new knowledge through primary research methodologies (e.g., experiments, surveys, data analysis).

D. Health Care Operational Support Services Pathway

The standards for the Operational Support Services pathway apply to occupations or job functions necessary to provide an environment and support systems for the delivery of health care. Careers could include central supply, facility maintenance, food services, interior decorating, housekeeping, biomedical engineering, epidemiology, social worker, biomedical technician and others.

Sample occupations associated with this pathway:

- Clinical Simulator Technician
- Central Service Technician
- Hospital Management Engineer
- Materials Manager

D1.0 Describe the process for monitoring clients' expectations by using plans to promote satisfaction and measurement tools to ensure sufficiency of products and delivery of services.

- D1.1 Understand the responsibilities of their roles and perform their tasks safely by using appropriate guidelines.
- D1.2 Know how to provide support to standardization, consolidation, and re-engineering processes.
- D1.3 Explain the importance of coordinating intradepartmental activities, including event planning and logistics, with outside agencies and contractors.
- D1.4 Evaluate and determine a process operational systems improvement.

D2.0 Assess basic operating procedures of support services.

- D2.1 Identify activities that require coordination between various departments.
- D2.2 Implement purchasing and procurement techniques.
- D2.3 Develop a preventative maintenance program for equipment and services.
- D2.4 Explain staffing needs and productivity.
- D2.5 Develop reporting mechanisms for measuring productivity.
- D2.6 Investigate systems and procedures that minimize customer cost of ordering, and storing and using supplies, services, and equipment.
- D2.7 Integrate infection control standards with design and construction activities.
- D2.8 Discuss the relationships among organization structures, policies, procedures, and quality assurance.

D3.0 Comply with legal regulations and facility standards for design, construction, maintenance, and improvement of health care facilities and environments.

- D3.1 Recognize physical, procedural, and electronic barriers.
- D3.2 Describe the process for evaluating compliance with corporate, legal, regulatory, and accreditation standards, ethics, and codes.

D3.3 Adhere to the federal, state, and local regulations that apply to accreditation, design, and construction of a health care facility.

D3.4 Use appropriate action to maintain a facility in good repair (e.g., report, make recommendations, or repair).

D3.5 Analyze the therapeutic and functional aspects of color, decor, and furnishings as well as the process for coordinating facility furnishings and finishes in accordance with appropriate safety codes.

D3.6 Evaluate how risk management can apply to support services functions.

D4.0 Comply with protocols and practices necessary to maintain a clean and healthy work environment.

D4.1 Demonstrate the use of appropriate personal protective equipment (PPE).

D4.2 Practice proper hand hygiene.

D4.3 Use various manual and mechanical decontamination and sterilization techniques and procedures.

D4.4 Evaluate potential causes and methods of transmitting infections and how to apply standard precautionary guidelines.

D4.5 Document and analyze sanitation and infection control procedures.

D4.6 Describe the care needed when handling chemicals.

D4.7 Describe basic emergency procedures used to respond to a hazardous spill.

D4.8 Explain how waste is handled, packaged, stored, and disposed of in accordance with federal, state, and local regulations, including hazardous chemicals, biohazards, and radioactive materials.

D4.9 Comply with hazardous waste disposal policies and procedures, including documentation, to ensure that regulated waste is handled, packaged, stored, and disposed of in accordance with federal, state, and local regulations.

D4.10 Implement a waste management program, including the recycling and reduction of regulated medical, solid, hazardous, chemical, and radioactive waste materials.

D4.11 Demonstrate protection from blood-borne pathogens and identify unsafe conditions for corrective action.

D5.0 Use principles and techniques of resource management to make appropriate decisions.

D5.1 Identify components of a comprehensive training program for health care employees, including safety, infection control, handling of hazardous materials, and use of equipment.

D5.2 Follow procedures and processes for the selection, acquisition, distribution, and maintenance of equipment and understand preventive maintenance for buildings and equipment.

D5.3 Demonstrate the process for developing inventory-reduction targets to achieve the financial goals of health care organizations.

D5.4 Use distribution strategies and systems to ensure the optimal flow of materials.

D5.5 Understand a department's labor distribution reports to ensure the proper allocation of resources for projects and operations.

D5.6 Evaluate competitive pricing, terms, and service levels to support product recommendations.

D6.0 Collect and distribute essential patient information to appropriate team members.

D6.1 Recognize and report unusual or unsafe environmental conditions.

D6.2 Recognize ethical conflicts related to assessment practices (e.g., labeling, confidentiality).

D6.3 Document actions according to the facility's protocol and regulatory guidelines.

D6.4 Maintain confidentiality according to the facility's protocol as well as the Health Insurance Portability and Accountability Act (HIPAA).

D7.0 Assess and maintain materials for quality management.

D7.1 Describe risk management strategies.

D7.2 Describe the use of calibration.

D7.3 Use appropriate inventory and control systems to purchase materials, supplies, and capital equipment.

D7.4 Perform quality control activities using manuals and following directions appropriately.

D7.5 Maintain equipment (e.g., imaging, laboratory).

D7.6 Send, receive, and distribute material for services.

D7.7 Organize inventory, purchase orders, and products.

D7.8 Inspect facilities to ensure compliance with standards, regulations, and codes.

D7.9 Assess procedures and processes to select, acquire, and maintain inventory.

D7.10 Evaluate cost effectiveness of alternative methods for inventory control.

D7.11 Discuss policies and procedures to monitor, distribute, and consume materials.

D8.0 Demonstrate handling and storage of materials, supplies, and equipment.

D8.1 Describe and implement a program to purchase materials, supplies, and capital equipment with allocated resources.

D8.2 Use appropriate safety equipment.

D8.3 Explain inventory control.

D8.4 Demonstrate appropriate inventory control systems (e.g., distribution, consumption, intentional loss of materials or supplies).

D8.5 Demonstrate proper care in handling and storage of sterile and non-sterile items.

D9.0 Analyze the business structure of supply and service management.

- D9.1 Describe the components of a purchasing agreement.
- D9.2 Describe the supply chain process.
- D9.3 Explain bids and quotes for supply and service selection.
- D9.4 Explain competitive pricing.
- D9.5 Assess integration of resource functions.
- D9.6 Assess purchasing and procurement techniques that improve quality and supply.
- D9.7 Utilize technology and translate how it supports the supply chain process.
- D9.8 Discuss the cost benefits of supply and service selection.
- D9.9 Analyze the impact of timely order placement and supplier performance.

D10.0 Demonstrate the ability to prepare, assemble, and deliver a nutritious, high-quality meal for the clients they serve.

- D10.1 Prepare a food tray with the appropriate utensils and food items as prescribed to meet dietary requirements.
- D10.2 Deliver trays to the specified area of the health care facility.
- D10.3 Using National Health Occupations Students of America (HOSA) Nursing Assisting guidelines, prepare the patient for a meal.
- D10.4 Using state and federal standards for examining food temperatures, follow guidelines for inspecting the safety of food.

D11.0 Demonstrate and use the correct transport equipment.

- D11.1 Assess the protocol for transporting a patient to surgery versus a patient to radiology.
- D11.2 Practice proper body mechanics and safety measures while transferring a patient from an emergency room to the assigned room and document results of the transfer.
- D11.3 Demonstrate and recite procedures about safe patient transport for interdepartmental transfers or upon discharge.

D12.0 Understand the need for an effective emergency preparedness plan.

- D12.1 Describe different types of emergency preparedness plans (e.g., homeland security, natural disaster, pandemic, crisis planning).
- D12.2 Explain emergency procedures for staff, including supplies needed in the event of an internal or external disaster.
- D12.3 Participate in educational and training programs related to emergency preparedness planning.
- D12.4 Assess the Emergency Preparedness Plan.

E. Public and Community Health Pathway

The standards for the Public and Community Health pathway apply to occupations or functions involved primarily in environmental health, community health and health education, epidemiology, disaster management, and geriatrics. The standards specify the knowledge and skills needed by professionals pursuing careers in this pathway.

Sample occupations associated with this pathway:

- Community Health Worker
- Epidemiologist
- Health Educator
- Advocate
- Environmentalist

E1.0 Understand the context and scope of public health on improving health and quality of life in personal, community, and the global population.

- E1.1 Understand written text about the history, philosophy, services, and careers in public health.
- E1.2 Describe the environmental, behavioral, biological, and socio-economic factors as well as access, quality, intervention and cost of medical care that are central to communities and the population.
- E1.3 Identify the roles and responsibilities of public health in addressing populations, health disparity, and disaster prevention and management.
- E1.4 Explain how public health can utilize health information and health communications to improve the health of populations.
- E1.5 Explain how public health can utilize social and behavioral interventions to improve the health of populations.
- E1.6 Explain how public health can utilize health policy and law to improve the health of populations.
- E1.7 Explain how public health assesses the options for intervention to improve the health of a population.
- E1.8 Explain the impact of the environment and communicable diseases on the health of populations.
- E1.9 Compare the scope of current public health policies with past practices.
- E1.10 Defend health decisions, individual rights, and social responsibilities.

E2.0 Design, promote, and implement community health programs which result in health-positive behaviors among all individuals, families, groups in a community, and the global environment.

- E2.1 Know public policies that have an impact on people's health.

E2.2 Identify and document factors influencing people's health status through a strong grounding in social and behavioral theory.

E2.3 Understand various strategies to improve the health status of individuals and the community.

E2.4 Understand the many health disparities barriers to access among underserved communities.

E2.5 Develop specific competencies for work in underserved and/or linguistically isolated communities.

E2.6 Demonstrate competency in working with diverse cultures and communities.

E2.7 Demonstrate ways in which enhancing and maintaining personal health and well-being are established.

E2.8 Explain fiscal and organizational resources to ensure optimal health programs and service delivery in communities.

E2.9 Expand health knowledge to provide information and referrals and advocacy on a range of health topics more effectively.

E2.10 Conduct outreach and health education at community sites with various cultural groups.

E2.11 Evaluate the process and outcome of community-based health education programs.

E2.12 Research the social, cultural, and behavioral factors influencing health outcomes.

E3.0 Examine gerontology and its social implications using a life-span perspective that focuses on older adults' needs/concerns along life's continuum in various environments.

E3.1 Understand how the demographics of the older population affect various aspects of our society.

E3.2 Recognize the contributions that aging persons make to their communities.

E3.3 Define the life course perspective and describe how age, gender, race, and ethnicity influence the life course.

E3.4 Identify a range of available services for elders in most communities.

E3.5 Understand health disparities among older adults and their impact on society.

E3.6 Understand the role of service providers and the use of community recreation and health services in their involvement with older persons.

E3.7 Understand common threats to loss of independence: falls, medication management, and lifestyle.

E3.8 Advocate for technology to enhance older adults' function, independence, and safety.

E3.9 Assess how policies, regulations, and programs differentially impact older adults and their caregivers, particularly among historically disadvantaged populations.

E3.10 Differentiate between normal changes in functioning due to aging and pathological changes leading to disease.

E3.11 Analyze the impact of an aging society on the nation's health care system.

E4.0 Promote the protection, sustainability, and enhancement of the overall environmental quality of life.

E4.1 Identify the various environmental factors that affect a community's health and safety such as water quality, air quality, food supply, industrial hygiene, and solid and hazardous waste disposal.

E4.2 Identify human health hazards that may cause sickness or impaired health/well-being.

E4.3 Identify the carriers or vectors that promote the transfer of these agents from the environment to the human.

E4.4 Interpret the principles of environmental health practices.

E4.5 Summarize health conditions that are caused or aggravated by environmental conditions.

E4.6 Discuss emerging global environmental health problems.

E4.7 Analyze current legislation and regulation regarding environmental issues.

E4.8 Explore approaches to control major environmental health problems.

E5.0 Predict and evaluate rates, risk factors, and health status indicators of morbidity and mortality, disease determinants, and causation.

E5.1 Describe the historical roots of epidemiological thinking and its contribution to the evolution of the scientific method.

E5.2 Describe the basic epidemiological concepts of rates, causation, and public health surveillance.

E5.3 Generate hypotheses of patterns of disease and injuries regarding person, place, and time.

E5.4 Research data regarding disease or injuries, including rates, risk factors, disease determinants, and causation of morbidity and mortality.

E5.5 Explore the effects of disease, injury, and violence on longevity and quality of life.

E5.6 Evaluate methods to prevent, detect, cure, and minimize disease, injury, and violence in the population.

E6.0 Integrate knowledge and skills necessary as a member of a Community Emergency Response Team (CERT) to demonstrate the response required to meet your community's immediate needs in emergencies or disasters.

E6.1 Describe the roles and responsibilities of a member of a Community Emergency Response Team (CERT) in immediate response.

E6.2 Describe potential hazards and their effect on the community.

E6.3 Describe prevention strategies in homes, workplaces, and communities.

E6.4 Identify planning and size-up requirements for potential search and rescue situations.

E6.5 Explain how the community has a role in disaster preparedness and response.

E6.6 Demonstrate preparation strategies to improve the quality of life for a person or community.

E6.7 Employ basic assessment, triage, and treatment as defined by CERT protocols under simulated disaster conditions.

E6.8 Demonstrate working as a team, applying safe techniques for debris removal, and victim extrication.

E6.9 Describe the post-disaster emotional environment and the steps that rescuers can take to relieve their own stressors and trauma and those of disaster survivors.

F. Mental and Behavioral Health Pathway

The standards for mental and behavioral health relate to occupations that assist clients on their journey toward better health. Collaborating with other departments as members of interdisciplinary teams of mental health professionals, such as psychiatrists, psychologists, registered nurses, and other disciplines, they assist with delivery of appropriate, quality treatment to patients with behavioral health concerns, psychological crises, and other biopsychological problems.

Sample occupations associated with this pathway:

- Mental Health Therapist
- Outreach Coordinator
- Psychologist
- Psychiatric Technician
- Mental Health Researcher

F1.0 Recognize and interpret principles of community engagement.

- F1.1 Identify and describe prevention and early intervention barriers to mental health care.
- F1.2 Define the psycho-education approach and describe how it is used as a tool to help consumers and their families learn more about managing their mental illness.
- F1.3 Define the principles of community engagement and how they apply to community-based participatory research.
- F1.4 Use and apply community-based participatory research methods to increase community participation and resources.
- F1.5 Develop and explore basic outreach approaches that can be successful in increasing awareness about mental health services.
- F1.6 Research and organize community resources that promote community wellness.
- F1.7 Advocate community inclusion and social roles such as; supported housing, employment, education, parenting, citizenship, and anti-stigma.

F2.0 Demonstrate the ability to build relationships by communicating empathy.

- F2.1 Describe the elements of active listening.
- F2.2 Demonstrate active listening by connecting new knowledge or experiences with prior knowledge and problem solving.
- F2.3 Differentiate between giving advice and active listening by constructing real-life examples.
- F2.4 Build strong verbal knowledge to frame language in ways that increase engagement.
- F2.5 Recognize complex language semantics and make appropriate adaptations for the community being served.
- F2.6 Build on communication by using motivational interviewing as an engagement tool.

F3.0 Develop and employ collaboration skills that engage others and build trust.

- F3.1 Define collaboration in a mental health context and build on prior knowledge by recalling collaborative experiences.
- F3.2 Employ aspects of collaborative leadership that enhances decision making and consensus building.
- F3.3 Explore and practice collaborative methods for working with special populations to increase their community capacity.
- F3.4 Design innovative strategies to monitor and evaluate engagement.

F4.0 Recognize and differentiate between the stages of mental health recovery.

- F4.1 Define four stages of mental health recovery (hope, empowerment, self-responsibility, and meaningful role in life) and demonstrate impact on complex mental health problems.
- F4.2 Demonstrate the ability to formulate goals related to each of the four stages of recovery using a multiple-step process of goal setting.
- F4.3 Compare and contrast a psychosocial rehabilitation and recovery model that supports each individual's potential for recovery verses a medical model that views abnormal behavior as the result of physical problems and should be treated medically.
- F4.4 Integrate and apply four stages of recovery by designing a recovery plan based on goals that require real-world scenarios.
- F4.5 Assess the implementation of the recovery plan and formulate alternative approaches to reach desired outcomes.
- F4.6 Advocate for hope and respect, and believe that all individuals have the capacity for learning and growth.
- F4.7 Examine ways in which one's recovery from mental illness can be measured.

F5.0 Communicate and practice leadership and accountability behaviors.

- F5.1 Identify strategies to work under pressure and cope with stress.
- F5.2 Develop a basic understanding of various leadership styles that promote positive change in mental health services.
- F5.3 Compare and contrast different leadership styles and accountability in mental health.
- F5.4 Construct multiple steps to solve complex problems using real-world scenarios in mental health services.

F6.0 Analyze and interpret elements of positive psychology (e.g., hope, resilience, strengths, creativity, community building, and supportive spirituality).

- F6.1 Recall the recovery model and communicate how positive psychology impacts a mental health consumer's recovery.
- F6.2 Interpret key terms from the positive psychology perspective in relationship to holistic wellness.

F6.3 Assess the impact of positive psychology's elements on risk reduction and integrated primary care.

F6.4 Build on the discovered strengths and capabilities of individuals.

F7.0 Formulate and implement quality care and treatment plans.

F7.1 Define and describe practices that help individuals improve the quality of all aspects of their lives, including social, occupational, educational, spiritual, and financial.

F7.2 Identify and provide evidence for an effective collaborative approach in mental health recovery that is inclusive of the individual in need.

F7.3 Practice promoting health and wellness, encouraging individuals to develop and use individualized wellness plans.

F7.4 Design a treatment plan that addresses the unique needs of individuals, consistent with their values, hopes and aspirations.

F7.5 Adhere to consistent documentation of implemented interventions and progress.

F8.0 Synthesize, understand, and predict the impact of mental health disparities across consumer populations.

F8.1 Define mental health disparities.

F8.2 Organize and summarize knowledge on the impact of mental health disparities among different populations.

F8.3 Analyze causes for mental health disparities using current research methods and literature.

F8.4 Synthesize research articles related to mental health disparities and produce a statement problem on what causes such disparities.

F9.0 Design a practice model of a personal support network by utilizing prior knowledge of recovery concepts and using natural supports within communities.

F9.1 Identify community-based self-help/peer support groups.

F9.2 Communicate with self-help/peer support groups in the community and generate information about their specific functions and responsibilities to the community they serve.

F9.3 Compare and contrast self-help/peer support groups to determine strengths and gaps in service delivery.

F9.4 Design a practice self-help/peer support group model that fills in the identified gaps and builds on the identified strengths.

F9.5 Examine the role that natural supports such as spiritual organizations, community centers, and other community-related resources play in an individual's mental health recovery.

F10.0 Formulate an argument and predict how electronic health records can transform quality of care and promote a green economy.

F10.1 Access and become familiar with basic electronic health records functions.

F10.2 Analyze the effect of electronic health records on the quality of care and a green economy.

F10.3 List and describe at least five ways that electronic health records will advance a green economy.

F10.4 Distinguish between interoperability at the local primary care level and interoperability with statewide mental health systems in using electronic health records.

F11.0 Recognize and respect the various cultures of a community and other factors that indicate its diversity in all aspects of communicating, designing, and implementing patient care.

F11.1 Identify and understand the patterns of communication including the use of languages.

F11.2 Communicate and listen effectively across cultures and all levels of care.

F11.3 Demonstrate appropriate judgment on when and how to use trained interpreters.

F11.4 Research factors that define cultural differences between and among different ethnic, racial, and special populations.

F11.5 Illustrate how to incorporate culturally appropriate community resources.

F11.6 Design and execute an ethnographic approach focusing on information retrieval, observing social behavior, managing stress and time, ask questions, explore aspects of global significance, and analyze data using relevant concepts.

F12.0 Evaluate the purpose and components of a treatment plan related to the consumer's health status.

F12.1 Understand the roles of a patient advocate to ensure treatment quality and resources.

F12.2 Explain the components of a treatment plan.

F12.3 Select appropriate equipment and instruments in accord with the treatment plan.

F12.4 Adhere to the roles and responsibilities, within scope of practice, that contribute to the design and implementation of a treatment plan.

F12.5 Prioritize and organize work in accordance with the patients' treatment plans.

F12.6 Determine the resources available for the effective implementation of treatment plans for patients.

F13.0 Identify and apply leadership styles in personal growth and development.

F13.1 Develop goal setting that leads to professional and career growth.

F13.2 Participate in student leadership and skill development activities such as California Health Occupations Students of America (Cal-HOSA).

F13.3 Employ self-regulation strategies that include self-monitoring and self-evaluation in approaching new and challenging tasks.

F13.4 Build and employ self-confidence to empower self and others.

F13.5 Refine and upgrade technical and clinical skills.

F13.6 Create and design a working portfolio that will be used for interviews for both post-secondary and employment acceptance.

Academic Alignment Matrix

HEALTH SCIENCE AND MEDICAL TECHNOLOGY	PATHWAYS					
	A. Biotechnology	B. Patient Care	C. Health Care Administrative Services	D. Health Care Operational Support Services	E. Public and Community Health	F. Mental and Behavioral Health
ENGLISH LANGUAGE ARTS						
Language Standards – LS – (Standard Area, Grade Level, Standard #)						
11-12.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.	A1.0, A3.0, A6.0, A7.0	B1.0, B2.0, B4.0, B5.0, B6.0, B7.0, B8.0, B10.0, B11.0, B12.0	B2.0, B4.0, B6.0, B7.0, B8.0, B9.0, B11.0, B12.0, B13.0		E 1.0, E4.0	F1.0, F2.0, F7.0
11-12.2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.		B1.0, B2.0, B4.0, B5.0, B6.0, B7.0, B10.0, B11.0, B12.0	C2.0, C4.0, C6.0, C7.0, C8.0, C9.0, C11.0, C12.0, C13.0		E1.0, E2.0	F1.0, F2.0, F7.0
11-12.3. 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.	A3.0, A7.0, A8.0	B1.0, B2.0, B4.0, B6.0, B13.0	C1.0, C2.0, C4.0, C5.0, C6.0, C7.0, C8.0, C11.0, C13.0		E1.0, E2.0	F1.0, F2.0, F11.0
11-12.4. 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.	A6.0, A7.0	B1.0, B2.0, B4.0, B5.0, B6.0, B11.0, B13.0	C1.0, C2.0, C3.0, C4.0, C5.0, C6.0, C7.0, C8.0, C12.0, C15.0		E1.0	F1.0, F4.0, F7.0, F9.0
11-12.5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.		B4.0, B5.0, B6.0, B8.0, B10.0, B13.0	C4.0, C5.0, C6.0		E1.0	F1.0, F4.0
11-12.6. Acquire and accurately use 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.	A3.0, A5.0, A6.0, A7.0	B1.0, B2.0, B4.0, B5.0, B6.0, B7.0, B8.0, B10.0, B11.0, B12.0, B13.0	C1.0, C2.0, C3.0, C4.0, C5.0, C6.0, C7.0, C8.0, C9.0, C10.0, C11.0, C12.0, C13.0, C14.0, C15.0, C16.0	D1.0	E1.0, E2.0, E5.0, E6.0	F1.0, F3.0, F4.0, F10.0

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	A. Biotechnology	B. Patient Care	C. Health Care Administrative Services	D. Health Care Operational Support Services	E. Public and Community Health	F. Mental and Behavioral Health
Reading Standards for Informational Text – RSIT – (Standard Area, Grade Level, Standard #)						
11-12.1. 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.			C1.0, C2.0, C4.0, C6.0		E1.0, E2.0, E4.0	F2.0, F4.0, F7.0
11-12.4. 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). (See grade 11/12 Language standards 4-6 on page 46 for additional expectations.)	A2.0, A3.0, A5.0, A6.0, A7.0	B1.0, B2.0, B5.0, B9.0, B10.0, B12.0, B13.0	C1.0, C2.0, C4.0, C6.0	D6.0	E1.0, E4.0, E5.0	F4.0, F6.0, F8.0, F10.0, F11.0
11-12.5. 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.	A1.0, A5.0		C6.0			
11-12.7. 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.	A1.0, A7.0, A8.0, A9.0	B3.0, B7.0, B10.0, B13.0	C1.0, C2.0, C3.0, C4.0, C6.0	D2.0, D3.0, D9.0, D10.0, D12.0	E3.0	F4.0
11-12.8. 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).	A1.0, A2.0	B1.0, B4.0, B5.0, B12.0	C1.0, C2.0, C3.0, C4.0, C5.0, C13.0	D3.0, D6.0		

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Reading Standards for Informational Text – RSIT – (Standard Area, Grade Level, Standard #) *(continued)*						
11-12.9 Analyze seventeenth-, eighteenth-, and nineteenth-century foundational U.S. documents of historical and literary significance (including the Declaration of Independence, the preamble to the Constitution, the Bill of Rights, and Lincoln's Second Inaugural Address) for their themes, purpose, and rhetorical features.			C1.0, C2.0, C3.0, C4.0, C10.0, C12.0, C13.0			
11-12.10 By the end of grade 11, read and comprehend literary nonfiction in the grades 11-CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction at the high end of the grades 11-CCR text complexity band independently and proficiently.	A1.0, A2.0, A3.0, A4.0, A7.0, A9.0	B1.0, B2.0, B13.0	C1.0, C3.0, C4.0, C6.0	D3.0, D4.0, D5.0, D7.0, D12.0		
Reading Standards for Literacy in Science and Technical Subjects – RRLST – (Standard Area, Grade Level, Standard #)						
11-12.1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes to any gaps or inconsistencies in the account.	A1.0, A2.0, A3.0, A4.0	B2.0, B5.0, B13.0	C1.0, C2.0, C3.0, C4.0, C6.0	D3.0, D4.0	E1.0	
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.	A1.0, A2.0, A3.0, A4.0, A7.0, A9.0	B13.0	C2.0, C3.0, C4.0, C6.0	D1.0, D2.0, D3.0, D4.0, D6.0, D7.0, D8.0, D9.0, D12.0		
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.	A3.0, A4.0, A5.0, A6.0, A8.0, A9.0	B8.0, B10.0, B11.0	C3.0, C9.0, C15.0	D1.0, D2.0, D3.0, D4.0, D5.0, D7.0, D8.0, D9.0, D10.0, D12.0	E6.0	F4.0, F5.0, F9.0

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Reading Standards for Literacy in Science and Technical Subjects – RRLST – (Standard Area, Grade Level, Standard #) *(continued)*						
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.	A3.0, A4.0, A5.0, A6.0, A8.0, A9.0	B1.0, B4.0, B5.0, B6.0, B11.0	C1.0, C2.0, C3.0, C4.0, C6.0, C7.0, C8.0, C9.0, C10.0, C11.0, C12.0, C13.0, C15.0	D1.0, D2.0, D3.0, D4.0, D5.0, D6.0, D7.0, D8.0, D10.0, D11.0, D12.0	E3.0	F6.0
11-12.5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.	A1.0, A7.0, A9.0	B1.0	C1.0, C4.0, C6.0			F4.0, F7.0
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.	A2.0, A7.0	B6.0	C4.0, C8.0	D1.0, D2.0, D3.0, D4.0, D5.0, D6.0, D7.0, D8.0, D9.0, D10.0, D12.0	E2.0, E3.0, E5.0	F4.0, F6.0, F7.0, F9.0
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.	A3.0, A4.0, A5.0, A6.0, A9.0	B4.0	C1.0, C3.0, C4.0, C6.0, C8.0	D2.0, D3.0, D4.0, D7.0, D9.0, D12.0	E1.0, E3.0, E4.0, E5.0	F1.0, F4.0, F5.0, E10.0
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.	A1.0, A2.0, A3.0, A4.0, A6.0, A9.0	B5.0	C3.0, C4.0, C6.0	D1.0, D2.0, D3.0, D4.0, D5.0, D7.0, D9.0, D12.0	E2.0, E3.0, E4.0, E5.0	F1.0, F4.0, F11.0
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.	A1.0, A2.0, A3.0, A4.0, A6.0, A9.0	B1.0, B2.0, B9.0, B13.0	C1.0, C2.0, C3.0, C4.0, C5.0, C6.0, C13.0	D2.0, D3.0, D4.0, D7.0, D9.0, D12.0	E3.0, E4.0, E5.0	F1.0, F5.0, F8.0, F11.0

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	A. Biotechnology	B. Patient Care	C. Health Care Administrative Services	D. Health Care Operational Support Services	E. Public and Community Health	F. Mental and Behavioral Health
Writing Standards – WS – (Standard Area, Grade Level, Standard #)						
11-12.2. 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. a. Introduce a topic or thesis statement; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	A1.0, A2.0, A7.0, A9.0	B1.0, B2.0, B10.0, B11.0, B12.0, B13.0	C4.0, C6.0, C7.0, C8.0, C9.0	D1.0, D3.0, D6.0, D7.0, D8.0, D9.0, D12.0	E1.0, E2.0, E3.0	F1.0, F2.0, F4.0, F6.0

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	A. Biotechnology	B. Patient Care	C. Health Care Administrative Services	D. Health Care Operational Support Services	E. Public and Community Health	F. Mental and Behavioral Health
Writing Standards – WS – (Standard Area, Grade Level, Standard #) *(continued)*						
11-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	A1.0, A2.0, A3.0, A4.0, A7.0, A9.0	B1.0, B2.0, B6.0, B7.0, B10.0, B11.0, B12.0, B13.0	C2.0, C4.0, C6.0, C7.0, C8.0, C9.0, C10.0, C12.0	D3.0, D4.0, D6.0, D12.0	E2.0, E3.0, E5.0	F7.0, F8.0, F11.0, F12.0
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.	A5.0, A9.0	B10.0, B12.0	C6.0, C7.0, C9.0, C11.0	D7.0, D9.0	E3.0, E5.0	F8.0, F10.0
11-12.7. 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.	A1.0, A2.0, A4.0, A5.0, A7.0, A9.0	B11.0, B13.0	C2.0, C4.0, C6.0, C8.0	D1.0, D4.0, D5.0, D7.0, D9.0, D12.0	E2.0, E4.0, E5.0	F1.0, F4.0, F8.0, F11.0
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 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 including footnotes and endnotes.	A2.0, A7.0, A9.0	B6.0, B9.0, B10.0, B11.0, B12.0, B13.0	C2.0, C4.0, C6.0, C8.0	D3.0, D12.0	E3.0, E5.0	F1.0, F2.0, F8.0
11-12.9. Draw evidence from literary or informational texts to support analysis, reflection, and research.	A1.0, A2.0, A7.0, A9.0	B13.0	C4.0, C6.0	D2.0, D3.0, D4.0, D12.0	E3.0, E4.0, E5.0	F1.0, F4.0, F6.0
Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHSST – (Standard Area, Grade Level, Standard #)						
11-12.1. Write arguments focused on discipline-specific content.	A2.0, A3.0, A4.0, A6.0		C1.0, C2.0, C4.0, C6.0, C8.0C9.0	D4.0, D5.0, D7.0, D9.0	E1.0, E2.0, E5.0	F1.0, F3.0, F4.0, F10.0

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Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHSST – (Standard Area, Grade Level, Standard #) *(continued)*						
11-12.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.	A1.0, A2.0, A7.0, A9.0	B1.0, B4.0, B5.0, B6.0, B7.0, B8.0, B9.0, B10.0, B11.0, B12.0	C1.0, C7.0	D1.0, D2.0, D3.0, D4.0, D6.0, D7.0, D8.0, D9.0, D12.0	E2.0, E5.0, E6.0	F1.0, F7.0, F12.0
11-12.3. Incorporate narrative elements effectively into arguments and informative/explanatory texts.	A1.0, A2.0, A3.0, A7.0, A9.0	B13.0	C1.0, C7.0	D1.0, D2.0, D3.0, D4.0, D6.0, D7.0, D8.0, D9.0, D12.0	E2.0, E5.0, E6.0	F4.0, F6.0, F8.0, F10.0
11-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate tot task, purpose, and audience.	A1.0, A2.0, A7.0, A9.0	B1.0, B2.0, B4.0, B6.0, B7.0, B10.0, B11.0, B12.0, B13.0	C1.0, C2.0, C4.0, C6.0, C7.0, C8.0, C9.0, C11.0, C12.0	D1.0, D3.0, D4.0, D6.0, D8.0, D9.0, D12.0	E2.0, E3.0, E5.0	F4.0, F7.0, F8.0
11-12.5. 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.		B13.0	C4.0, C6.0, C7.0, C9.0, C12.0		E2.0, E3.0	F4.0, F7.0, F8.0
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.	A5.0, A7.0, A9.0	B1.0, B2.0, B10.0, B11.0, B12.0, B13.0	C1.0, C2.0, C7.0, C9.0, C10, C12.0	D7.0, D9.0	E3.0, E5.0	F10.0
11-12.7. 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.	A1.0, A2.0, A9.0	B13.0		D2.0, D5.0, D12.0	E2.0, E4.0, E5.0	F1.0, F3.0, F8.0

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Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHSST – (Standard Area, Grade Level, Standard #) *(continued)*						
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.	A1.0, A2.0, A7.0, A9.0	B9.0, B10.0, B11.0, B12.0, B13.0	C1.0, C2.0, C3.0, C4.0, C6.0, C7.0, C8.0, C9.0, C12.0, C13.0, C14.0, C15.0, C16.0	D2.0, D3.0, D4.0, D12.0	E3.0, E5.0	F1.0, F3.0, F8.0, F9.0
11-12.9. Draw evidence from informational texts to support analysis, reflection, and research.	A1.0, A2.0, A9.0	B9.0, B10.0, B11.0, B12.0, B13.0	C5.0, C16.0	D2.0, D3.0, D4.0, D12.0	E3.0, E4.0, E5.0	F1.0, F8.0
11-12.10. 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.	A4.0, A9.0	B7.0, B10.0, B13.0	C9.0		E2.0, E3.0, E5.0	F4.0, F6.0, F7.0
MATHEMATICS						
Algebra – A-SSE – Seeing Structure in Expressions						
Interpret the structure of expressions						
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.	A1.0, A3.0, A6.0	B3.0	C3.0	D9.0	E3.0	F7.0, F10.0

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Algebra – A-SSE – Seeing Structure in Expressions *(continued)*						
Write expressions in equivalent forms to solve problems						
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.	A6.0			D2.0, D5.0, D7.0, D8.0, D9.0		
Algebra – A-CED – Creating Equations						
Create equations that describe numbers or relationships						
1. Create equations and inequalities in one variable including ones with absolute value and use them to solve problems in and out of context, including equations arising from linear functions. 1.1 Judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step. (CA Standard Algebra II - 11.2)	A1.0, A2.0, A3.0, A6.0		C10.0			
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	A1.0, A2.0, A3.0, A6.0			D2.0, D5.0, D7.0, D9.0		
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.	A1.0, A2.0, A3.0, A6.0	B3.0	C3.0	D5.0, D7.0, D8.0, D9.0		
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.	A3.0, A6.0					

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Algebra – A-APR – Arithmetic with Polynomials and Rational Expressions						
Perform arithmetic operations on polynomials						
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, and divide polynomials by monomials. Solve problems in and out of context. (Common Core Standard A-APR-11)	A1.0, A3.0, A6.0	B3.0		D5.0, D7.0, D8.0		
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 yare any numbers, with coefficients determined for example by Pascal's Triangle.	A1.0					
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.	A6.0					
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.	A1.0, A3.0, A6.0			D5.0, D7.0, D8.0		
Algebra – A-REI – Reasoning with Equations and Inequalities						
Understand solving equations as a process of reasoning and explain the reasoning						
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.	A1.0, A3.0, A6.0	B3.0				

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Algebra – A-REI – Reasoning with Equations and Inequalities *(continued)*						
2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	A1.0, A2.0, A3.0					
Solve equations and inequalities in one variable						
3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. 3.1 Solve equations and inequalities involving absolute value. (CA Standard Algebra I - 3.0 and CA Standard Algebra II - 1.0)	A1.0, A2.0, A3.0, A6.0	B3.0	C3.0	D5.0, D7.0		
Solve systems of equations						
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.	A1.0, A2.0, A3.0					
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	A1.0, A3.0, A6.0					
8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.	A3.0, A6.0					
Represent and solve equations and inequalities graphically						
10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	A1.0, A2.0, A3.0, A6.0	B3.0	C3.0		E2.0, E5.0	F7.0, F8.0, F12.0
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.	A1.0, A2.0, A3.0, A6.0					

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Algebra – A-REI – Reasoning with Equations and Inequalities *(continued)*						
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.	A1.0, A6.0					
Functions – F-IF – Interpreting Functions						
Understand the concept of a function and use function notation						
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)*.	A1.0, A3.0, A6.0	B3.0	C3.0	D2.0, D7.0, D9.0	E2.0, E3.0, E5.0	F6.0, F7.0, F8.0, F12.0
2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	A1.0, A3.0, A6.0	B3.0	C3.0	D2.0, D7.0, D9.0		
Interpret functions that arise in applications in terms of the context						
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.	A1.0, A2.0, A3.0, A6.0	B3.0	C3.0	D2.0, D7.0, D9.0	E1.0, E2.0, E3.0, E4.0, E5.0	F6.0, F7.0, F8.0, F12.0
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.	A1.0, A3.0, A6.0	B3.0	C3.0	D5.0, D7.0, D9.0		F6.0, F7.0, F8.0, F12.0

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Functions – F-IF – Interpreting Functions *(continued)*						
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.	A1.0, A2.0, A3.0, A6.0	B3.0	C3.0	D2.0, D5.0, D7.0, D9.0	E1.0, E2.0, E3.0, E4.0, E5.0	F7.0, F8.0, F12.0
Analyze functions using different representations						
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	A1.0, A2.0, A3.0, A6.0					
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.	A6.0					
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.	A1.0, A3.0, A6.0	B3.0	C3.0		E3.0, E4.0, E5.0	F6.0, F7.0, F8.0, F12.0

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Functions – F-IF – Interpreting Functions *(continued)*						
10. Demonstrate an understanding of functions and equations defined parametrically and graph them. (CA Standard Math Analysis - 7.0)	A1.0, A6.0					
Functions – F-BF – Building Functions						
Build a function that models a relationship between two quantities						
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.* 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.	A3.0, A6.0			D5.0, D7.0, D9.0	E4.0, E5.0	F6.0, F7.0, F8.0, F12.0
Build new functions from existing functions						
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. 3.1 Solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions. (CA Standard Algebra II - 24.0)	A1.0				E4.0, E5.0	F6.0, F7.0, F8.0, F12.0

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Functions – F-LE – Linear, Quadratic, and Exponential Models						
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.	A1.0, A3.0, A6.0	B3.0	C3.0			
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).	A3.0, A6.0		C3.0			
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.	A1.0	B3.0	C3.0		E4.0, E5.0	F6.0, F7.0, F8.0, F12.0
Interpret expressions for functions in terms of the situation they model						
5. Interpret the parameters in a linear or exponential function in terms of a context.	A1.0, A3.0, A6.0		C3.0			
6. Apply quadratic equations to physical problems, such as the motion of an object under the force of gravity. (CA Standard Algebra 1- 23.0)	A6.0		C3.0			
Number and Quantity – N-Q – Quantities						
Reason quantitatively and use units to solve problems						
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	A1.0, A3.0, A6.0, A8.0	B3.0	C3.0	D5.0, D7.0, D9.0	E1.0, E2.0, E5.0	F6.0, F7.0, F8.0, F12.0

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Number and Quantity – N-Q – Quantities *(continued)*						
2. Define appropriate quantities for the purpose of descriptive modeling.	A1.0, A3.0, A6.0, A8.0	B3.0	C3.0	D7.0	E1.0, E2.0, E4.0, E5.0	F7.0, F8.0, F11.0, F12.0
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	A1.0, A3.0, A6.0, A8.0	B3.0	C3.0	D7.0	E2.0, E4.0, E5.0	F7.0, F8.0, F11.0, F12.0
Statistics and Probability – S-IC – Making Inferences and Justifying Conclusions						
Understand and evaluate random processes underlying statistical experiments						
1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	A1.0, A5.0, A6.0	B3.0, B9.0, B13.0		D5.0	E1.0, E2.0, E5.0	F1.0, F7.0, F8.0, F11.0, F12.0
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?	A1.0, A5.0, A6.0	B3.0, B9.0, B13.0			E5.0	F8.0
Make inferences and justify conclusions from sample surveys, experiments, and observational studies						
3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	A1.0, A3.0, A5.0	B3.0, B9.0, B13.0	C3.0		E4.0, E5.0	F1.0, F6.0, F8.0, F11.0
5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	A1.0, A3.0, A4.0, A5.0, A6.0	B3.0, B9.0, B13.0	C3.0		E5.0	F6.0, F8.0
6. Evaluate reports based on data.	A1.0, A3.0, A5.0, A6.0, A9.0	B1.0, B3.0, B9.0, B13.0	C1.0, C3.0, C4.0	D5.0, D7.0, D9.0	E1.0, E2.0, E3.0, E4.0, E5.0	F4.0, F6.0, F8.0, F11.0

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Statistics and Probability – S-ID – Interpreting Categorical and Quantitative Data						
Summarize, represent, and interpret data on a single count or measurement variable						
1. Represent data with plots on the real number line (dot plots, histograms, and box plots).	A1.0, A2.0, A3.0, A4.0, A5.0, A6.0, A9.0	B1.0, B3.0	C3.0		E1.0, E2.0, E3.0, E4.0, E5.0	F3.0, F4.0, F6.0, F8.0, F11.0
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.	A1.0, A6.0		C3.0		E3.0, E5.0	F6.0, F8.0
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	A1.0, A6.0		C3.0		E3.0, E5.0	F6.0, F8.0
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.	A1.0			D5.0, D7.0, D9.0	E3.0, E5.0	F6.0, F8.0
Summarize, represent, and interpret data on two categorical and quantitative variables						
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.	A1.0, A6.0	B3.0	C3.0	D5.0, D7.0, D9.0	E3.0, E5.0	F6.0, F8.0

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Statistics and Probability – S-ID – Interpreting Categorical and Quantitative Data *(continued)*						
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.	A1.0, A4.0, A6.0			D5.0, D7.0, D9.0	E3.0, E5.0	F6.0, F8.0
Interpret linear models						
7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	A1.0, A2.0, A3.0, A6.0, A9.0	B1.0, B3.0	C3.0	D2.0, D5.0, D7.0, D8.0, D9.0	E1.0, 2.0, E3.0, E4.0, E5.0	F6.0, F8.0
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.	A6.0		C3.0		E3.0, E5.0	F6.0, F8.0
9. Distinguish between correlation and causation.	A1.0, A3.0, A6.0	B3.0	C3.0	D5.0, D7.0, D8.0, D9.0	E3.0, E5.0	F6.0, F8.0
Statistics and Probability – S-CP – Conditional Probability and the Rules of Probability						
Understand independence and conditional probability and use them to interpret data						
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").	A1.0					

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Statistics and Probability – S-MD – Using Probability to Make Decisions						
Calculate expected values and use them to solve problems						
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.	A1.0, A3.0, A6.0					
Use probability to evaluate outcomes of decisions						
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.	A1.0			D12.0	E1.0, E5.0	F6.0, F8.0
6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	A1.0					
7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	A1.0		C3.0	D12.0	E1.0, E5.0	
Statistics and Probability – APPS – Advanced Placement Probability and Statistics						
7.0 Students demonstrate an understanding of the standard distributions (normal, binomial, and exponential) and can use the distributions to solve for events in problems in which the distribution belongs to those families.	A1.0					
10.0 Students know the definitions of the mean, median. and mode of distribution of data and can compute each of them in particular situations.	A1.0, A6.0				E1.0, E2.0, E3.0, E4.0, E5.0	F4.0, F7.0, F8.0, F9.0, F11.0, F12.0

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SCIENCE						
Physical Sciences – PS						
PS1: Matter and Its Interactions						
PS1.A: Structure and Properties of Matter	A6.0, A8.0, A9.0	B10.0		D10.0, D12.0	E6.0	
PS1.B: Chemical Reactions	A6.0, A9.0	B10.0, B11.0		D4.0	E4.0, E6.0	
PS2: Motion and Stability: Forces and Interactions						
PS2.A: Forces and Motion		B8.0, B9.0		D5.0, D11.0, D12.0	E4.0, E6.0	
PS2.C: Stability and Instability in Physical Systems		B8.0, B9.0		D5.0, D11.0	E4.0	F1.0, F9.0
PS3: Energy						
PS3.A: Definitions of Energy					E6.0	
PS3.C: Relationship Between Energy and Forces		B8.0			E6.0	
PS3.D: Energy in Chemical Processes and Everyday Life	A3.0			D12.0	E4.0, E6.0	
PS4: Waves and Their Applications in Technologies for Information Transfer						
PS4.B: Electromagnetic Radiation		B9.0				
PS4.C: Information Technologies and Instrumentation	A7.0		C8.0, C9.0, C10.0, C12.0, C14.0			F10.0
Life Sciences – LS						
LS1: From Molecules to Organisms: Structures and Processes						
LS1.A: Structure and Function	A1.0, A3.0, A4.0,			D4.0	E5.0	F1.0, F4.0

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SCIENCE						
Life Sciences – LS *(continued)*						
LS1.B: Growth and Development of Organisms	A4.0, A9.0	B2.0, B10.0		D4.0, D10.0		
LS1.C: Organization for Matter and Energy Flow in Organisms	A1.0, A3.0	B2.0				
LS1.D: Information Processing	A1.0, A3.0, A4.0					F10.0, F11.0
LS2: Ecosystems: Interactions, Energy, and Dynamics						
LS2.A: Interdependent Relationships in Ecosystems	A1.0				E5.0	
LS2.C: Ecosystems Dynamics, Functioning, and Resilience					E2.0, E4.0, E5.0	F1.0
LS2.D: Social Interactions and Group Behavior					E2.0	F1.0, F2.0, F3.0, F7.0
LS3: Heredity: Inheritance and Variation of Traits						
LS3.A: Inheritance of Traits	A3.0				E1.0, E3.0, E5.0	
LS3.B: Variation of Traits	A3.0, A9.0				E1.0, E3.0, E5.0	F8.0
LS4: Biological Evolution: Unity and Diversity						
LS4.A: Evidence of Common Ancestry and Diversity					E1.0, E2.0, E3.0, E5.0	F1.0, F11.0
LS4:B: Natural Selection					E1.0, E2.0, E5.0	
LS4.C: Adaptation	A4.0					
LS4.D: Biodiversity and Humans	A4.0					

Academic Alignment Matrix

HEALTH SCIENCE AND MEDICAL TECHNOLOGY	PATHWAYS					
	A. Biotechnology	B. Patient Care	C. Health Care Administrative Services	D. Health Care Operational Support Services	E. Public and Community Health	F. Mental and Behavioral Health
Earth and Space Sciences – ESS						
ESS3: Earth and Human Activity ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change	A9.0			D12.0	E4.0	
Engineering, Technology, and the Applications of Science – ETS						
ETS1: Engineering Design ETS1.A: Defining and Delimiting an Engineering Problem ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution	A9.30			D1.0, D2.0, D5.0, D9.0, D12.0		
ETS2: Links Among Engineering, Technology, Science, and Society ETS2.A: Interdependence of Science, Engineering, and Technology ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World	A5.0, A9.0	B1.0, B5.0, B8.0	C3.0, C5.0, C6.0, C7.0, C8.0, C9.0, C10.0, C11.0	D2.0, D4.0, D7.0, D12.0		
HISTORY/SOCIAL SCIENCE						
Principles of American Democracy and Economics – AD						
12.2 Students evaluate and take and defend positions on the scope and limits of rights and obligations as democratic citizens, the relationships among them, and how they are secured.					E1.0	
12.2.1. Discuss the meaning and importance of each of the rights guaranteed under the Bill of Rights and how each is secured (e.g., freedom of religion, speech, press, assembly, petition, privacy).		B6.0			E1.0	
12.2.5. Describe the reciprocity between rights and obligations; that is, why enjoyment of one's rights entails respect for the rights of others.		B13.0			E1.0	

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Principles of American Democracy and Economics – AD *(continued)*						
12.3 Students evaluate and take and defend positions on what the fundamental values and principles of civil society are (i.e., the autonomous sphere of voluntary personal, social, and economic relations that are not part of government), their Interdependence, and the meaning and importance of those values and principles for a free society.					E1.0, E2.0, E3.0, E4.0	F1.0, F3.0, F7.0, F11.0
12.7 Students analyze and compare the powers and procedures of the national, state, tribal, and local governments.	A1.0	B1.0	C1.0, C2.0	D3.0	E1.0, E2.0, E3.0, E4.0, E5.0, E6.0, E7.0, E8.0	
12.7.5. Explain how public policy is formed, including the setting of the public agenda and implementation of it through regulations and executive orders.	A7.0		C1.0, C2.0, C4.0		E1.0, E2.0	
12.7.6. Compare the processes of lawmaking at each of the three levels of government, including the role of lobbying and the media.			C2.0			
Principles of Economics – PE						
12.1 Students understand common economic terms and concepts and economic reasoning.						
12.1.1. Examine the causal relationship between scarcity and the need for choices.			C3.0			
12.1.2. Explain opportunity cost and marginal benefit and marginal cost.			C3.0			
12.1.5. Analyze the role of a market economy in establishing and preserving political and personal liberty (e.g., through the works of Adam Smith).			C3.0			
12.2 Students analyze the elements of America's market economy in a global setting.						

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Principles of Economics – PE *(continued)*						
12.2.1. Understand the relationship of the concept of incentives to the law of supply and the relationship of the concept of incentives and substitutes to the law of demand.				C3.0		
12.2.2. Discuss the effects of changes in supply and/or demand on the relative scarcity, price, and quantity of particular products.				C3.0, D9.0		
12.2.3. Explain the roles of property rights, competition, and profit in a market economy.	A7.0					
12.2.4. Explain how prices reflect the relative scarcity of goods and services and perform the allocative function in a market economy.	A7.0					
12.2.5. Understand the process by which competition among buyers and sellers determines a market price.	A7.0			D1.0, D5.0, D9.0		
12.2.6. Describe the effect of price controls on buyers and sellers.	A7.0					
12.2.7. Analyze how domestic and international competition in a market economy affects goods and services produced and the quality, quantity, and price of those products.	A7.0					
12.3 Students analyze the influence of the federal government on the American economy.						
12.3.1. Understand how the role of government in a market economy often includes providing for national defense, addressing environmental concerns, defining and enforcing property rights, attempting to make markets more competitive, and protecting consumers' rights.	A7.0					
12.3.2. Identify the factors that may cause the costs of government actions to outweigh the benefits.	A7.0		C1.0, C2.0			
12.4 Students analyze the elements of the U.S. labor market in a global setting.						

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Principles of Economics – PE *(continued)*						
12.4.2. Describe the current economy and labor market, including the types of goods and services produced, the types of skills workers need, the effects of rapid technological change, and the impact of international competition.	A1.0	B12.0	C1.0			
12.4.3. Discuss wage differences among jobs and professions, using the laws of demand and supply and the concept of productivity.	A1.0	B12.0	C1.0, C2.0, C3.0	D1.0	E1.0	F1.0
12.5 Students analyze the aggregate economic behavior of the U.S. economy.						
12.5.2. Define, calculate, and explain the significance of an unemployment rate, the number of new jobs created monthly, inflation or deflation rate, and a rate of economic growth.		B12.0				
U.S. History and Geography – US						
11.2 Students analyze the relationship among the rise of industrialization, large-scale rural-to-urban migration, and massive immigration from Southern and Eastern Europe.						
11.2.1. Know the effects of industrialization on living and working conditions, including the portrayal of working conditions and food safety in Upton Sinclair's *The Jungle*.					E4.0, E5.0	
11.5 Students analyze the major political, social, economic, technological, and cultural developments of the 1920s.						
11.5.7. Discuss the rise of mass production techniques, the growth of cities, the impact of new technologies (e.g., the automobile, electricity), and the resulting prosperity and effect on the American landscape.	A1.0, A9.0					
11.11 Students analyze the major social problems and domestic policy issues in contemporary American society.						
11.11.3. Describe the changing roles of women in society as reflected in the entry of more women into the labor force and the changing family structure.	A1.0	B12.0	C1.0	D1.0	E1.0	F1.0

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U.S. History and Geography – US *(continued)*						
11.11.6. Analyze the persistence of poverty and how different analyses of this issue influence welfare reform, health insurance reform, and other social policies.	A2.0, A7.0	B1.0	C1.0, C4.0	D3.0	E1.0, E2.0	F8.0
11.11.7. Explain how the federal, state, and local governments have responded to demographic and social changes such as population shifts to the suburbs, racial concentrations in the cities, Frostbelt-to-Sunbelt migration, international migration, decline of family farms, increases in out-of-wedlock births, and drug abuse.	A1.0, A2.0	B1.0, B12.0	C1.0,C2.0, C3.0	D3.0	E1.0, E2.0, E3.0	
Chronological and Spatial Reasoning – CSR						
1. Students compare the present with the past, evaluating the consequences of past events and decisions and determining the lessons that were learned.	A1.0, A2.0				E1.0, E2.0, E3.0, E4.0, E5.0	F1.0
2. Students analyze how change happens at different rates at different times; understand that some aspects can change while others remain the same; and understand that change is complicated and affects not only technology and politics but also values and beliefs.	A1.0, A2.0				E1.0, E2.0, E3.0, E4.0, E5.0	
3. Students use a variety of maps and documents to interpret human movement, including major patterns of domestic and international migration, changing environmental preferences and settlement patterns, the frictions that develop between population groups, and the diffusion of ideas, technological innovations, and goods.	A1.0, A2.0				E2.0, E3.0, E4.0, E5.0	
Historical Research, Evidence, and Point of View – HR						
1. Students distinguish valid arguments from fallacious arguments in historical interpretations.	A1.0, A2.0					
2. Students identify bias and prejudice in historical interpretations.	A1.0, A2.0					

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Historical Research, Evidence, and Point of View – HR *(continued)*						
3. Students evaluate major debates among historians concerning alternative interpretations of the past, including an analysis of authors' use of evidence and the distinctions between sound generalizations and misleading oversimplifications.	A1.0, A2.0					
4. Students construct and test hypotheses; collect, evaluate, and employ information from multiple primary and secondary sources; and apply it in oral and written presentations.	A1.0, A2.0, A3.0, A4.0, A5.0, A6.0, A9.0	B4.0, B6.0, B7.0			E5.0	
Historical Interpretation – HI						
1. Students show the connections, causal and otherwise, between particular historical events and larger social, economic, and political trends and developments.	A1.0, A2.0, A3.0, A7.0					
2. Students recognize the complexity of historical causes and effects, including the limitations on determining cause and effect.	A1.0, A2.0,					
3. Students interpret past events and issues within the context in which an event unfolded rather than solely in terms of present-day norms and values.	A1.0, A2.0, A3.0, A7.0	B4.0				
4. Students understand the meaning, implication, and impact of historical events and recognize that events could have taken other directions.	A1.0, A2.0, A3.0, A7.0					
5. Students analyze human modifications of landscapes and examine the resulting environmental policy issues.						
6. Students conduct cost-benefit analyses and apply basic economic indicators to analyze the aggregate economic behavior of the U.S. economy.			C3.0, C5.0	D5.0, D9.0	E1.0, E2.0, E3.0, E4.0, E5.0, E6.0	

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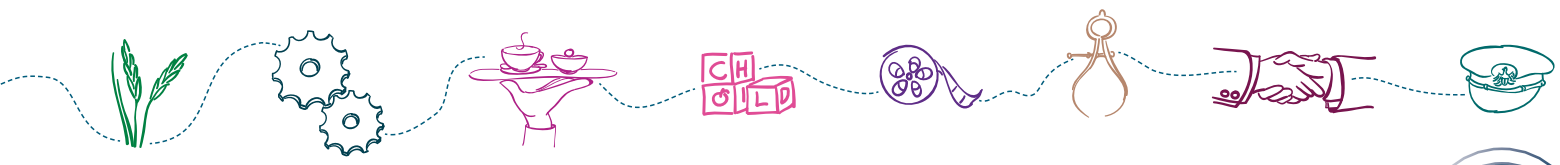

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