



OREGON
DEPARTMENT OF
EDUCATION



HEALTH SCIENCES

Statewide Program of Study Framework: Health Sciences Career Cluster

Knowledge and Skill Statements/Performance Indicators

Employability



Career Cluster



Focus Areas

Biotechnology

Therapeutic &
Diagnostic Services

Health Informatics and
Support Services

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Overview

The Statewide Program of Study Framework for Health Sciences is designed to prepare students for entry-level employment in a range of careers across the industry and/or to pursue advanced postsecondary educational studies. The cluster encompasses five program areas from the pre-existing skill statements cluster that were incorporated into three focus areas: (1) Biotechnology, (2) Therapeutic & Diagnostic Services, and (3) Health Informatics & Support Services.

This document summarizes the technical skills that a student completing a career and technical education (CTE) Program of Study might be expected to know and be able to do. When reading the document, note that:

- **A Program of Study** spans secondary and postsecondary education, meaning that students are expected to master the identified skills during high school or at an affiliated community college. It is not expected that all skills will be taught at the high school level.
- **Knowledge and Skill Statements** (indicated in bold) summarize the types of skills to be taught in a specific focus area. Educators are expected to address these skill statements as part of their CTE Program of Study.
- **Suggested Performance Indicators** illustrate tasks that students might perform to demonstrate their understanding of each skill statement. They are offered as examples and are not required to be taught.

Faculty in Oregon high schools and community colleges offering related industry training were asked to rate the relative importance of each skill and indicator for high school graduates entering a community college after having completed a CTE Program of Study offered at the secondary level. These ratings included:

- **Critically important.** This skill would be expected of students continuing their studies at a community college offering related programming or entering the workforce after having completed a CTE Program of Study at the high school level.
- **Somewhat important.** This skill would be useful but not necessary for students continuing their studies at a community college offering related programming or entering the workforce after having completed a CTE Program of Study at the high school level.
- **Not important.** This skill would not be expected of students continuing their studies at a community college offering related programming or entering the workforce after having completed a CTE Program of Study at the high school level (i.e., it will be taught in college or on the job).

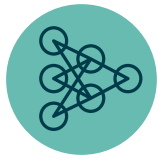
How to Use This Document

Educators offering a CTE Program of Study in the Health Sciences Career Cluster should review the Knowledge and Skill Statements and Suggested Performance Indicators in this document. Three types of skills and indicators are provided:



Employability Knowledge and Skills – *Applicable to all Career Clusters*

All learners are expected to master these basic skills to function in the workplace. These cross-cutting abilities, found in all jobs in all industries, encompass a broad range of communication, critical thinking, interpersonal, and organizational skills imperative for career success.



Career Cluster-Level Knowledge and Skills – *Applicable to all careers in the Health Sciences Cluster*

All health sciences workers are expected to have a broad understanding of the field. These cross-cutting skills prepare workers to succeed in a range of jobs in the cluster. High school students mastering these skills are prepared to enter college or the workforce with an understanding of their career options and training needs.



Focus Area-level Knowledge and Skills – *Applicable to a specific career*

Field-specific knowledge that an entering college student or entry-level worker would be expected to possess. High school students mastering these skills are prepared to enroll in college to pursue advanced training or enter employment prepared to succeed. Postsecondary graduates would be prepared to enter employment with a credential, certificate, or degree.

These skills have been classified based on the level of knowledge required for their mastery:¹

- **Foundational Skills** describe technical skills that all high school students completing a Program of Study would be expected to master. Ideally, these skills would be taught within a high school CTE Program of Study (or in collaboration with a postsecondary partner if it is not feasible within high school).

¹ Survey respondents did not rate any skills as being sufficiently advanced to be taught primarily at the postsecondary level. Accordingly, skills have been classified into the two categories foundational and intermediate, which differs from classifications used in other learning areas.

■ **Intermediate Skills** describe more technically advanced skills that high school instructors are encouraged to teach in a CTE Program of Study, though some might be taught at a partnering community college due to equipment or time constraints.

Each Knowledge and Skill Statement includes a list of Suggested Performance Indicators that illustrate how students might demonstrate their understanding or abilities relating to each statement. These indicators are offered as an optional, industry-suggested, community college faculty-vetted way to demonstrate the Knowledge and Skill Statements. They are not required.

Educators may choose to select from these indicators and/or design other means for students to show skill mastery in their CTE Program of Study. It is anticipated that secondary and postsecondary educators will collaborate in selecting the number, type, and technical specificity of Suggested Performance Indicators, as well as the educational level at which they will be taught.

For more detailed information, see the Health Sciences Resource Guide on the Oregon Department of Education website.

Health Sciences Career Cluster

Knowledge and Skill Statements

Employability Knowledge and Skills

These Knowledge and Skill statements apply to all Career Clusters in Oregon.

Code number	Knowledge and Skill Statement
E-01	Adhere to workplace practices
E-02	Exhibit personal responsibility and accountability
E-03	Practice cultural competence
E-04	Demonstrate teamwork and conflict resolution
E-05	Communicate clearly and effectively
E-06	Employ critical thinking to solve problems
E-07	Demonstrate creativity and innovative thinking
E-08	Demonstrate fluency in workplace technologies
E-09	Plan, organize, and manage work
E-10	Make informed career decisions

Career Cluster-Level Knowledge and Skills

These Knowledge and Skill statements apply to all Health Sciences Programs of Study in Oregon.

Code number	Knowledge and Skill Statement
CC-HS01	Explain the history, trends, and career pathways within the healthcare system
CC-HS02	Identify and explain key components of the healthcare delivery system
CC-HS03	Evaluate the roles and responsibilities of individual members of the healthcare team and explain their role in promoting the delivery of quality healthcare
CC-HS04	Describe common health industry technologies and tools and how to use them securely and effectively
CC-HS05	Analyze the legal responsibilities, limitations, and implications of actions within the healthcare workplace
CC-HS06	Analyze the established practices, procedures, and standards associated with the healthcare workforce
CC-HS07	Understand and maintain patient rights, including confidentiality
CC-HS08	Describe ethics as they apply to healthcare delivery

Code number	Knowledge and Skill Statement
CC-HS09	Identify existing and potential safety hazards to patients, co-workers, self, and environment within the healthcare setting
CC-HS10	Use appropriate techniques for ensuring patient safety when positioning, transferring, and transporting patients
CC-HS11	Demonstrate personal safety practices
CC-HS12	Promote health and wellness
CC-HS13	Accurately use health sector terminology and protocols for communicating effectively
CC-HS14	Use knowledge of human anatomy and physiology in a healthcare role
CC-HS15	Use knowledge of diseases and disorders in a healthcare role
CC-HS16	Understand factors that define cultural differences between and among different ethnic, racial, and cultural groups and special populations

Focus Area Level Knowledge and Skills

These are updated Knowledge and Skill Statements for the three Focus Area Programs of Study in the Health Sciences Career Cluster.

BIOTECHNOLOGY

Code number	Knowledge and Skill Statement
FA-BIOT01	Summarize the goals of biotechnology research and development within legal and ethical protocols
FA-BIOT02	Apply mathematical concepts to the field of biotechnology
FA-BIOT03	Use statistical data when conducting biotechnology research and development
FA-BIOT04	Apply genetic principles to biotechnology
FA-BIOT05	Use standard operating procedure (SOP) when performing systematic and methodical application of general and organic chemistry principles
FA-BIOT06	Apply principles of biochemistry to biotechnology
FA-BIOT07	Recognize basic concepts in cell biology and become familiar with the laboratory tools used for their analysis
FA-BIOT08	Understand the fundamental principles of molecular cell biology
FA-BIOT09	Describe the morphology and process of reproduction of microorganisms important in clinical disease and biotechnology applications
FA-BIOT10	Identify techniques, trends, and current areas of research in biotechnology

Code number	Knowledge and Skill Statement
FA-BIOT11	Demonstrate the principles of solution preparation, sterile techniques, contamination control, and measurement and calibration of instruments used in biotechnology research
FA-BIOT12	Understand the biotechnology product development processes and regulations that affect those processes
FA-BIOT13	Understand the ethical, moral, legal, and cultural issues related to the use of biotechnology research and product development

THERAPEUTIC & DIAGNOSTIC SERVICES

Code number	Knowledge and Skill Statement
FA-TD01	Recognize the integrated systems approach to healthcare delivery services
FA-TD02	Recognize and practice components of an intake assessment relevant to patient care
FA-TD03	Assess the state of the patient and document using accurate medical terminology
FA-TD04	Use effective oral and written communication techniques when responding to patient questions and concerns
FA-TD05	Understand that treatment/care plans must adhere to facility protocols, regulatory guidelines, and scope of practice
FA-TD06	Evaluate patient needs, strengths, and problems to determine if treatment/care goals are being met
FA-TD07	Use effective oral communication when communicating diagnostic information with departments and professionals
FA-TD08	Use effective written communication techniques when communicating patient health condition information with departments and professionals
FA-TD09	Understand the purpose of common diagnostic procedures
FA-T10	Explain behavioral health assessments and treatments

HEALTH INFORMATICS AND SUPPORT SERVICES

Code number	Knowledge and Skill Statement
FA-HISS01	Understand healthcare systems as the organization of people, institutions, funding, and resources
FA-HISS02	Understand how to use health information effectively
FA-HISS03	Use an electronic healthcare patient information system to optimize the acquisition, storage, retrieval, and use of information
FA-HISS04	Document, communicate, and maintain health information within legal and regulatory guidelines

Code number	Knowledge and Skill Statement
FA-HISS05	Communicate health information accurately and within legal and regulatory guidelines, upholding the strictest standards of confidentiality
FA-HISS06	Understand how to abstract and code information from medical records and documents using industry standard methods of classification
FA-HISS07	Demonstrate various decontamination techniques and procedures
FA-HISS08	Employ best safety practices for handling hazardous materials and managing waste
FA-HISS09	Employ best safety practices for handling and storing a variety of materials common to the health services environment
FA-HISS10	Utilize financial information and data to make appropriate decisions regarding purchase and maintenance of equipment and materials
FA-HISS11	Apply principles and organizational protocols when acquiring and distributing equipment and materials

Employability Knowledge and Skill Statements with Suggested Performance Indicators

● **Foundational** - Basic skills that **should be taught** within high school or, if not feasible, at a partnering college

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational
E-01 <i>Adhere to workplace practices</i>	<ul style="list-style-type: none"> A. Explain and follow workplace standards, rules, and regulations B. Show up on time and prepared to work C. Demonstrate the ability to take direction, be proactive, and work independently 	●
E-02 <i>Exhibit personal responsibility and accountability</i>	<ul style="list-style-type: none"> A. Apply professional and ethical standards of the industry to personal conduct B. Maintain integrity and promote personal and professional integrity in co-workers C. Take responsibility and carry out work assignments 	●
E-03 <i>Practice cultural competence</i>	<ul style="list-style-type: none"> A. Demonstrate awareness of issues related to diversity, equity, and inclusion B. Work effectively with colleagues of differing abilities, cultures, and backgrounds C. Describe issues relating to workplace harassment D. Model behaviors that are respectful and sensitive of others 	●
E-04 <i>Demonstrate teamwork and conflict resolution</i>	<ul style="list-style-type: none"> A. Demonstrate the ability to collaborate and contribute to the work of a diverse team B. Explain when it is appropriate to lead and when to follow another's lead C. Demonstrate strategies for resolving issues with coworkers 	●
E-05 <i>Communicate clearly and effectively</i>	<ul style="list-style-type: none"> A. Listen attentively, and speak and write clearly to convey information correctly B. Interpret information and instructions presented in verbal and written form C. Demonstrate effective communication with colleagues, supervisors, customers, and suppliers D. Demonstrate the ability to communicate verbally, in writing, and using electronic communication tools 	●

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational
E-06 <i>Employ critical thinking to solve problems</i>	A. Recognize problems in the workplace and diagnose their root causes B. Develop well-reasoned plans to solve identified challenges C. Apply and follow through on plans to ensure that problems are resolved	●
E-07 <i>Demonstrate creativity and innovative thinking</i>	A. Develop ideas to solve problems in new and different ways B. Investigate one's own and others' ideas to find those with greatest applicability C. Develop and deploy plans to implement new ideas in the workplace	●
E-08 <i>Demonstrate fluency in workplace technologies</i>	A. Demonstrate knowledge and application of general technology skills, including hardware and software commonly used in the industry B. Use online communication, networking tools and social networks to access, manage, evaluate, and create information to successfully function in a knowledge economy C. Describe and demonstrate a fundamental understanding of the ethical, legal, and security issues surrounding access to and use of information technologies	●
E-09 <i>Plan, organize, and manage work</i>	A. Identify an intended project outcome including available inputs, materials, labor, timeline for producing work, and job-site obligations B. Effectively plan, monitor, and complete projects on time and within budget using available resources and materials C. Demonstrate ability to write coherent reports and project summaries to communicate the progress of project work and its adherence to schedule	●
E-10 <i>Make informed career decisions</i>	A. Identify job and entrepreneurial opportunities in the industry and the required education and credentials to obtain employment B. Set short- and long-term career goals based on personal interests and aptitudes C. Maintain a project portfolio D. Develop a professional resume E. Explain and demonstrate how to cultivate and maintain a professional presence in an online environment, including the appropriate use of social media and networking platforms	●

Health Sciences Knowledge and Skill Statements with Suggested Performance Indicators

- **Foundational** - Basic skills that **should be taught** within high school or, if not feasible, at a partnering college
- **Intermediate** - Advanced skills **encouraged to be taught** within high school, with some offered at a partnering college

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
CC-HS01 <i>Explain the history, trends, and career pathways within the healthcare system</i>	A. Identify historical and current trends in healthcare and how they impact the system and society B. Explain current and potential uses of biotechnology within healthcare (e.g., vaccine development, genetically tailored health care) C. Compare and contrast various healthcare career pathways D. Describe different types of healthcare careers E. Identify the certification, licensing, and regulatory requirements associated with different healthcare pathways F. Describe the importance of major healthcare contributors and developments, linking them with modern innovations and practices	A. ● B. ● C. ● D. ● E. ●	F. ■
CC-HS02 <i>Identify and explain key components of the healthcare delivery system</i>	A. Describe the organizations that constitute healthcare delivery systems (e.g., insurance, individual providers, hospitals, rehabilitation centers) B. Predict where and how factors such as cost, managed care, technology, socioeconomics, an aging population, access to care, alternative therapies, and lifestyle/behavior changes may affect various healthcare delivery system models C. Describe different types of healthcare plans and the tradeoffs associated with each D. Differentiate among the methods of payment for healthcare in the United States including private and state or federal insurance E. Identify the different types of facilities and options for healthcare delivery in the United States healthcare delivery system F. Construct a general systems model using inputs, throughputs, and a feedback loop	A. ●	B. ■ C. ■ D. ■ E. ■ F. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
CC-HS03 <i>Evaluate the roles and responsibilities of individual members of the healthcare team and explain their role in promoting the delivery of quality healthcare</i>	A. Describe the roles and responsibilities of individuals in different roles and in different parts of the healthcare industry and how they work together to address patient needs B. Collaborate effectively with individuals of diverse backgrounds C. Explain the types of expertise held by team members D. Recognize the importance of working collaboratively with persons from diverse backgrounds to accomplish a common goal E. Identify characteristics of effective teams	A. ● B. ● C. ● D. ● E. ●	
CC-HS04 <i>Describe common health industry technologies and tools and how to use them securely and effectively</i>	A. Evaluate the current and potential uses and risks of artificial intelligence within healthcare B. Understand security and confidentiality requirements for storage and transmission of electronic health records C. Understand common healthcare technologies, written communications, and security measures for documentation, retrieval, storage, and communication of health records D. Demonstrate how to use electronic charting, scheduling, and billing systems E. Identify social media technologies, apps, electronic conferencing, webpages, and email systems used to communicate information to team members and colleagues F. Describe how healthcare interoperability standards guide the exchange of health information between different systems, applications, and relevant parties	A. ● B. ● C. ● D. ●	E. ■ F. ■
CC-HS05 <i>Analyze the legal responsibilities, limitations, and implications of actions within the healthcare workplace</i>	A. Adhere to copyright and intellectual property laws and regulations, and appropriately cite proprietary information B. Identify policies and requirements for documentation and record keeping C. Compare and contrast behaviors and practices that could result in malpractice, liability, or negligence D. Evaluate what types of incidents need to be reported E. Identify relevant non-discrimination laws	A. ● B. ● C. ● D. ● E. ●	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
CC-HS06 <i>Analyze the established practices, procedures, and standards associated with the healthcare workforce</i>	<ul style="list-style-type: none"> A. Summarize the Health Insurance Portability and Accountability Act (HIPAA), particularly those aspects related to patient rights, patient safety, and other ethical/legal directives governing medical treatment B. Access and analyze quality assurance standards of practice C. Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations D. Employ practices that adhere to licensure, certification, registration, and legislated scope of practice E. Identify mandated standards for workplace safety, such as by the Occupational Safety and Health Administration (OSHA), the Centers for Disease Control and Prevention (CDC), and the Clinical Laboratory Improvement Amendments (CLIA) F. Summarize mandatory standards for harassment, labor, and employment laws 	<ul style="list-style-type: none"> A. ● B. ● C. ● D. ● E. ● F. ● 	
CC-HS07 <i>Understand and maintain patient rights, including confidentiality</i>	<ul style="list-style-type: none"> A. Describe confidentiality according to the Health Insurance Portability and Accountability Act (HIPAA) B. Apply the doctrine of informed consent C. Evaluate technological threats to confidentiality D. Understand the potential business and personal impacts of not upholding patient rights 	<ul style="list-style-type: none"> A. ● B. ● C. ● D. ● 	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
<p>CC-HS08 <i>Describe ethics as they apply to healthcare delivery</i></p>	<ul style="list-style-type: none"> A. Differentiate between morality and ethics and the relationship of each to healthcare outcomes B. Differentiate between ethical and legal issues impacting healthcare C. Analyze legal and ethical aspects of confidentiality D. Analyze and evaluate the implications of medical ethics E. Describe when to report activities and behaviors by oneself and others that adversely affect the health, safety, or welfare of patients or co-workers F. Demonstrate empathy and fair treatment of all persons G. Respect patients' autonomy in making decisions about their own healthcare H. Discuss the impact of religions and cultures on those giving and receiving healthcare with an understanding of past and present events I. Understand how the healthcare system does not always uphold ethics for individuals in marginalized communities and the impacts this has on health outcomes J. Demonstrate respect of individual cultural, social, and ethnic diversity within the healthcare environment 	<ul style="list-style-type: none"> A. ● B. ● C. ● D. ● E. ● F. ● G. ● H. ● I. ● J. ● 	
<p>CC-HS09 <i>Identify existing and potential safety hazards to patients, co-workers, self, and environment within the healthcare setting</i></p>	<ul style="list-style-type: none"> A. Understand the fundamentals of standard and transmission-based precautions B. Use safe work practices and follow health and safety policies and procedures C. Practice appropriate cleaning, disinfecting, and sterilizing processes D. Use health and safety practices for storing and maintaining tools, equipment, and supplies E. Use safety data sheets (SDS) F. Understand the manufacturers' instructions for use (IFUs) of common medical instruments G. Contrast medical and surgical asepsis H. Demonstrate how to prevent and respond to work-related accidents or injuries I. Recognize hazardous chemicals commonly used in the healthcare environment and how to use them in an appropriate manner J. Utilize emergency procedures and protocols 	<ul style="list-style-type: none"> A. ● B. ● C. ● D. ● E. ● F. ● G. ● H. ● I. ● J. ● 	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
CC-HS10 <i>Use appropriate techniques for ensuring safety when positioning, transferring, and transporting patients</i>	A. Determine appropriate equipment for transportation and transfer B. Assess and adjust equipment and modify techniques to accommodate patient status C. Demonstrate appropriate transport and transfer methods to accommodate the health status of the patient D. Evaluate potential hazards to patient, oneself, and co-workers E. Integrate proper body mechanics, ergonomics, safety equipment, and techniques to prevent personal injury to patients, oneself, and other co-workers	A. ● B. ● C. ● D. ● E. ●	
CC-HS11 <i>Demonstrate personal safety practices</i>	A. Manage a personal exposure incident in compliance with Occupational Safety and Health Administration (OSHA) regulations B. Apply principles of body mechanics and ergonomics to protect oneself and others C. Use personal protective equipment (PPE) as appropriate to the environment D. Use techniques to ensure environmental safety and safe working conditions E. Demonstrate methods of fire prevention in the healthcare setting F. Prevent accidents by using proper safety techniques	A. ● B. ● C. ● D. ● E. ● F. ●	
CC-HS12 <i>Promote health and wellness</i>	A. Advocate for available preventive health screenings and examinations B. Use practices that promote the prevention of disease and injury C. Communicate to patients about high-risk behaviors D. Demonstrate personal health and wellness practices E. Evaluate complementary and alternative medicine approaches for optimizing health outcomes	A. ● B. ● C. ● D. ● E. ●	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
CC-HS13 <i>Accurately use health sector terminology and protocols for communicating effectively</i>	A. Communicate information and ideas effectively to multiple audiences using a variety of media and formats B. Demonstrate professional oral and written communication C. Evaluate how different cultures and generations attach different meanings to various gestures, intonations, and other communication techniques D. Identify barriers to accurate and appropriate communication E. Understand common de-escalation strategies F. Understand how to apply a trauma-informed approach to interactions with others G. Advocate and practice safe, legal, and responsible use of digital media information and communications technologies H. Recognize major word parts of medical terminology including roots, prefixes, and suffixes I. Understand how common terminology may differ for specific professions within healthcare	A. ● B. ● C. ● D. ● E. ● F. ● G. ● H. ● I. ●	
CC-HS14 <i>Use knowledge of human anatomy and physiology in a healthcare role</i>	A. Describe the organization of the human body B. Identify basic structures and describe functions of human body systems C. Describe the basic structures and functions of cells, tissues, organs, and systems as they relate to homeostasis D. Compare relationships among cells, tissues, organs, and systems E. Explain body planes, directional terms, quadrants, and cavities F. Analyze the interdependence of the body systems as they relate to wellness, disease, disorders, therapies, and care/rehabilitation	A. ● B. ● C. ● D. ● E. ● F. ●	
CC-HS15 <i>Use knowledge of diseases and disorders in a healthcare role</i>	A. Compare selected diseases/disorders including respective classification(s), causes, diagnoses, therapies, and care/rehabilitation B. Analyze methods to control the spread of pathogenic microorganisms C. Explain the difference between situational and clinical behavioral disorders D. Contrast various types of immunities E. Analyze body system changes in light of diseases, disorders, and wellness F. Compare the aging process among the body systems	A. ● B. ● C. ● D. ● E. ● F. ●	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
<p>CC-HS16 <i>Understand factors that define cultural differences between and among different ethnic, racial, and cultural groups and special populations</i></p>	<p>A. Understand the importance of culturally- and linguistically appropriate care and communication</p> <p>B. Utilize culturally appropriate community resources</p> <p>C. Examine the scientific basis for several complementary and alternative medicine approaches as practiced within various cultures</p> <p>D. Engage in self-reflection around one’s own internal biases</p> <p>E. Ask questions and explore aspects of global significance</p> <p>F. Know when and how to incorporate trained interpreters to facilitate communication and improve patient outcomes</p>	<p>A. ●</p> <p>B. ●</p> <p>C. ●</p> <p>D. ●</p> <p>E. ●</p> <p>F. ●</p>	

Biotechnology Knowledge and Skill Statements with Suggested Performance Indicators

Health sciences is a broad field with many entry points and career pathways. These knowledge and skill statements and suggested performance indicators may have different applications by industry sector.

- **Foundational** - Basic skills that **should be taught** within high school or, if not feasible, at a partnering college
- **Intermediate** - Advanced skills **encouraged to be taught** within high school, with some offered at a partnering college

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-BIOT01 <i>Summarize the goals of biotechnology research and development within legal and ethical protocols</i>	A. Use data to explain biotechnology's contributions to quality of life B. Describe the use of model organisms in biotechnology research and manufacturing C. Recognize the role of innovation in the creation of emerging biotechnology careers D. Assess legal and ethical considerations associated with using biotechnology E. Propose a biological or industrial enzyme that could be used for treating disease and contribute to the quality of life F. Develop a list of environmental diseases or chronic conditions that have been or could be treated with biotechnology products	A. ● B. ● C. ● D. ●	E. ■ F. ■
FA-BIOT02 <i>Apply mathematical concepts to the field of biotechnology</i>	A. Prepare solutions based on both percent and weight composition to demonstrate proficiency in use of mechanical and digital microbalances B. Calculate and prepare solutions of various molarity, calculate and prepare buffers of various pH, and prepare serial dilutions C. Explain scientific notation		A. ■ B. ■ C. ■
FA-BIOT03 <i>Use statistical data when conducting biotechnology research and development</i>	A. Compare the standard deviation and the mean of data results from testing effectiveness of two biotechnology products B. Graphically illustrate a set of biotechnology data so that a layperson would understand it		A. ■ B. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-BIOT04 <i>Apply genetic principles to biotechnology</i>	A. Describe the basic structure of a chromosome B. Construct a karyotype with human chromosomes C. Differentiate the genetic inheritance of a dominant homozygous trait (e.g., dwarfism) from a heterozygous disease (e.g., sickle cell anemia) D. Examine genetic factors beyond chromosomal arrangement, such as genomic data	A. ● B. ● C. ● D. ●	
FA-BIOT05 <i>Use standard operating procedure (SOP) when performing systematic and methodical application of general and organic chemistry principles</i>	A. Contrast covalent, ionic, and hydrogen bonding B. Use the periodic table to describe atomic structure and to characterize elements based on the functional group C. Construct a molecule of a compound with three or more carbon atoms D. Create an equation of two organic substrates leading to a product E. Describe atomic number, atomic mass, and orbitals F. Predict endothermic and exothermic characteristics of a chemical reaction	A. ●	B. ■ C. ■ D. ■ E. ■ F. ■
FA-BIOT06 <i>Apply principles of biochemistry to biotechnology</i>	A. Describe the relationship between biochemistry and biotechnology product development B. Compare the underlying reasons why some molecules are hydrophilic, and some are hydrophobic C. Diagram six chemical side groups that could be in a biotechnology product D. Categorize all amino acids into essential and non-essential	A. ● B. ●	C. ■ D. ■
FA-BIOT07 <i>Recognize basic concepts in cell biology and become familiar with the laboratory tools used for their analysis</i>	A. Describe the basic structures and functions of cells and how this knowledge is used in biotechnology B. Describe conditions that promote cell growth under aseptic conditions in the laboratory and workplace C. Use various methods to monitor the growth of cell cultures D. Explain the basic concepts of cell growth and reproduction, DNA replication, mitosis, meiosis, and protein synthesis E. Discuss the structure and function of the macromolecule	A. ● B. ● C. ● D. ● E. ●	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-BIOT08 <i>Understand the fundamental principles of molecular cell biology</i>	A. Describe the central dogma of molecular biology and how understanding this process impacts biotechnology research and development B. Define and describe the structure and function of DNA ribonucleic acid (RNA) and proteins, and explain the consequences of DNA mutations on proteins C. Use standard techniques of DNA extraction, purification, restriction digests, bacterial cell culture, and agarose gel electrophoresis and document and evaluate results D. Demonstrate and document and evaluate results of standard protein techniques, including antibody production, enzyme assays, spectrophotometry, gel electrophoresis, and chromatography E. Demonstrate DNA replication graphically and its importance to biotechnology product development	A. ● B. ● C. ● D. ● E. ●	
FA-BIOT09 <i>Describe the morphology and process of reproduction of microorganisms important in clinical disease and biotechnology applications</i>	A. Explain microbial taxonomy and classification systems and use them to identify microbial organisms B. Analyze how microorganisms are used in mass producing recombinant proteins C. Compare and contrast the use of plasmids in bacterial transformation and the process of plasmid DNA isolation and production decisions D. Compare and contrast bacterial, fungal, and animal cells and how these similarities and differences affect biotechnology product development E. Describe the structure of viruses and differentiate between types F. Explain how chemical energy operates major cell processes (e.g., biosynthesis, movement, transport, growth)	A. ● B. ● C. ●	D. ■ E. ■ F. ■
FA-BIOT10 <i>Identify techniques, trends, and current areas of research in biotechnology</i>	A. Describe and identify uses of the following techniques: recombinant DNA, genetic engineering, monoclonal antibody production, separation, and purification of biotechnology products and bioprocessing B. Predict how artificial intelligence, nanotechnology, bioinformatics, proteomics, genomics, and transcriptomics will create new career opportunities and impact healthcare environments		A. ■ B. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-BIOT11 <i>Demonstrate the principles of solution preparation, sterile techniques, contamination control, and measurement and calibration of instruments used in biotechnology research</i>	A. Describe how molarity relates to solution preparation B. Calculate the molarity of a given solution and measure the pH of this solution C. Apply biosafety protocols in the laboratory environment D. Describe the criticality of the requirements of sterile techniques	A. ● B. ● C. ● D. ●	
FA-BIOT12 <i>Understand the biotechnology product development processes and regulations that affect those processes</i>	A. Analyze the role of pre-clinical and clinical trials in biotechnology product development B. Examine the role of a quality assurance person in this process C. Describe the role of agencies in promoting patient safety, quality control, and entrepreneurship D. Define current good manufacturing practices (CGMP) and why they are important in biotechnology production E. Diagram the process involved in making one biotechnology product in an industrial setting	A. ● B. ● C. ● D. ●	E. ■
FA-BIOT13 <i>Understand the ethical, moral, legal, and cultural issues related to the use of biotechnology research and product development</i>	A. Differentiate between morality and ethics and the relationship of each to biotechnology healthcare product development B. 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 C. Understand the critical need for ethical policies and procedures for institutions engaged in biotechnology research and product development D. Describe the dilemma of healthcare costs related to advancements in biotechnology and public access to treatments	A. ● B. ● C. ●	D. ■

Therapeutic & Diagnostic Services Knowledge and Skill Statements with Suggested Performance Indicators

Health sciences is a broad field with many entry points and career pathways. These knowledge and skill statements and suggested performance indicators may have different applications by industry sector.

- **Foundational** - Basic skills that **should be taught** within high school or, if not feasible, at a partnering college
- **Intermediate** - Advanced skills **encouraged to be taught** within high school, with some offered at a partnering college

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-TD01 <i>Recognize the integrated systems approach to healthcare delivery services</i>	A. Understand the relationships between prevention, diagnosis, health condition, prognosis, and treatment procedures B. Describe the relationship and use of an integrated healthcare delivery system C. Illustrate the value of preventive and early intervention in relationship to healthcare practices D. Understand the significance of alternative approaches to healthcare in relationship to delivery systems E. Describe the importance of reimbursement systems in relationship to the delivery of patient care	A. ●	B. ■ C. ■ D. ■ E. ■
FA-TD02 <i>Recognize and practice components of an intake assessment relevant to patient care</i>	A. Identify and summarize major life events as they impact healthcare practices and patient outcomes B. Assess patient quality of life related to health condition(s) using standardized patient reported outcomes C. Identify patient healthcare needs, strengths, and problems D. Maintain patient confidentiality E. Conduct basic interview to acquire new knowledge (e.g., medical and family histories) F. Evaluate information gathered and connect patient data to appropriate system of care	A. ● B. ● C. ● D. ●	E. ■ F. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-TD03 <i>Assess the state of the patient and document using accurate medical terminology</i>	A. Identify factors affecting degree and quality of pain B. Use trauma-informed and cultural humility approaches to screen for mental-health and substance use disorders C. Keep written records as appropriate within facility policies and protocols D. Obtain and document vital signs E. Identify site, onset, type, quality, and degree of pain F. Determine when it may be necessary to refer patient to another healthcare provider	A. ● B. ● C. ●	D. ■ E. ■ F. ■
FA-TD04 <i>Use effective oral and written communication techniques when responding to patient questions and concerns</i>	A. Use sensitivity and withhold bias when communicating with patients B. Use active listening skills (e.g., reflection, restatement, and clarification) and communication techniques to gather information from the patient C. Observe and document the ability of patients to comprehend and understand information and determine how to adjust communication techniques D. Use appropriate strategies for interacting with and responding to patient questions and concerns E. Develop clearly written patient information and instructions F. Maintain written guidelines of the Health Insurance Portability and Accountability Act (HIPAA) in all communications	A. ● B. ● C. ● D. ● E. ● F. ●	
FA-TD05 <i>Understand that treatment/care plans must adhere to facility protocols, regulatory guidelines, and scope of practice</i>	A. Describe how a treatment/care plan might use a problem-solving model and incorporates patient input B. Identify the appropriate resources for implementing a treatment/care plan C. Evaluate priorities for treatment and/or referrals D. Understand basic care procedures within the scope of practice to assist with patient comfort	A. ● B. ●	C. ■ D. ■
FA-TD06 <i>Evaluate patient needs, strengths, and problems to determine if treatment/care goals are being met</i>	A. Consider patient goals and preferences during the development of a treatment/care plan B. Understand the need to assess follow-up and alternative options to a treatment/care plan C. Understand the need to revise or create modifications to treatment/care plan based on patient response to treatment D. Identify appropriate evaluation tools to assess patient response to treatment/care plan E. Describe how to document patient findings and report information appropriately	A. ● B. ● C. ●	D. ■ E. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-TD07 <i>Use effective oral communication when communicating diagnostic information with departments and professionals</i>	A. Assess the appropriate communication techniques based on the individual ability to understand B. Apply active listening skills using reflection, restatement, and clarification C. Demonstrate courtesy to others, including self-introduction D. Interpret verbal and nonverbal behaviors to augment communication within scope of practice	A. ● B. ● C. ● D. ●	
FA-TD08 <i>Use effective written communication techniques when communicating patient health condition information with departments and professionals</i>	A. Report relevant information in a timely manner B. Distinguish between subjective and objective information when reporting C. Identify correct syntax and grammar appropriate to patient D. Analyze communication for appropriate response and provide feedback E. Organize, write, and compile technical information and summaries F. Use medical terminology to interpret, transcribe, and communicate information, data, and observations	A. ● B. ●	C. ■ D. ■ E. ■ F. ■
FA-TD09 <i>Understand the purpose of common diagnostic procedures</i>	A. Describe how common diagnostic procedures may be adjusted to prioritize patient and personal safety B. Document diagnostic results C. Understand how to communicate diagnostic results to healthcare team	A. ● B. ●	C. ■
FA-TD10 <i>Explain behavioral health assessments and treatments</i>	A. Explain how the Diagnostic and Statistical Manual of Mental Disorders (DSM) handbook and the American Society of Addiction Medicine (ASAM) criteria for substance use disorders are used in diagnosis and treatment in behavioral health B. Compare behavioral health assessment and treatment plans (e.g., ADHD, depression, anxiety) C. Describe the range of services including group and individualized therapy D. Describe theories and interventions being used in mental and social health (cognitive behavioral therapy [CBT], dialectical behavior therapy [DBT], creative arts therapy [CAT], emotionally focused therapy [EFT], solution-focused brief therapy [SFBT], and family therapy) E. Describe informed consent and how it impacts behavioral health F. Describe an individual treatment plan and its use	A. ● B. ● C. ● D. ● E. ● F. ●	

Health Informatics and Support Services Knowledge and Skill Statements with Suggested Performance Indicators

Health sciences is a broad field with many entry points and career pathways. These knowledge and skill statements and suggested performance indicators may have different applications by industry sector.

- **Foundational** - Basic skills that *should be taught* within high school or, if not feasible, at a partnering college
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Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-HISS01 <i>Understand healthcare systems as the organization of people, institutions, funding, and resources</i>	<ul style="list-style-type: none"> A. Recognize the resources necessary for a health system (e.g., financial, health informatics, diagnostic equipment, pharmaceuticals, and other therapeutic resources) B. Recognize the different general methods of funding healthcare (e.g., out-of-pocket payments, health insurance, government funding, charities) C. Recognize major specific payment systems (e.g., Medicare, Medicaid, Workers' Compensation) D. Understand common U.S. models for structuring healthcare funding (e.g., Health Maintenance Organizations [HMOs], Preferred Provider Organization [PPOs], Managed Care Organization [MCOs], and Independent Physician Association [IPAs]) E. Understand the specific roles and responsibilities of healthcare workers, including the healthcare administrative role of leadership for individuals and the organization within a variety of healthcare delivery systems F. Understand the relationships between healthcare providers, payers, and auditing organizations 	<ul style="list-style-type: none"> A. ● B. ● C. ● D. ● 	<ul style="list-style-type: none"> E. ■ F. ■
FA-HISS02 <i>Understand how to use health information effectively</i>	<ul style="list-style-type: none"> A. Recognize the major uses of health information (e.g., patient care, billing, research) B. Determine which data components are necessary for the successful completion of tasks C. Formulate and report information clearly and concisely 	<ul style="list-style-type: none"> A. ● B. ● C. ● 	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-HISS03 <i>Use an electronic healthcare patient information system to optimize the acquisition, storage, retrieval, and use of information</i>	A. Understand how health information systems exchange data and stay updated B. Distinguish which type of documents must have hard copies retained, and which may be stored only in digital form C. Integrate information for timely, accurate dissemination	A. ● B. ● C. ●	
FA-HISS04 <i>Document, communicate, and maintain health information within legal and regulatory guidelines</i>	A. Select the systems and sources of information necessary for the successful completion of the task B. Assemble and accurately document required information C. Interpret health information that has been collected D. Differentiate the purposes and audiences for whom the information is collected E. Prepare and disseminate accurate documentation for various audiences within legal and regulatory requirements	A. ● B. ● C. ● D. ● E. ●	
FA-HISS05 <i>Communicate health information accurately and within legal and regulatory guidelines, upholding the strictest standards of confidentiality</i>	A. Evaluate how legal and regulatory requirements apply to the transfer of information B. Distinguish who in the organization needs information and when they need it C. Understand the laws and regulations regarding the transfer of information to a third party D. Determine which communication methods patients have approved and who they have approved to receive communications E. Manage recorded information and other documents in ways that ensure confidentiality and privacy F. Communicate information in a method that ensures confidentiality of content G. Communicate information on a need-to-know basis for optimum patient outcomes	A. ● B. ● C. ● D. ● E. ● F. ● G. ●	

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-HISS06 <i>Understand how to abstract and code information from medical records and documents using industry-standard methods of classification</i>	A. Understand medical record documentation (e.g., chart notes, injections, medications, lab reports) B. Interpret and extract information from medical records and documents C. Input and use health information applying management principles to ensure quality, compliance, and integrity D. Identify and apply accurate medical terminology E. Analyze and determine the need for requesting further clarification when transcribing/transferring information that may be unclear F. Assess and apply information for regulatory and legal purposes G. Assemble appropriate, accurate information including proper codes to record charges for reimbursement H. Complete common insurance claim forms ensuring federal, state, and third-party insurance reimbursements are included and complete payer compliance claim forms	A. ● B. ● C. ● D. ● E. ● F. ● G. ● H. ●	
FA-HISS07 <i>Demonstrate various decontamination techniques and procedures</i>	A. Demonstrate knowledge of standard precaution guidelines B. Select procedures and precautions to be followed when using chemicals C. Demonstrate techniques for mechanical and manual cleaning procedures D. Define chain of infection and provide strategies for how to break each part of the chain to prevent the spread of infection E. Evaluate potential causes and methods of transmitting infection F. Integrate infection control standards with relevant activities and procedures	A. ● B. ● C. ● D. ● E. ● F. ●	
FA-HISS08 <i>Employ best safety practices for handling hazardous materials and managing waste</i>	A. Develop a plan for monitoring hazardous waste disposal and recycling policies and procedures in accordance with regulatory requirements B. Assess the operations of a waste management program, including recycling and reduction of regulated medical, solid, hazardous chemical, and radioactive and biological waste materials C. Develop a plan to safely handle, package, store, and dispose of waste in accordance with federal, state, and local regulations D. Develop systems and procedures that minimize customer cost of ordering, storing, and using supplies, services, and equipment	A. ● B. ● C. ●	D. ■

Code and Knowledge and Skill Statement	Suggested Performance Indicators	Foundational	Intermediate
FA-HISS09 <i>Employ best safety practices for handling and storing a variety of materials common to the health services environment</i>	A. Demonstrate understanding of process and environmental requirements for proper handling and storage of sterile and non-sterile items B. Demonstrate appropriate inventory control and distribution systems C. Develop a plan to purchase materials, supplies, and capital equipment within allocated resources D. Recommend policies and procedures to monitor distribution, consumption, and pilferage of materials	A. ● B. ● C. ● D. ●	
FA-HISS10 <i>Utilize financial information and data to make appropriate decisions regarding purchase and maintenance of equipment and materials</i>	A. Explain competitive pricing, terms, and service levels B. Identify opportunities for reduction in resource consumption C. Evaluate purchasing processes and agreements D. Assess cost benefits that support best product recommendations	A. ● B. ●	C. ■ D. ■
FA-HISS11 <i>Apply principles and organizational protocols when acquiring and distributing equipment and materials</i>	A. Assess purchasing and procurement techniques to improve the overall supply chain B. Analyze timely order placement and supplier performance C. Assess a supplier's performance standards program D. Assess the integration of resource functions E. Evaluate distribution strategies and systems to ensure optimal materials flow F. Develop a plan to maintain adequate quantities of supplies, equipment, instruments, and medical devices	A. ● B. ● C. ● D. ● E. ● F. ●	