



OaklandWorks

A School-To-Career Partnership

Health and Bioscience
Career Cluster Standards

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WestEd

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Introduction to the Health and Biosciences Industries

Health care is one of the nation's faster growing industries, currently employing over 8 million workers in over 250 different health careers. By the year 2000, employment is expected to increase to over 11 million workers. Health care careers fall into four service areas: Therapeutic, Diagnostic, Information Services, and Environmental Services. Some health careers focus on direct patient care while others involve indirect patient care. Some of the recent advances in health research and application have been in the area of biotechnology. These include the use of cellular and molecular biology, such as DNA probes and monoclonal antibodies for improved diagnosis, treatment, and prevention of disease and disorders of the human body. Careers in biotechnology do not usually involve direct patient care.

Current trends and changes in health care include new scientific discoveries and knowledge, increased responsibility for entry-level workers, the need for excellence the "first time out" for cost containment, and the increased need for broad-based skills for workers. These skills include teamwork and client interaction skills, as well as many career-related skills, so workers are able to perform different job functions, as needed.

The OaklandWorks Industry/Education career cluster approach to standards is to identify broad career-technical, rather than job-specific skills, that are common to a group or cluster of similar occupations,

Career Pathways within the Industry/Education Partnership

The Health and Bioscience Career Cluster Standards are targeted to the following:

- Career academies in the Oakland Unified School District that focus on Health and Bioscience (Fremont, Oakland Tech, and Skyline)
- Community college programs including:
 - ❖ Merritt College - Radiologic Technology
 - ❖ College of Alameda - Dental Assisting
 - ❖ Vista College, Laney College - Biotechnology
 - ❖ Vista College, College of Alameda - Medical Clerical
 - ❖ Merritt College - Allied Health – ADN (Registered Nurse), Vocational Nurse, Nurses Aides, Emergency Medical Technician
 - ❖ Laney College - Health Profession and Occupations
- California State University, Hayward programs in the following areas:
 - ❖ Health Science,
 - ❖ Recreation
 - ❖ Communicative Sciences and Disorders
 - ❖ Nursing, option: Geriatric Nurse Practitioner
 - ❖ Kinesiology and Physical Education



highlighting the integration of academic and vocational content. This approach helps to provide students with a general understanding of “all aspects of an industry.”

The OaklandWorks Standards Format

These standards in this document identify the core knowledge and skills for the Health and Bioscience Career Cluster for the OaklandWorks Industry/Education School-to-Work Partnership. The standards specify in broad terms the knowledge and skills necessary for initial success in each program area (grades 13-14). They consist of content standards (specifying what a student should know and be able to do) and examples of performance indicators (products or actions and tasks that provide evidence of success).

The OaklandWorks standards format includes three different types/levels of standards. They include the following:

- *Employability Skills*—These skills and qualities are foundational to occupations in the cluster.
- *Career-Technical Standards*—These standards define general knowledge and skills—not job-specific skills—that are common across the multitude of occupations within the cluster.
- *Academic Standards*—The academic standards represent generic academic skills that support the career cluster. These standards have been synthesized from the district-adopted standards and highlight academic standards identified as important to this career cluster by the development teams. The performance indicators are examples of how the general academic skills can be contextualized by career-specific content.

The academic standards adopted by Oakland Unified School District in Language Arts, Mathematics, History/Social Science, and Science have been cross-referenced to related performance indicators to enhance their usability. For example, the sample performance indicator for Employability Skill Standard 4: Thinking and Problem Solving, “Applies inductive and deductive reasoning processes”, is cross-referenced to the district’s mathematics standard, Mathematics: Standard 5: Mathematical Reasoning (e.g., [Mathematics 5]). When more than one topic is identified for a standard an alphanumeric coding system is used (e.g., Language Arts Standard 1: Reading: Topic A: Reading Skills and Fluency is coded as Language Arts 1A). A complete list of the alphanumeric codes related to the district’s academic standards appears at the end of this document.

Employability Skill Standards for Health and Bioscience

Employability Skill Standards	Sample Performance Indicators
<p>Standard 1: Communication Students will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing to diverse audiences.</p>	<ul style="list-style-type: none"> • Conveys empathic, active listening during interactions with others [Language Arts 4C] • Demonstrates cultural awareness [Language Arts 2] • Works well with diverse populations • Accurately assesses others' ability to understand [Language Arts 4B-C] • Adapts communication to individual needs, including paraphrasing or translating [Language Arts 4C] • Demonstrates understanding of the impact of race, culture, and gender in delivery of services and applies sensitive intervention strategies [Language Arts 2A-B]
<p>Standard 2: Document Handling Skills Students will understand the facility protocol and guidelines for collecting data. They will participate in identifying client needs, strengths and problems, and in reporting results.</p>	<ul style="list-style-type: none"> • Complies with regulation and guidelines in completing forms • Demonstrates understanding of appropriate documentation and handling of information related to patient charts and databases • Observes client, instrumentation, and environment to monitor and track client status [Language Arts 1D] • Records and reports information (research protocols, lab reports, lab notebook) [Language Arts 3B2, 3B8] • Follows facility policies and procedures
<p>Standard 3: Research Skills Students will use a variety of resources to collect appropriate up-to-date information to support quality health care service delivery and excellence in bioscience product manufacturing and development.</p>	<ul style="list-style-type: none"> • Uses a variety of resources to gather information, such as the Internet [Language Arts 3B2] • Demonstrates knowledge and use of medical, scientific, and other resource materials [Language Arts 3B2] • Identifies human and community resources for clients' needs • Cites references for information and procedures appropriately [Language Arts 3B2]



Employability Skill Standards for Health and Bioscience

Employability Skill Standards	Sample Performance Indicators
<p>Standard 4: Thinking and Problem Solving Students will understand a variety of problem solving strategies and use this understanding for appropriate decision making.</p>	<ul style="list-style-type: none"> • Sets goals and develops plans to achieve the goals • Applies inductive and deductive reasoning processes [Mathematics 5] • Uses effective learning strategies and analytical skills to solve problems and make decisions [Mathematics 5] • Evaluates and analyzes results of observations, notes, and lab tests and determines appropriate actions and further needed information
<p>Standard 5: Understanding The Industry Students will understand how employability skills enhance their employment opportunities and job satisfaction. They will demonstrate key employability skills and will maintain and upgrade skills, as needed.</p>	<ul style="list-style-type: none"> • Exhibits personal skills, such as attendance, time management, and individual responsibility • Maintains professional conduct and appearance • Demonstrates understanding of various career options and the preparation required for them • Demonstrates understanding of certification; licensing; continuing education requirement

Employability Skill Standards for Health and Bioscience

Employability Skill Standards	Sample Performance Indicators
<p>Standard 6: Teamwork Students will understand the role and responsibilities of individual members of the work team. They will interact effectively and sensitively with all members of the work team.</p>	<ul style="list-style-type: none"> • Demonstrates awareness of own role as a professional within health care service provider or research and manufacturing team • Communicates client information within a team in a timely manner [Language Arts 4C] • Interacts with peers and professionals in a respectful and considerate manner [Language Arts 4C] • Understands how to deal with conflict through mediation and use of conflict negotiation strategies • Apprises other team members of problems when they occur • Takes initiative and leads, when appropriate

Health and Bioscience Technical Content Standards

Technical Content Standards	Sample Performance Indicators
<p>Standard 1: Integrated Biology Knowledge Base Students will understand the underlying processes of both microbiology and ecology, including human body systems. They will have knowledge of an integrated biology knowledge base.</p>	<ul style="list-style-type: none"> • Uses appropriate medical, dental, health, and bioscience terminology in scientific texts, reports, manuals and charts • Explains scientific principles underlying the functions and processes of various biological systems • Reports in writing on selected research topics related to normal and abnormal human growth and development [Language Arts 3B2]
<p>Standard 2: Preventive Care and Wellness Students will understand the fundamentals of wellness and the prevention of disease processes. They will encourage the practice of preventive health behaviors among their clients.</p>	<ul style="list-style-type: none"> • Performs appropriate and thorough patient assessments • Shows knowledge of available preventive health screenings and examinations • Explains preventive health practices, such as good nutrition and stress management • Encourages clients to manage and reduce health risk factors • Demonstrates understanding of the uses and limits of standard laboratory tests (e.g., urine, blood, pregnancy)

Health and Bioscience Technical Content Standards

Technical Content Standards	Sample Performance Indicators
<p>Standard 3: Social, Economic, Historical, and Cultural Context Students will understand the socio-economic context for health care systems and services and biotechnology products and manufacturing, particularly in the local area. Students will understand the role of the health and bioscience community in providing for and improving the quality of life.</p>	<ul style="list-style-type: none"> • Demonstrates understanding of the basic financial structure of health care industry (e.g., HMO, insurance, Social Security) [History/Social Science 3A, 3C] • Demonstrates understanding of the major causes of diseases (e.g., infectious, chronic) in their community • Knows how to access and assess basic health services available in the community • Demonstrates understanding of historical improvements in health and in health care made possible through public sanitation, aseptic technique, antibiotics, vaccines, and biotechnology [History/Social Science 1A, 1E] • Describes possible future improvements in health care including future applications of biotechnology
<p>Standard 4: Client Interaction Students will understand how to explain planned procedures and goals to clients. They will use various strategies to respond to clients' questions and concerns.</p>	<ul style="list-style-type: none"> • Asks appropriate questions to elicit pertinent information [Language Arts 4C] • Instructs clients/patients clearly [Language Arts 4A, 4C] • Determines clients' ability to understand [Language Arts 4C] • Respects clients' cultural differences • Responds to clients' feelings

Health and Bioscience Technical Content Standards

Technical Content Standards	Sample Performance Indicators
<p>Standard 5: Biotechnological Processes Students will understand microbiotechnology processes and systems. They will participate in simulation strategies and laboratory exercises for investigation of various biotechnology issues.</p>	<ul style="list-style-type: none"> • Applies aseptic techniques • Performs appropriate techniques for solution making [Science 1G-H, 3F] • Shows knowledge of colonization, identification, and maintenance techniques [Science 2A-C] • Understands bioinformatics, such as in-silico and in-vitro strategies • Uses biotechnology-based diagnostic tests
<p>Standard 6: Legal and Ethics Students will understand their legal and ethical responsibilities, limitations, and the implications of their actions within the health care delivery and bioscience workplace setting. They will perform their duties within established guidelines, regulations, policies, and laws.</p>	<ul style="list-style-type: none"> • Complies with applicable government regulations and good laboratory practices • Follows workplace and professional regulations • Demonstrates awareness of malpractice and liability issues [History/Social Science 2B, 2F] • Maintains client and product confidentiality • Operates within scope of practice in health care contexts • Stops procedure when feels uncomfortable • Describes examples of ethical and unethical uses of medical technology including biotechnology [History/Social Science 2F]

Health and Bioscience Technical Content Standards

Technical Content Standards	Sample Performance Indicators
<p>Standard 7: Safety Students will understand the existing and potential hazards to clients, coworkers, and self. They will prevent injury or illness through safe work practices and follow health and safety policies and procedures.</p>	<ul style="list-style-type: none"> • Uses laboratory instruments, equipment, and chemicals, as recommended [Science 1D-E, 1H, 3E-G, 4D-E] • Applies the principles of body mechanics for proper lifting and moving of clients, supplies, and equipment [Science 1A, 4A] • Uses appropriate aseptic techniques to control the spread of infection [Science 1F-G, 2A-C, 3A, 3K] • Follows emergency procedures and protocols • Follows lab procedures for prevention of fire and electrical hazards • Wears protective attire as appropriate (e.g., gowns, labcoats, safety glasses, gloves) • Follows rules in generating and handling hazardous wastes
<p>Standard 8: Computer Literacy Students will understand computer applications as they apply to present and future areas of health care service delivery and biotechnology manufacturing processes.</p>	<ul style="list-style-type: none"> • Accurately enters information in appropriate database fields • Effectively navigates complex databases to find specified information • Demonstrates understanding of the impact of technology on the workplace and service delivery • Ensures data security and confidentiality by controlling access and release of information • Verifies that system information is accurate and complete • Analyzes system functions to improve efficiency

Academic Standards for Health and Bioscience

Academic Standards	Sample Performance Indicators
<p>Standard 1: Language Arts Students will demonstrate reading, writing, speaking, and listening skills, and an appreciation for cultural diversity in literature and language.</p>	<ul style="list-style-type: none"> • Uses a wide range of strategies to read, comprehend, interpret, evaluate, and apply a variety of written materials (e.g., medical and technical manuals, diagrams, charts, narratives, physician’s and research orders, lab instructions, business, policy, and personnel documents) [Language Arts 1A-B, 1D] • Reads and comprehends a range and breadth of written material including public and functional documents [Language Arts 1A-B, 1D] • Expresses ideas and information in written form clearly and accurately and tailors to the intended purpose and audience (e.g., medical and technical reports and business documents) [Language Arts 3A-C] • Actively listens and communicates in a clear, courteous, and complete manner on personal and professional levels [Language Arts 4B-C] • Applies proper workplace and academic English language usage in professional communication situations (e.g., writing and speaking) [Language Arts 3C; 4C] • Interprets and evaluates visual representations and observational data [Language Arts 4B]

Academic Standards for Health and Bioscience

Academic Standards	Sample Performance Indicators
<p>Standard 2: Mathematics Students are able to reason, communicate, solve problems and develop understanding of numbers, measurement, geometry, functions, statistics and probability, logic, and algebra.</p>	<ul style="list-style-type: none"> • Performs basic computations without use of a calculator (e.g., add, subtract, multiply, and divide; converts fractions, decimals, percentages, and metric values) [Mathematics 1] • Analyzes and solves health and bioscience problems (e.g., medical and technical) by selecting and applying appropriate quantitative methods [Mathematics 1-2, 5] • Analyzes and interprets numeric information (e.g., technical charts and data) [Mathematics 1-6] • Applies mathematical equations and formulas in technical troubleshooting and patient care [Mathematics 2, 4, 5] • Applies mathematical concepts (e.g., numbers, geometry, statistics and probability) to solve health- and bioscience-related problems [Mathematics 1-8]

Academic Standards for Health and Bioscience

Academic Standards	Sample Performance Indicators
<p>Standard 3: History/Social Science Students will demonstrate historical thinking (e.g., chronological/spatial thinking, examining evidence, diversity/multiple perspectives, interpretation) and understanding of government and economics (e.g., fundamental economic concepts, macroeconomics, and international economic concepts) in health and bioscience.</p>	<ul style="list-style-type: none"> • Analyzes major economic trends (e.g., globalization, development of HMOs, rapid growth of technology) and how they impact health and bioscience [History/Social Science 1A, 1C-D, 3A, 3E] • Describes major health and bioscience principles as they relate to the role of government and policymaking [History/Social Science 2C, 2F] • Identifies how contemporary issues and fundamental economic concepts impact global health care and bioscience [History/Social Science 1A, 1C, 2F, 3A] • Demonstrates understanding of health and bioethics law concepts (e.g., government relations, laws, and policies) as they relate to the role of health and bioscience in the national and international marketplace [History/Social Science 1A, 3D-E] • Applies understanding of diversity of viewpoints and linguistic and cultural backgrounds in health care and biotechnology environments [History/Social Science 1C, 1E] • Recounts the historical development of health care as an industry and describes the rapid emergence of the field of bioscience [History/Social Science 1A]

Academic Standards for Health and Bioscience

Academic Standards	Sample Performance Indicators
<p>Standard 4: Science Students will demonstrate understanding of physics (e.g., motion and forces, waves, and electronic and magnetic phenomena), chemistry (e.g., atomic and molecular structure, chemical bonds, conservation of matter and stoichiometry, gases, acids and bases, solutions, and organic and biochemistry), biology/life sciences (e.g., cell biology, genetics, ecology, and structure and function in living systems), and earth sciences and the connections and applications of these concepts as they relate to health and bioscience.</p>	<ul style="list-style-type: none"> • Explains basic scientific concepts as they relate to health and safety in health care and biotechnology environments [Science 1A-J, 2A-G, 3A-K, 4A-E] • Demonstrates understanding of the impact of technology and science as they have contributed to the development and refinement of health care and biotechnology systems and processes [Science 1A-J, 2A-G, 3A-K, 4A-E] • Explains the impact of science (e.g., historical and contemporary contributions) and interactions between science and society in relation to health care and bioscience [Science 1A-J, 2A-G, 3A-K, 4A-E] • Explains the individual and social implications of epidemiology (e.g., in relation to disease processes, transport processes, immunology and biological specificity, homeostasis and negative feedback) [Science 1A-J, 2A-G, 3A-K, 4A-E]
<p>Other Skills for the Health and Bioscience Cluster: Anatomy Students will demonstrate understanding of the basic principles of human anatomy as related to health and bioscience.</p>	<ul style="list-style-type: none"> • Identifies the various human body systems and the organs associated with each system [Science 2F] • Identifies and locates all bones and muscles in the muscular and skeletal systems [Science 2F]
<p>Other Skills for the Health and Bioscience Cluster: Physiology Students will demonstrate understanding of the basic principles of physiology as related to health and bioscience.</p>	<ul style="list-style-type: none"> • Explains scientific principles underlying the functions and processes of various biological systems [Science 2F] • Describes the physiological changes that accompany various developmental stages of growth [Science 2F]



Academic Standards for Health and Bioscience

Academic Standards	Sample Performance Indicators
<p>Other Skills for the Health and Bioscience Cluster: Botany and Zoology Students will demonstrate understanding of the basic principles of botany and zoology as related to health and bioscience.</p>	<ul style="list-style-type: none">• Demonstrates understanding of plant and animal classification, anatomy, and physiology [Science 2B, 2E]• Describes factors which influence plant and animal growth, including genetics, nutrients, water, light, air, and microbial activity [Science 2A, 2E]

Resources

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